KuVS Newsletter

2020 - 08 Back to Contents

Contents

KuVS Newsletter

KuVS Newsletter

Editor Message

Dear KuVS members,

we welcome you to the 11th edition of the KuVS newsletter. Since the unforeseen COVID-19 pandemic increased the workload for many groups, e.g., due to quickly realizing online lectures, remote supervision, virtual conferences, etc., we decided to react to the new situation by also shifting the publication date of the newsletter. Thereby allowing more time for providing and completing input to this newsletter. As a result, we are proud to present a longer 11th edition of our KuVS newsletter. We would like to thank you all again for your contributions, especially as we know that the working load has increased due to online teaching and endless video conferences.

We are happy to present an edition that features reports, call for papers, and a high number of dissertations completed within the KuVS community. Moreover, the NetSys 2021 in Lübeck, our class reunion, is coming closer with paper deadlines in the middle of October and a lot of calls that we also feature in this newsletter. Given the current situation, the newsletter contains a special section covering corona-related reports, e.g., on how to advertise research with YouTube, how to design and evaluate virtual conferences, and how to enrich teaching with online labs on how the Internet works. We also would like to make you aware that this is the first version for which we asked for contributions in English. As the world and Germany becomes more international, we believe that it is about time for our newsletter to address an international audience.

Finally, to add a little more fun to this newsletter, at its end you find riddles from Rolf Windenberg (aka Nigel Fred Brown) based on his mathematically oriented reform of English orthography. Have fun in trying to solve them.

More information and recent editions of our newsletter are available on https://www.kuvs.de/newsletter/.

We hope you enjoy reading this edition of the KuVS newsletter / Wir wünschen viel Spaß bei der Lektüre des aktuellen Newsletters.

Ihre Newsletter Editoren,

Oliver Hohlfeld
BTU Cottbus–Senftenberg

Corinna Schmitt
Universität der Bundeswehr München

Mathias Fischer
Universität Hamburg

Andreas Blenk
TU München

Fachgruppe KuVS

2.1 Movements of Persons

- Prof. Boris Koldehofe vom Fachgebiet Multimedia Kommunikation an der Technischen Universität Darmstadt folgte dem Ruf an die Universität Groningen zum 1.2.2020. Er ist weiterhin am Sonderforschungsbereich MAKI tätig. Er lehrt und forscht im Bereich vernetzter und verteilter Systeme und ist Mitglied des Forschungsteams Distributed Systems sowie des interdisziplinären Forschungszentrums für kognitive Systeme und Materialien "CogniGron". Siehe beispielsweise aktuelle Stellenausschreibung: https://www.rug.nl/about-ug/work-with-us/job-opportunities/?details=00347-02S0007U2P
- Jun. Prof. Amr Rizk vom Fachgebiet Multimedia Kommunikation an der Technischen Universität Darmstadt ist seit 1.7.2019 an der Universität Ulm und weiterhin am Sonderforschungsbereich MAKI tätig. Er lehrt und forscht im Bereich cyber-physischer Systeme.

2.2 KuVS Award Winners 2019

Bachelor

- Felix Bachmann (KIT): Flexible Group Communication for Software-based Networks
- Sebastian Reuter (RWTH): Path Splitting for Tor – A Countermeasure against Fingerprinting Attacks

PhD

- Matthias Rost (TU Berlin): Virtual Network Embeddings: Theoretical Foundations and Provably Good Algorithms
- Mirko Stoffers (RWTH): Automated Optimization of Discrete Event Simulations Without Knowing the Model

Master
None

2.3 Aktuelle Informationen zur NetSys 2021 in Lübeck

Die NetSys2021 findet vom 8. bis 11. März 2021 in Lübeck statt. Die Planungen laufen auf Hochtouren und wir sind zuversichtlich, dass wir alle uns in Präsenz treffen können.

Das technische Programm von NetSys21 konzentriert sich auf Originalbeiträge auf dem Gebiet der Vernetzung und verteilter Systeme und bietet außerdem eingeladene Präsentationen zu aktuellen Themen im Bereich der Vernetzung und verteilter Systeme, eine Industriesitzung, separate Workshops, Tutorials, Poster, Demos, einen Early Work Track und ein Doktorandenforum. Ebenfalls enthalten ist das jährliche eintägige ITG-Expertensymposium "Zukunft der Netze" (ZdN) mit eingeladenen Fachvorträgen zu fortgeschrittenen Themen der Netzwerktechnik. Auch die deutsche GI FG Betriebssysteme plant, ihren jährlichen Workshop in Kombination mit NetSys 2021 in Lübeck durchzuführen.

NetSys 2021 ruft daher zur Einreichung erweiterter Abstracts auf, in denen originelle und neuartige Forschungsarbeiten und Ideen sowie "Hot Topic Papers" vorgestellt werden, d.h. Präsentationen von Arbeiten, die in den letzten zwei Jahren bereits auf anderen Konferenzen oder in Fachzeitschriften auf diesem Gebiet angenommen oder veröffentlicht wurden.

Das NetSys21 TPC wird erweiterte Abstract-Papiere für die Präsentation und Aufnahme in die NetSys 2021-Proceedings auswählen, die über die Zeitschrift Electronic Communications of the EASST (ECEASST) frei zugänglich veröffentlicht werden.

Darüber hinaus wird der PC von NetSys'21 die besten eingereichten Abstracts auswählen und deren Autoren einladen, erweiterte Versionen für eine Sonderausgabe von ACM TOIT: SI über die jüngsten Fortschritte bei Netzwerken und verteilten Systemen einzureichen.

Präsentationen zu aktuellen Themen sollen aktuelle und hoch bedeutsame Ergebnisse in vernetzten und verteilten Systemen hervorheben, die in einem hoch innovativen, zum Nachdenken anregenden und stimulierenden Format präsentiert werden sollen - z.B. mit neuen Forschungsthemen, -richtungen und -methoden. Dazu gehören aktuelle Beiträge, die in Top-Journalen (wie TON oder CCR) oder Top-Konferenzen (wie SIGCOMM, IMC, MobiCom, CoNEXT, INFOCOM, ICDCS) erschienen sind (oder erscheinen werden) und die für die NetSys-Community von hohem Interesse sind.

Der Call ist noch bis zum 16. Oktober geöffnet; Details finden sich unter https://netsys2021.org/calls/cfp-main

Zusätzlich zum Hauptteil wird es eine Reihe von Workshops, die auch bereits ausgewählt wurden, und Fachgesprächen geben. Ergänzt wird das Arbeitsprogramm um den mittlerweile fest etablierten Demo Track sowie das ebenso bekannte PhD Forum, was diesmal eine Ergänzung in Form einer Early-Work-Session erfährt.

Neben dem wissenschaftlichen Programm hat Lübeck selbst natürlich Einiges zu bieten und ist nicht umsonst ein touristisches Highlight (wir vermeiden den Begriff Hotspot sehr bewusst ...), das allein schon die Reise in den Norden fast zu einem Muss macht. Wir werden uns bemühen, den Teilnehmer*innen einige der schönsten Flecken Lübecks im Rahmen des Programms zu

präsentieren. So planen wir bspw. den Empfang am Montagabend im Europäischen Hansemuseum; auch eine Stadtführung wird es natürlich geben. Und das führt auch gleich zu einem weiteren Highlight: die NetSys2021 wird die NetSys der kurzen Wege, da sich die Hotels und Sehenswürdigkeiten alle auf der von der Trave umflossenen Altstadtinsel befinden - und der Tagungsort direkt gegenüber in den Media Docks, nur von einer Brücke von der Altstadt getrennt.

Jetzt wollen wir aber zunächst mal hoffen, dass die Entwicklung der Pandemie uns auch wirklich die Chance lässt, uns im März in Lübeck zu treffen. Aktuelle Informationen zu aktuellen Entwicklungen hierzu und zu anderen Entwicklungen finden sich immer unter https://netsys2021.org/. Wir freuen jedenfalls sehr auf die Tagung und auf Euren und Ihren Besuch!

Die Organisatoren
Stefan Fischer, Horst Hellbrück, Mathias Fischer und Winfried Lamersdorf

News from the Working Groups

3.1 How to advertise research in times of corona? Research Videos

Wolfgang Kellerer, TU München

PhD students at LKN present their research to public audience in short research videos – all videos are available on YouTube

At the Chair of Communication Networks (LKN) of the Technical University of Munich research topics of PhD students are usually presented in lectures to explain typical research questions and to attract students. Likewise, projects are presented in meetings to guests. In the absence of students in classrooms and the closure of the university for external guests, both is not possible any more. Hence, Prof. Wolfgang Kellerer asked all PhD students to explain their research in short 3-5 min videos. The responses were overwhelming and the methods used range from short comic strips to live experiments. The PhD students at LKN are proud to present their research topics in short videos to the public. All videos are available on the LKN YouTube Channel "LKN TUM". For the playlist go to https://www.youtube.com/playlist?list=PL7L6RSh-SL50RBajpvk_RuWXBGTO9TlDe

The videos were done as part of the LKN Research Video Challenge 2020 and we are also proud to present the awardee of this challenge: Best Research Communication Award (includes Best Research Video Award): Alberto Martinez Alba: "Flexible Mobile Networks" (see screenshot)

Best Research Video Awards (in alphabetical order):

- Arled Papa: "In-Flight Entertainment Network Slicing"
- Hansini Vijayaraghavan: "Resource Management in LiFi-RF Heterogeneous Networks"
- Hasanin Harkous: "Flexible Networks with P4 Programmable Devices"
- Onur Ayan: "Resource Management for Networked Control Systems"
- Sai Kireet Patri: "A Beginner's Guide to Optical Network Planning"

KuVS Newsletter

3.2 Teaching how the Internet really works and how it can be measured with online labs

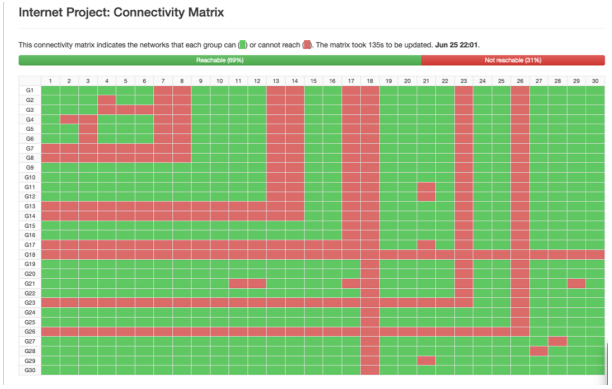
Oliver Hohlfeld, Stefan Mehner, Helge Reelfs
Brandenburg University of Technology

At BTU, we enriched our master-level classes *i*) Internet architecture and *ii)* Internet measurements with a new innovative mini Internet platform as online lab to teach how the Internet really works and how it can be measured—completely online and easy to access without having to install software. We derived the Docker-based infrastructure from ETH's `mini-inter.net` that we extended to the scope of our classes. Both classes run in parallel in the summer using the mini Internet to turn exercises into practical problems.

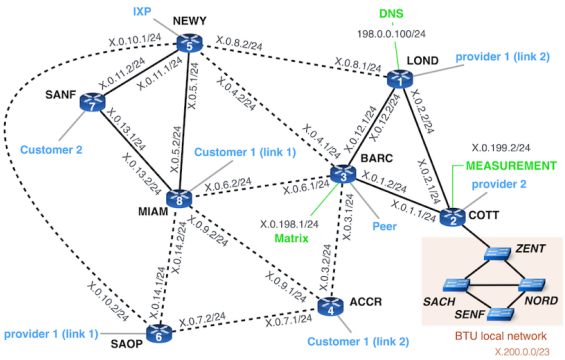
In the first class (Internet architecture), the students use our infrastructure to build and operate their very own mini-Internet together with their fellow students partitioned in groups that operate an AS each. They begin with setting up the BTU campus network, configuring their own intercontinental Autonomous System (AS), and end with interconnecting the different ASes run by the different student groups to form an Internet by utilizing IXP connectivity or realizing complex peering policies with BGP and mitigating Internet security issues. Thereby teaching how the Internet really works.

In the second class (Internet measurements), the students perform various active and passive measurement tasks on the mini Internet. That is, they have to empirically understand its properties by applying techniques taught in class to measure a complex, dynamic system that is constantly changing. From the data, they derive topological information (e.g., hidden links configured by others) or traffic flows on multiple links to ultimately optimize the traffic flows between ASes for costs, latencies, etc.

The mini Internet labs were well received, e.g., reflected by students that passed the class in 2019 and joined again only for the online labs. Their conclusion? The mini Internet lab substantially enriched their understanding of network technology and how mistakes by others (e.g., their fellow students) can propagate to harm the system.



Live connectivity matrix between different ASes run by the different student groups
http://mittelerde.informatik.tu-cottbus.de/



Intercontinental topology of an AS operated by each group—including BTU's campus network.

3.3 Evaluating the Experience of Virtual Conferences

Oliver Hohlfeld, Brandenburg University of Technology

The outbreak of the COVID-19 pandemic in 2020 forced academic conference to move to an online format with only little preparation time and prior experience. This necessity for virtual conferences is rooted travel restrictions and social distancing enforced by many governments around the world as a response to the outbreak. Yet, virtual conferences are a new instrument with which our community still has limited experience and familiarity.

Questionnaire-based approach to assess the participants experience

To assess both the benefits and challenges of virtual conferences, we designed a questionaire-based approach to assess the participants experience of attending virtual conferences. This enables a data-driven investigation of the participant's experience, goals, and general feedback about virtual conferences. It assesses virtual conference attendance relative to prior experience in attending on-site conferences—and thus assumes that such experience exists (asked as part of the questionnaire). This way, potential limitations, opportunities, and challenges of virtual conferences can be understood. So far, we have applied this questionnaire at 4 conferences and workshops, including PAM and IEEE QoMEX.

The approach investigates the participants expectations and experiences using two questionnaires. The first is called *pre-conference questionnaire* and should be distributed before the virtual conference takes place. The second is called *post-conference questionnaire* and should be administered directly after the virtual conference. Both are available online[1].

Lessons learned organizing the PAM 2020 virtual conference

We applied the questionnaire methodology to the Passive & Active Measurement (PAM) conference held in March 2020—one of the first conferences in our field that moved to an online format. All results are covered in an experience report published in the July issue of SIGCOMM CCR[2]. The report gives guidelines to future virtual conference organizers.

Disseminating knowledge works equally well or even better – sozializing doesn't

The results highlight that the virtual conference format allowed most participants to better focus on the technical content and to interact on presentation-related discussions even outside of the sessions. Socializing and expanding technical discussion to other topics did not work well—there is clearly room for improvement on this front.

Virtual conferences have the potential to broaden participation across all groups of participants that otherwise would not have joined the on-site edition (observed for both PAM and QoMEX,

[1] Virtual conference assessment questionnaires: https://github.com/ohohlfeld/virtual-conference-experience/blob/master/questionnaires/techreport/paper.pdf

[2] PAM 2020 experience report: https://ccronline.sigcomm.org/2020/ccr-july-2020-2020/lessons-learned-organizing-the-pam-2020-virtual-conference/

which had its highest registration count this year as virtual conference). The surveyed participants expressed interest in attending future virtual conferences, which appears correlated with their good overall experience. However, handling time-zone differences well complicates talk scheduling.

Virtual conferences require new designs – departing from traditional schemes

Virtual conferences allow for fundamentally new designs, interactions, and benefits. In our experience, the current design of virtual conferences is still tied to the more rigid on-site conference format. Virtual conferences, however, offer substantial flexibility to depart from traditional designs. Examples include: *i)* A hybrid model (online and on-site) in which the dissemination of papers by presentations is held virtually (which appears to work better) and in-depth discussions are held on-site in a "Dagstuhl-like" fashion without planned talks and a focus on breakout sessions and discussion; *ii)* Publishing talk videos before the conference so that participants could pre-watch and focus the interaction on discussions (e.g.,brief overview talk, few minutes of authors addressing community questions, longer live Q&A or other formats); and *iii)* Utilizing new means of social interaction by randomly assigning participants to short 1:1 sessions (like speed-dating) or enabling breakout sessions. In this space, we are seeing the emergence of tools enabling novel ways of facilitating interaction (e.g.,along the lines of the OnlineTown or Mozilla Hubs, where proximity in a virtual environment enables audio/video communication). However, in order to keep focus and limit distractions, the large availability of options and platforms that can be employed in virtual conferences should be balanced with the goal of containing the number of tools used by participants.

Discussion future (virtual) conference formats at Dagstuhl 2021

As part of the Dagstuhl seminar 21032[3] "Towards Climate-Friendly Internet Research" scheduled for January 17 — 20, 2021, we will evaluate experiences in running and participating in virtual conferences. The intention is to understand what went well and what went badly in implementing and deploying virtual conferences, what practical challenges were encountered, and what further needs to be improved. The broader goal of the seminar is to identify how to best retain the new status quo that implicitly reduces the carbon footprint from travel.

[3] https://www.dagstuhl.de/21032

3.4 Konferenz ohne Präsenz

Christoph Rensing, TU Darmstadt

https://blog.multimedia-communications.net/konferenz-ohne-praesenz/

Ein Bericht von PD Dr. Christoph Rensing über die Learning Analytics & Knowledge Conference 2020 oder: Wie man eine internationale wissenschaftliche Konferenz trotz COVID-19 erfolgreich durchführen kann.

Seit dem August 2018, dem Zeitpunkt an dem die Society of Learning Analytics Research (SOLAR) die Entscheidung getroffen hatte, die Ausrichtung der 10. LAK Tagung an Kollegen Hendrik Drachsler aus Frankfurt und mich zu übertragen, liefen die Vorbereitung auf die Tagung. Neben der Zusammenstellung des wissenschaftlichen Programms lag unser Augenmerk als lokale Organisatoren auf der Schaffung von Möglichkeiten zur Vernetzung der Teilnehmer*innen in Workshops, Pausen oder dem Social Event. Wir waren sehr stolz, als wir schon frühzeitig die Marke von 500 registrierten Teilnehmern überschritten hatten und steuerten auf 600 Anmeldungen aus fünf verschiedenen Kontinenten zu, als die ersten Nachfragen einer Gruppe von Wissenschaftlern aus Wuhan bzgl. Stornierungsmöglichkeiten wegen COVID-19 Reisebeschränkungen kamen.

Ab diesem Zeitpunkt mussten wir uns mehr und mehr mit Alternativen zu einer reinen Präsenztagung beschäftigen; zunächst planten wir zweigleisig: Präsenz und Online. Zwölf Tage vor dem geplanten Beginn war dann klar, dass der Campus gesperrt sein würde und wir entschieden die Konferenz nicht ausfallen zu lassen, sondern soweit möglich als Online-Konferenz durchzuführen.

Das bedeutete sehr viele organisatorische Maßnahmen, von der Information der Teilnehmer*innen über die komplette Umstellung des Programms bis hin zur Schaffung der technischen Voraussetzungen. Mit einem super engagierten und in Online-Lehre erfahrenen Team klappte das zunächst für unmöglich Gehaltene.

Das Konferenzprogramm wurde auf drei Tage von 9:00 bis 22:00 deutscher Zeit verteilt und eine Zuordnung der Referent*innen zu ihren jeweiligen Zeitzonen vorgenommen. So konnten alle Vorträge live in virtuellen Konferenzräumen gehalten werden und auch die KollegInnen aus Amerika und Australien hatten die Möglichkeit zumindest einige Vorträge aktiv zu verfolgen. Zudem wurden alle Vorträge aufgezeichnet und über eine Plattform der Goethe Universität bereitgestellt. Das gilt auch für die Poster- und Demopräsentationen, zu denen die Referent*innen gebeten wurden im Vorfeld Videos zu senden. Eine weitere Herausforderung bestand in der Bereitstellung von Möglichkeiten zum Austausch. Dafür dienten Foren, die über die Konferenzwebseite erreichbar waren, aber insbesondere auch unsere virtuellen Räume für Pausen ”Coffee Machine” und ”Bench in the Sun” und Social Events wie Preisverleihungen und Conference Closing.

All das ist uns tatsächlich gelungen: Während der Konferenzeröffnung waren mehr als 200 Teilnehmer*innen zugegen, in den einzelnen Vortragssessions mehrfach 80 bis zu 110 Teilnehmende – damit mindestens genauso viel wie in klassischen Präsenzsessions. Es wurde in den Foren

und über Twitter diskutiert (siehe unten) und im Virtuellen entstanden neue Kontakte. Die Resonanz war insgesamt überaus positiv.

Mein Dank gilt allen die dazu beigetragen haben und ich bin gespannt, wie die Erfahrungen zukünftige Tagungen verändern werden.

3.5 Kommunikation und Übung sind Trumpf

https://blog.multimedia-communications.net/kommunikation-und-uebung-sind-trumpf/

Wie gehen universitäre Einrichtungen mit den Regelungen um COVID-19 um? Wir haben mit Dr. Patrick Lieser gesprochen, der sich um die Einrichtung angemessener Infrastrukturen kümmert. Seine Devise: organisieren, kommunizieren und viel üben.

Interviewer: Patrick, durch COVID-19 musste sich an unserem Fachgebiet für Multimedia Kommunikation sehr schnell, sehr viel ändern. Wie seid ihr das angegangen?

Patrick: Es war klar, wir müssen Schwimmen lernen. Und zwar nicht mit Schwimmflügeln, sondern gleich richtig. Deshalb haben wir uns darauf eingestellt, unter diesen besonderen Bedingungen ein Jahr oder mehr den normalen Lehr- und Forschungsbetrieb fortführen zu können. Mit der klaren Regel von unserem Chef Prof. Ralf Steinmetz, dass alle ins Home Office gehen. Es gab zwei Bedingungen: alle handeln selbstverantwortlich und es muss ein Grundvertrauen in die Kolleg*innen da sein.

Interviewer: Welche konkreten Maßnahmen habt ihr ergriffen?

Patrick: Es wurde direkt ein Server mit der Groupware Mattermost eingerichtet, wo mit der Integration von Big Blue Button auch Videochats möglich sind. Wir wollten unabhängig sein und unsere Arbeitsabläufe so gut wie möglich digital abbilden. Dazu gehörte auch das soziale Miteinander.

Interviewer: Wie ergänzt ihr die technischen Abläufe durch eine soziale Komponente?

Patrick: Die soziale Komponente ist nicht ergänzend, ich halte sie für essentiell. Viele Ideen kommen bekanntlich beim informellen Gespräch an der Kaffeemaschine. Deswegen haben wir virtuelle Kaffeetreffs per Videochat etabliert. Das kann die physische Präsenz natürlich nicht ersetzen, aber es ist wichtig und man spürt, dass die anderen da sind und nicht jeder zum Einzelkämpfer mutiert. Derzeit planen wir virtuelle Räume, die wie Büros betreten werden und Leute sich besuchen können.

Interviewer: Mit welchen Problemen habt ihr zu kämpfen und wo ist noch Verbesserungsbedarf?

Patrick: Alles will eingeübt werden, darauf muss man sich einstellen. Das gilt für die strukturelle und die individuelle Ebene. Ein Beispiel: zu viele Kommunikationskanäle etablieren

schafft Chaos, denn wenn Nachrichten über WhatsApp, Telegram, Mattermost, E-Mail etc. aufploppen, verliert man den Überblick. Es muss klar priorisiert werden, wann welches Medium genutzt wird – und auch in welches man nach Feierabend nicht mehr reinschaut bzw. die Benachrichtigungen deaktiviert. Generell würde ich sagen, dass mehr Kommunikation und Organisation nötig sind, damit es rund läuft. Für jeden Einzelnen gilt: die Arbeit im Homeoffice erfordert es, selbst geschaffene Regeln einzuhalten. Dazu gehören ein fester Arbeitsbeginn und Feierabend, ohne sich die oft nötige Flexibilität zu nehmen. Die richtige Balance zu finden, ist Übungssache.

Interviewer: Was hat sich im Umgang mit den Kolleg*innen verändert?

Patrick: Für die Kommunikation mit anderen muss man genau wissen, wann jemand erreichbar ist. Es ist für mich auch wichtig, den Gemütszustand zusätzlich zu erfragen. Ich sehe schließlich nicht sofort, ob jemand gestresst ist oder nicht. Da braucht es mehr Kommunikation als im direkten Kontakt, wenn der kurze Blick ins Büro nicht möglich ist und man nicht erkennt, ob gerade intensiv nachgedacht wird, Studenten betreut werden oder Mittagspause ist. Erst wenn diese Faktoren geklärt sind, kann ich adäquat mit jemandem zusammenarbeiten.

Interviewer: Hat sich auch etwas verbessert?

Patrick: Ja, denn man merkt nun deutlich, welche Meetings wirklich nötig sind und überlegt sich dann zweimal, ob man sie abhält oder eine Mail auch ausreichend ist. Das schult den Blick und verbessert sogar einige alte Abläufe. Ansonsten bin ich begeistert, wie sehr alle zusammenarbeiten und der normale Betrieb einfach weitergeht. Wir schreiben weiterhin Projektanträge, machen Lehre und stellen neue Mitarbeiter ein. Einige jetzt erprobte Methoden und Techniken werden wir sicher auch nach Corona zu schätzen wissen und weiter nutzen. Trotzdem bin ich froh, wenn wir uns alle im Büro wiedersehen können.

3.6 Dieser neue Corona-Test zählt – buchstäblich

https://blog.multimedia-communications.net/dieser-neue-corona-test-zaehlt-buchstaeblich/

Auf genaue Zahlen kommt es dieser Tage an. Da derzeit immer noch zu wenige COVID-19-Tests zu Verfügung stehen, haben Forscher*innen eine Online-Umfrage entwickelt, die helfen soll, die Fallzahlen besser zu schätzen. Die ergänzende Methode ist derzeit für 17 verschiedene Nationen in der jeweiligen Landessprache verfügbar.

Die nationalen Regierungen weltweit stehen vor der großen Herausforderung, die bereits mit COVID-19 infizierten Menschen zu zählen und entsprechende Maßnahmen abzuleiten. Schwierig ist das deshalb, weil ihnen nur begrenzte Ressourcen in Form von validen Abstrich-Tests für den Mund-, Nasen- oder Rachenraum zur Verfügung stehen. Das international angelegte Portal Coronasurveys hat eine ergänzende, statistische Befragungsmethode entwickelt, um die weltweiten Fallzahlen infizierter Menschen schätzen zu können.

Das Forschungsteam ist rund um den Globus verteilt, darunter sind auch Augusto-Garcia Agundez vom Fachgebiet Multimedia Kommunikation und Prof. Antonio Fernandez Anta vom IMDEA Networks Institute, Madrid. Beide Forschungseinrichtungen kooperieren seit vielen Jahren. Im Rahmen des Coronasurveys werden in regelmäßigen Abständen offene Umfragen in derzeit 17 verschiedenen Ländern durchgeführt, zu denen jede Person mit Internetanschluss und Browser Zugang hat. Die Verbreitung findet vor allem über soziale Medien wie Facebook, Twitter und Instagram statt. Die Teilnehmer*innen werden gefragt, wie viele Personen er/sie kennt, die COVID-19-Symptome zeigen. Zusätzlich spielen auch indirekte Faktoren eine Rolle: wie viele Personen kennt der/die Befragte persönlich? Damit wird versucht, die Größe des persönlichen Umfelds mit den Personen, die Symptome aufweisen, in Beziehung zu setzen.

Die Forscher*innen vermuten, dass die offene, einfache Befragungsart eine hohe Rücklaufquote erzielt. Die große Zahl an Teilnehmer*innen soll ein valides Ergebnis erzielen. Es werden keine privaten Informationen erhoben, somit ist der Rückschluss von den erhobenen Daten auf eine konkrete Person nicht möglich. Die Schätzungen werden mit anderen Schätzungen und verfügbaren Daten wie des London Imperial College Reports verglichen, um kontinuierlich ihre Genauigkeit zu überprüfen. Die Forscher*innen hoffen, dass ihre Daten nützlich sind, um die Zahl der mit dem COVID-19-Virus infizierten Personen zu einem bestimmten Zeitpunkt in einem bestimmten Land besser zu schätzen und deren Entwicklung zu verfolgen.

Die Umfrage ist bereits jetzt verfügbar. Klicken Sie und machen Sie mit! https://coronasurveys.org

3.7 Franziska-Braun-Preis MAKI

https://blog.multimedia-communications.net/preis-fuer-gleichstellung-junger-schuelerinnen/

Preis für Gleichstellung junger Schülerinnen

Berufswünsche entstehen schon im Kindesalter. Um hier Vorurteile zu vermeiden, hat das Gleichstellungsteam des Fachbereichs Elektro- und Informationstechnik ein Konzept erarbeitet, das Schülerinnen ab der fünften Klasse bis zur Oberstufe begleitet, um das Berufsbild der Ingenieurin erlebbar und attraktiv zu machen. Der Sonderforschungsbereich MAKI betreute eine der Gruppen mit einem eigenen Workshop zum Thema Programmierung und Videostreaming. Das Projekt wird mit dem diesjährigen Franziska-Braun-Preis ausgezeichnet.

Ein Studium der Elektrotechnik und Informationstechnik öffnet die Wege zu einer spannenden und breit gefächerten Palette an Berufen. Dennoch sind Frauen am Fachbereich etit der TU deutlich unterrepräsentiert. Die Elektrotechnik-Ingenieurinnen Anna Pfendler und Ann-Kathrin Seifert vom Gleichstellungsteam wollen das ändern. „Ich denke, dass vielen nicht bewusst ist, welchen Facettenreichtum ein Studium der Elektrotechnik bietet“, sagt Pfendler, die über Auswirkungen erneuerbarer Energien auf die Stabilität des Stromnetzes promoviert. Ihre Kollegin Seifert, die im Bereich Signalverarbeitung für medizinische Anwendungen forscht,

bringt ein weiteres Argument ins Spiel: „Im sozialen Umfeld vieler Mädchen gibt es nur wenige weibliche Rollenvorbilder. Gerade in einem Alter, in dem sich erste Berufswünsche formen, sind Ingenieurinnen oder Technikerinnen nicht ausreichend präsent."

Die Idee der Gleichstellungsbeauftragten: Technisch interessierte und begabte Mädchen sollen schon im Alter von etwa zehn Jahren angesprochen und dann kontinuierlich begleitet werden. Zusammen mit kooperierenden Darmstädter Schulen und großer Unterstützung aus dem Fachbereich hat das Gleichstellungsteam verschiedene Workshops konzipiert, die aufeinander aufbauen und alle zwei Jahre besucht werden können. Die Schülerinnen lernen dabei, selbstständig technische Aufgabenstellungen zu lösen, die an Lehrinhalte aus dem Schulunterricht anknüpfen. Neben den fachlichen Inhalten sollen die Teilnehmerinnen auch weibliche Vorbilder kennenlernen. Die Workshops werden daher von mindestens einer Wissenschaftlerin des Fachbereichs etit begleitet.

Ralf Kundel, Julia Müller und Michaela Bock vom Sonderforschungsbereich MAKI betreuten zusammen mit Mihaela Damian den Workshop für die Jahrgangsstufen acht und neun. Dort drehte sich alles um Fotos und Videos, die von einer zuvor eigens programmierten App aufgenommen wurden. Zum Einsatz kamen hierbei winzig kleine Computer, die sogenannten Raspberry Pis – oder eben auf Deutsch Himbeerkuchen. Am Ende der drei Tage konnten die Schülerinnen nicht nur Fotos mit ihrer App bearbeiten, sondern auch kleine Live-Videos streamen.

Experimentierfreude wecken

Das Konzept hat auch die Beiratsmitglieder, die für die Vergabe des Preises an das ausgezeichnete Projekt gestimmt haben, überzeugt. „Durch aufeinander aufbauende Workshops vermitteln die Schülerinnen-Projektttage niedrigschwellig das Berufsbild der Ingenieurin und wecken die Experimentierfreude von Schülerinnen", heißt es in der Begründung.

Die Projekttage wurden schon mehrmals erfolgreich durchgeführt. Die stetig steigenden Teilnehmerinnenzahlen und Nachfragen bestätigen den Erfolg. Langfristig soll das Angebot erweitert werden, so dass für jede Klassenstufe die Teilnahme an einem Workshop möglich ist und die Schülerinnen dadurch einmal im Jahr an Projekten forschen können – und ein positiver Eindruck von einem technischen Studienfach bleibt.

Beitrag: Claudia Staub / Thomas Lenz

3.8 How did Internet traffic change during the pandemic?

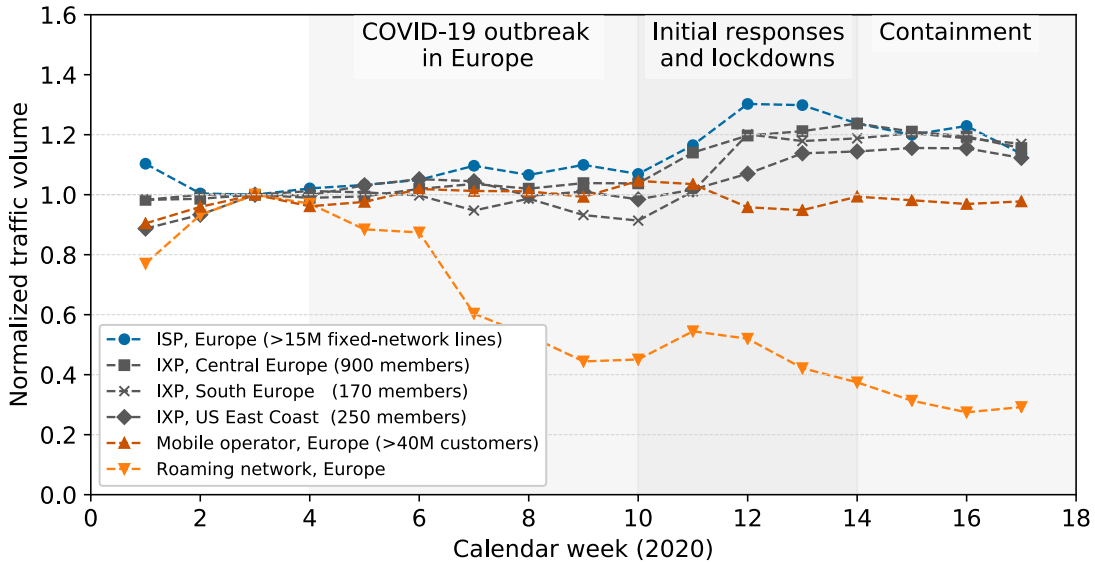
Oliver Hohlfeld, Brandenburg University of Technology

Due to the COVID-19 pandemic, many governments imposed lock-downs that forced hundred millions to stay at home. As a result of these measures, Internet traffic of residential users increased, in particular, for remote working, entertainment, commerce, and education. In turn, traffic demands in the Internet core shifted as well.

How did Internet traffic change during the pandemic?

To study this question, we are using data from a diverse set of vantage points (one ISP, three IXPs, and one metropolitan educational network) and study the effect of these lockdowns on traffic shifts. We find that the traffic volume increased by 15-20% almost within a week—while overall still modest, this constitutes a large increase within this short time period. The Internet infrastructure is able to handle this increase, as most traffic shifts occur outside of traditional peak hours. When looking at traffic sources, we find that while hypergiants still contribute a significant fraction of traffic, we see a higher increase in traffic of non-hypergiants. We observe traffic increases in applications such as Web conferencing, VPN, gaming, messaging that people use when at home. While many networks see increased traffic demands, in particular, residential users, others see major decreases, e.g., the in/out ratio of the educational network switched.

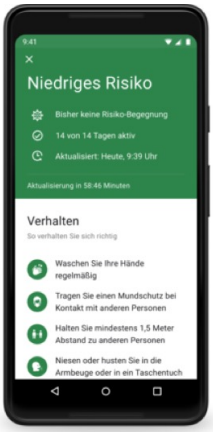
Further details: *The Lockdown Effect: Implications of the COVID-19 Pandemic on Internet Traffic*
Anja Feldmann, Oliver Gasser, Franziska Lichtblau, Enric Pujol, Ingmar Poese, Christoph Dietzel, Daniel Wagner, Matthias Wichtlhuber, Juan Tapiador, Narseo Vallina-Rodriguez, Oliver Hohlfeld, Georgios Smaragdakis
https://arxiv.org/abs/2008.10959 (to appear at IMC 2020)



Traffic changes during 2020 at multiple vantage points—daily traffic averaged per week, normalized by 3rd week of Jan. Traffic increases overall by 15-20%, cellar roaming traffic largely decreases due to lockdowns.

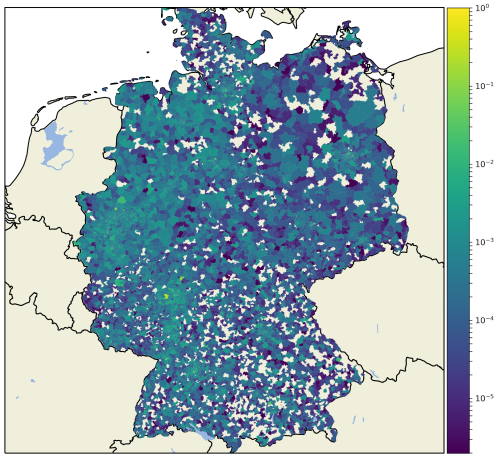
3.9 Quick Nationwide Adoption of the Corona-Warn-App

Helge Reelfs, Oliver Hohlfeld, Ingmar Poese
Brandenburg University of Technology / BENOCS



The Corona-Warn-App is Germany's official contact tracing smartphone app released on June 16, 2020. It aims to trace infection chains by informing users whom were exposed to a person later tested positive. Since widespread adoption is key to the app's success, we take the rare opportunity to monitor its nation-wide adoption starting at day 1. We measure *interest* in the Corona-Warn-App by monitoring Corona-Warn-App and website traffic at its hosting infrastructure, enabling us to provide first insights into the adoption across Germany. We further study whether local COVID-19 outbreaks manifest in higher use.

Quick adoption among Germany



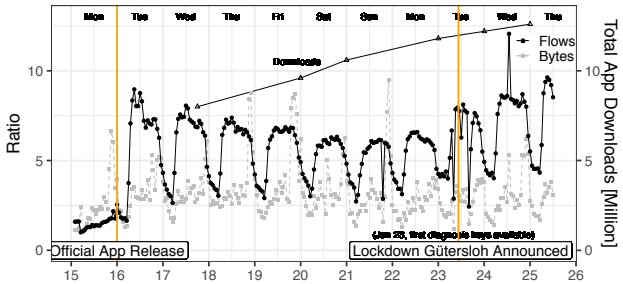
Traffic by district: usage across Germany aggregated over 10 days normalized by maximum

Already on its first day, the Corona-Warn-App generated substantial interest—manifested in traffic from almost all German districts.

Local outbreaks do not increase traffic

Our measurement period contains two local COVID-19 outbreaks: *i)* in Berlin on June 18 and *ii)* in Gütersloh and Warendorf on June 23. In Gütersloh, the traffic increased only very slightly and hardly noticeable (insufficient data for Warendorf). The outbreak in Berlin on June 18 is only visible for users of a single ISP and not in the overall traffic from Berlin-based users. That is, local COVID-19 outbreaks do not appear to increase traffic in the affected regions but can correlate to nation-wide increases.

Further info: http://arxiv.org/abs/2008.07370



Hourly aggregated HTTPS traffic from CWA CDN to users normed to the minimum (left y-axis) and the total app downloads in million from Google/Apple (right y-axis).

3.10 Finished PhD Theses

3.10.1 Andreas Schmidt (Universität des Saarlandes)

Title: Cross-layer Latency-Aware and -Predictable Data Communication

Abstract: Cyber-physical systems are making their way into more aspects of everyday life. These systems are increasingly distributed and hence require networked communication to coordinatively fulfil control tasks. Providing this in a robust and resilient manner demands for latency-awareness and -predictability at all layers of the communication and computation stack. This thesis addresses how these two latency-related properties can be implemented at the transport layer to serve control applications in ways that traditional approaches such as TCP or RTP cannot. Thereto, the Predictably Reliable Real-time Transport (PRRT) protocol is presented, including its unique features (e.g. partially reliable, ordered, in-time delivery, and latency-avoiding congestion control) and unconventional APIs. This protocol has been intensively evaluated using the X-Lap toolkit that has been specifically developed to support protocol designers in improving latency, timing, and energy characteristics of protocols in a cross-layer, intra-host fashion. PRRT effectively circumvents latency-inducing bufferbloat using X-Pace , an implementation of the cross-layer pacing approach presented in this thesis. This is shown using experimental evaluations on real Internet paths. Apart from PRRT, this thesis presents means to make TCP-based transport aware of individual link latencies and increases the predictability of the end-to-end delays using Transparent Transmission Segmentation.

Open Access to Dissertation: SciDok

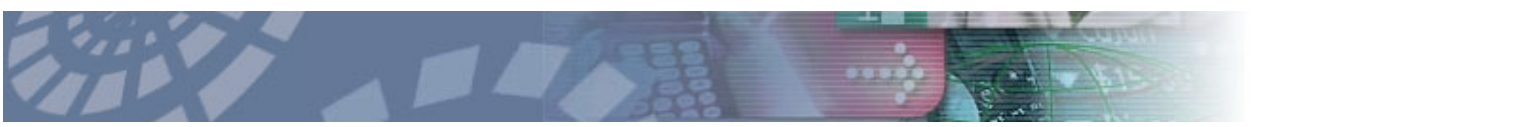
Next Steps: Researcher in Embedded Systems Quality Assurance at Fraunhofer IESE (Institute for Experimental Software Engineering)

3.10.2 Florian Lau (Universität zu Lübeck)

Title: DNA-Based Nanonetworks

Abstract: Nanodevices are minuscule, autonomous devices that interact at the nanoscale. Due to their small size, nanodevices are subject to resource constraints. To circumvent these, nanodevices may form nanonetworks. In doing so, nanonetworks may solve problems that exceed the capabilities of single devices. Nanodevices and nanonetworks may be used to solve problems for which no satisfactory solution exists. Popular examples are medical scenarios, e.g., combating various forms of cancer. Other medical examples are the suppression of diseases during emergence or the local treatment of infections. In medicine, both problems haven't been solved yet and mostly systemic treatment is necessary. Despite the various use cases, there are several unsolved problems in nanoscience. While it is possible to create primitive nanodevices under laboratory conditions, they can only be regarded as proof of concepts. One of the biggest unsolved problems is the actual construction of the components required in nanonetworks. While several suggestions and metalinguistical machine models exist, those are insufficiently specified or no means of construction are given. Most existing ideas are limited to partial solutions of construction, communication or computation. The compatibility of the modules is generally not clarified. No concepts that combine construction, communication and computation in a holistic model for nanonetworks have been established yet. This work presents a combined solution for the enumerated problems. The basic component for the presented approach is DNA. The inherent properties of this molecule may be used to assemble complex nanostructures. DNA can be utilized to create both nanodevices and a communication mechanism. Properly designed DNA-molecules can even be utilized for computational purposes. Based on these DNA-technologies, a concept is presented that solves all named problems. The resulting components are then combined into a reference architecture for DNA-based nanonetworks. This reference architecture revolutionizes the prevalent paradigm of communication and computation in nanonetworks. In the presented paradigm, computations are outsourced into the assembly process of molecules in the communication channel. This work presents nanonetworks that solve computations of thresholds, basic arithmetics and distributed consensuses as a proof of concept. Since wet-lab experiments with DNA tend to be very expensive, simulations are used to evaluate the presented models. The simulations show that the conceptualized components fulfill the hypothesized functions.

Next Steps: After my graduation I took the opportunity to start working on my habilitation and therefore stayed at university.



3.10.3 Muhammad Waqas Rehan (Universität zu Lübeck)

Title: High Performance Communication in Stream-based Multichannel Wireless Sensor Networks

Abstract: Indeed 21^{st} century can be regarded as information era which has revolutionized and modernized the world with the implementation of information and communication technologies. In the prevailing information era, high performance wireless communication has an enormous contribution in further advancing and digitizing the conventional communication infrastructure. To do so, a variety of new wireless technologies are invented such as IEEE 802.11, 3G/4G, WiMax, ZibBee and suchlike, that have revolutionized the world with numerous exciting features.

In the similar line, Wireless Sensor Networks (WSNs) is a growing wireless network technology that may play a pivotal role in sensing, surveillance and automatic monitoring of the surroundings. Due to self organizing and independent nature, WSNs may automate the observation of a region of interest. Subsequently, sensor networks may ensure division of labor of human beings and may further contribute to digitize the globe. That is why, WSNs may be regarded as a potential player for bringing socio-economic and technological advancement of the world.

Conventionally, wireless communication was single channel based and channel assignment was performed in a static manner. Being based on single frequency channel, these sensor networks may suffer from various challenges such as throughput loss, delay, congestion and retransmissions overhead. With the advancement of technology, Multichannel Wireless Sensor Networks (MWSNs) were introduced, having the ability to provide parallel communication for improving network throughput, delay, packet loss ratio and so on. In this way, MWSNs may be regarded as suitable candidate for ensuring real-time, reliable and efficient communication in delay sensitive applications such as multimedia or stream-based sensor networks. Eventually, MWSNs may make sure high performance communication in mission critical WSNs.

Although a variety of wireless channels are available in the unlicensed Industrial, Scientific and Medical band (ISM), however selecting an appropriate communication channel among the available wireless frequencies (as per application requirements) is indeed a demanding assignment in MWSNs. Since switching a wireless channel is costly in terms of delay and energy consumption, therefore, it is a challenging task to judiciously decide about channel switching, keeping in view the application requirements of WSNs. Besides that, too frequent channel switchings may induce data loss in high data rate applications such as multimedia and stream-based sensor networks. Furthermore, devising appropriate mechanism for JOINT channel assignment and routing for improving Quality of Service (QoS) and thereby ensuring high performance in MWSNS is a real challenge.

To handle the above mentioned challenges, this dissertation contributes a variety of algorithms whose purpose is to select the appropriate channel for wireless communication and to employ it for routing the surveillance information to multiple sink nodes for achieving high performance in mission critical MWSNs. For this purpose, two multichannel MAC protocols i.e.

Ext-NEAMCBTC and MAGIC are devised for selecting the appropriate communication channel in normal and noisy (with some degree of stability) multichannel environments respectively. Afterward, a QoS-aware multichannel multi-sink routing protocol is proposed entitled as QCM2R that is suitable for high performance end-to-end routing in stream based MWSNs. The simulations of MAC protocols are performed in MATLAB whereas the routing protocol is implemented in NS-2 and its graphs are constructed in MATLAB. The results shows that our devised protocols are superior in performance than the existing counterparts.

Furthermore, this dissertation discusses in-detail the preliminaries, application areas, issues/challenges of multichannel technology at MAC and Routing layers. The thesis is concluded by outlining numerous future research directions at the corresponding layers.

Next Steps: Dr.-Ing. Rehan is serving as Scientific Staff in the Institute of Telematics, University of Lübeck, Germany. At current, he is researching in IoT and Fog/Edge Computing under BigSIoT Project.

3.10.4 Yasser Mawad (Universität zu Lübeck)

Title: Infrastructure-based Solutions for Delay-Tolerant Networking

Abstract: The InterPlaNetary (IPN) Internet is a network designed for use in space. IPN consists of a group of network devices such as satellites and probes that can communicate with each other, as a next step in the development of Deep Space Network (DSN). Realization of future IPN communication must address a set of significant challenges: extremely long delays, data-rate asymmetry, packet loss, inconsistent connectivity, and link disruptions.

The above challenges should be taken into account for any future developments in network architectures and wireless devices as well. These require a new set of protocols as well as a specific technology tolerant to large delays and (frequent) errors.

The mobile wireless research community investigates two important types of network environments to solve the intermittent communication problem, which can be applied to IPNs.

1. Mobile Ad Hoc Networks (MANETs) are environments with many, often changing connections. They use multi-hop paths to contribute to an efficient data transfer.

2. Delay-/Disruption Tolerant Networks (DTNs) are frequently disconnected environments and may lack continuous network connectivity. They address the technical issues in heterogeneous networks.

Delay-/Disruption Tolerant Networks were originally developed as a reliable InterPlaNetary network. They provide new dimensions of communication with technological developments unsuitable for the use of traditional TCP/IP networks. TCP cannot handle the volatility of DTNs, as it always assumes a predetermined end-to-end path between different nodes. The Bundle Protocol (BP) arose as an alternative solution from network research. BP provides an overlay network built on top of the transport layer or lower-layer protocols. This overlay provides connectivity to larger networks involving heterogeneous devices.

This dissertation designs and implements a new and innovative DTN routing protocol, HIDTN. This protocol employs handover to effectively address intermittent communications of hybrid DTN networks. HIDTN operates in a wide range of heterogeneous network environments and performs better than existing routing protocols in terms of packet delivery and network overhead as well. The evaluation shows that our proposed routing scheme achieves up to 80% more efficiently while still being as reliable as previous schemes. It addresses all challenges noted above, as long as connectivity will be established eventually.

Next Steps: I am serving as a scientific staff at the Institute of Computer Engineering at the University of Lübeck, Germany. The main reasearch interest focuses mainly on mobile autonomous robots, cyber-physical systems and integrated circuits in the form of SoCs (System-on-Chip. We deal with the architecture of hardware and software systems as well as their prototypical implementation and evaluation.

3.10.5 Georg von Zengen (TU Braunschweig)

Title: Resource Allocation in Mobile Wireless Real Time Networks

Abstract: The use cases for Cyber-Physical Systems (CPSs) range from industrial automation over automotive to search-and-rescue applications. Nowadays these CPSs work either in static networks, like in production lines, or isolated and mobile, as for example Unmanned Aerial Vehicles (UAVs). The cooperation of mobile CPSs is only possible with very relaxed real-time requirements. For the tight cooperation of mobile CPSs new techniques are needed. The special challenge in such networks is that the communication needs to guarantee hard timing boundaries but also needs to be flexible enough to adapt to changes within the network.

In this work we present an architecture that copes with these networks and their challenges. It consists of four main components: a time synchronization, a real-time networking stack, a scheduling algorithm and a management protocol. As cooperation between mobile CPSs requires feedback loops to be closed via the wireless links, the time synchronization needs to be accurate between several CPSs. To be able to time the execution of tasks as accurate as possible we present a sub microsecond time synchronization. By utilizing our drift compensation, CPSs can make use of low-cost crystal oscillators without loosing timing accuracy.

To make use of such an accurate time synchronization, we present a real time network stack that incorporates not only the scheduler for the communication but also the scheduler for the execution of tasks. Thus, the jitter a feedback loop experiences is kept minimal. To support the adaption to changes in the network we designed all operations in a way that they introduce a minimum amount of jitter.

This adaption to changes is one of the key requirements to the scheduling algorithm. As the adaption must happen without harming the timings of running real-time application, a novel

scheduling approach is necessary. To fulfill this requirement we introduce a Mixed Integer Linear Programming (MILP)-model to calculate schedules for the presented real-time network stack. As solving MILP-models is computational complex and CPSs often have only limited computational power, we introduce a heuristic to calculate these schedule with far less effort.

To disseminate schedules to CPSs, we evaluate the applicability of Concurrent Trans- mission (CT) protocols. All previous research on CT was done on similar hardware. We investigate whether the results of this research can be generalized and point out the differences and similarities. Further, we frame the challenges heterogeneous CT networks have to overcome.

3.10.6 Tobias Meuser (TU Darmstadt)

Title: Data Management in Vehicular Networks
Relevance-Aware Networking for Advanced Driver Assistance Systems

Abstract:

Future vehicles will exchange an increasing amount of data to increase their awareness beyond their local perception. This data is generated by the sensors of other vehicles, which share their local view of the environment. Compared to the data exchanged by today's vehicles, this data is much more fine-granular and, thus, changes more frequently, requiring much higher bandwidth to maintain an up-todate view of the environment. The diverse level of accuracy or potential inaccuracy of vehicle-generated data, in conjunction with their increased bandwidth volume, poses considerable challenges for future vehicular networks. The potential inaccuracy of data provided by other vehicles necessitates a validation, which requires knowledge about the measuring sensors. Besides, the higher bandwidth consumption requires a more accurate consideration of each vehicle's interest in data, as not everything can be exchanged. The paradigm of Approximate Networks is particularly well suited for the provisioning of fine-granular data, as it allows to trade network and computation resources with the availability and quality of data. Our contributions in this thesis amount to developing mechanisms to apply the concept of approximate networks in the vehicular scenario. For this purpose, we first develop mechanisms for the assessment of data in these networks, which are the basis for our approach to approximate vehicular networks. As our first contribution, we propose an aggregation scheme to increase the data quality in the network. Our innovative aggregation scheme considers the heterogeneity of sensors and data-specific properties to adapt the influence of old measurements and increase the quality of the resulting aggregate. We then investigate the relevance of data to a specific vehicle as our second contribution, which relies on the prediction of the specific vehicle's future context. By combining the accuracy of the aggregate and its relevance, we determine the expected gain for a specific vehicle, the so-called impact. This impact is key for effective data prioritization and builds the foundation of our approximate vehicular network. As our third contribution,we design and implement an approximate vehicular network based on Diverse Prioritization and Treatment, aiming at improving network performance without increasing the resources consumed, as typically advocated under approximate networking. A probabilistic mechanism is proposed to properly modulate the redundancy of the messages in the network, leading to their increased overall availability to the interested vehicles without increasing the consumed resources. Finally, we design and develop our VEHICLE.KOM platform that is used to assess the effectiveness of the developed mechanisms under varying environmental conditions. We show that our aggregation scheme drastically reduces the false aggregates and adapts its behavior to lifetime and accuracy effectively. In addition, we demonstrate the effectiveness of our approach to approximate vehicular networking, by showing a drastic increase in the network performance under dynamic network conditions, especially when considering cooperation between vehicles.

3.10.7 Patrick Lieser (TU Darmstadt)

Title: Decentralized Communication Services for Post-Disaster Scenarios Resource Allocation, Prioritization, and Long-Range Communication Support

Abstract:

Our modern society strongly depends on critical infrastructures, such as the central power grid or information and communication technology. When these infrastructures fail during and after disasters, the affected population has no means of communication. At the same time, the increased population density of urban areas coupled with the peoples' expectation to have permanent access to communication systems and to be informed at all times and at any place, has made disastermanagement increasingly challenging. Communication is crucial during disasters as it empowers the affected population to organize and help themselves. But even if parts of the communication infrastructure are still intact, the increased communication demand for disaster relief efforts and checking on loved ones typically overloads the available infrastructure. As such, infrastructure-independent and rapidly deployable communication systems are required. Delay-tolerant ad-hoc networks can be used to build communication networks, which propagate messages via the storecarry-forward paradigm directly between neighboring communication devices. Such DTN-MANETs can be formed by the smartphones of the affected population. However, such communication networks must overcome various scenario-specific difficulties, such as limited network lifetime due to limited battery power of the devices, message propagation limitations caused by isolated network areas due to the limited range of device-to-device communication, and network resource restrictions. In this thesis, we first assess scenario-specific characteristics by conducting and evaluating a large-scale field test. Based on these results, our main contribution is the design and implementation of the decentralized disaster communication system D2CS.KOM, which extends the functionality of conventional DTN-MANETs. We enable D2CS.KOM to allocate available energy resources to the network participants in a fully decentralized way, extending the lifetime of communication devices and thus the overall network. We further propose and integrate a prioritization architecture to improve the propagation of disaster-relevant messages in the network and enable the system to adapt to continuously changing communication demands. Since the mobility of network participants determines the performance of data dissemination in DTN-MANETs, D2CS.KOM overcomes this limitation by utilizing Unmanned Aerial Vehicles (UAVs) to strategically support the dissemination of messages. We generalize disaster-specific characteristics into the Simonstrator.KOM simulation platform and conduct an extensive evaluation of our contributions. We show that our system extends the communication lifetime of individual nodes and consequently of the overall network while prioritizing disaster-relevant messages. Additionally, we demonstrate the significant support capabilities of UAVs in intermittent DTN-MANETs. In summary, we show that our contributions constitute a significant step towards ensuring communication during and after disasters by improving upon decentralized, infrastructure-independent communication systems.

3.10.8 Rhaban Hark (TU Darmstadt)

Title: Monitoring Federated Softwarized Networks
Approaches for Efficient and Collaborative Data Collection in Large-Scale Software-Defined Networks

Abstract:

The term Softwarized Networking encapsulates technologies that allow the use of software to program a communication network. These technologies, predominantly Software-Defined Networking (SDN) and Network Functions Virtualization (NFV), have dominated the scientific interests of the networking community in the last decade. Leading companies already adopted SDN in large-scale deployments (e.g., Google's B4 Project, Microsoft Azure). According to Cisco, 76% of all data centers will apply SDN by 2021. Along with a hand full of valuable advantages, the foundation of the success of Softwarized Networking lies in its flexibility. In the case of SDN, a logically centralized controller, denoted control-plane, uses software to dynamically change how the networking devices, denoted data-plane, handle traffic. This centralization tremendously eases the management process. With respect to network state monitoring, which is a cornerstone of network management and the basis for its adaptivity, SDN provides, in addition to the advantage of the by-design centrally available knowledge, a set of new techniques to collect statistics from the networking devices. The centralization of the control-plane quickly turned out to be only of logical nature and requires a physically distributed implementation to achieve scalability and reliability. Therefore, numerous distributed controller architectures have been proposed. Yet, the distribution of the control and, in line with this, the distribution of large-scale networks (e.g., one data center consists of a multitude of distributed sub-data centers) have not been considered in existing monitoring approaches. We believe there is a potential to increase the efficiency of monitoring when network parts collaborate. In this thesis, we exploit this potential by developing monitoring approaches that utilize coordination and information exchange among collaborating SDN controllers. We create mechanisms to discover redundancy in the monitoring of shared resources and aggregate overlapping measurement tasks of different controllers whenever possible. Doing so, we substantially cut down the costs for monitoring, which is necessary for future networks that face a vast increase in load and dynamics. On top of this, we zoom into the statistic collection process in Softwarized Networks between controllers and the data-plane devices. Within that, we identify three not yet fully explored aspects, namely how, where, and which statistics to measure from the network. We propose novel methods for these aspects to collect information efficiently while limiting resource consumption. Extensive evaluations show that filtering irrelevant data can reduce the required measurement transmissions to a fraction and an intelligent measurement point placement requires only a small number of measurements compared to measuring the entire network, without affecting the accuracy.

3.10.9 Florian Jomrich (TU Darmstadt)

Title: Dynamic Maps for Highly Automated Driving Generation, Distribution and Provision

Abstract:

With an ever-increasing number of vehicles roaming the streets and a general intensification of ongoing daily traffic the current vehicular safety systems are not able to reduce the number of traffic accidents further. As the majority of severe or deadly traffic accidents nowadays is caused by human error, car manufacturers and researchers alike focus on the self-driving vehicle as a promising solution to this problem, as a machine is unaffected from human conditions such as tiredness or drunk driving. To enhance the overall achievable driving safety and comfort the self-driving vehicles rely on an additional map database, besides the hardware sensor system installed onboard. The so-called High Definition Map (HD Map), a highly precise virtual model of the actual real-world provides detailed information about the ongoing traffic situation ahead of the car's sensor ranges. Otherwise critical traffic situations can be resolved by this a priori knowledge and if necessary, a handover of the driving control back to a human driver can be triggered. The maintenance of the HD Map is a major challenge, as due to the importance of the map for the self-driving vehicle map updates have to be realized in much shorter time (minutes instead of months) compared to established concepts common for human-oriented digital navigation maps. This thesis provides contributions in the areas of Distribution, Generation and Provision of such map updates, as the key communication challenges of the maintenance procedure. Our first contribution is the development, implementation and evaluation of a protocol that realizes the context-specific distribution of partial and incremental map updates. The protocol has been designed with the prerequisites and requirements of a self-driving vehicle in mind. To achieve the efficient dissemination of updates to all cars the protocol relies on infrastructure-based (cellular) and Ad-hoc communication (WLAN) between the vehicles. The performance of the protocol is evaluated based on realistic traffic simulations and actual map content. As our second contribution, we develop and implement an algorithm that detects changes in the road infrastructure (e.g. induced by construction sides) based solely on low-cost sensor information. This detection algorithm facilitates the succeeding update generation of the map material in the identified area. We evaluate the capabilities of the detection algorithm under a real-world data set in the example of a highway construction site scenario. To enhance the provision of map updates and vehicular sensor data via wireless communication, we conduct our third and most comprehensive contribution. We focus on the design and enhancement of a variety of different techniques and concepts to obtain broad knowledge about the serving wireless network to be provided in a subsequent step as valuable information to related transmission scheduling algorithms. These techniques and concepts include the measurement and prediction of the various performance indicators of actual deployed cellular networks, via low-cost hardware and software, as well as their further usage in simulation and network connectivity maps, always with an emphasis on easy deployability and the reutilization of existing components. Overall, this thesis presents essential contributions, which in their collectivity

support the realization of a robust, dynamic and reliable maintenance cycle of an HD Map for self-driving vehicles.

3.10.10 Elena Grigoreva (TU München)

Title: Strategic Network Planning for Converged Optical Networks

Supervisor: Priv.-Doz. Dr.-Ing. habil. Carmen Mas Machuca

Abstract:

Declining revenues, increasing network costs, new stringent and heterogeneous user requirements place a set of challenges for the Network Providers (NPs). An example of new requirements could be ultra-reliable communications with 0.99999 availability requirement for mission critical services, 1ms delay for tactile Internet or 10 Gbps capacity per sector for the centralized 5G cloud Radio Access Network (RAN). The traditional approach of building an individual optical networks for every application, i.e., residential access and mobile backhaul in 4G, would be cost prohibitive in this case. This means that the NPs have to find the ways to reduce the network costs and maximize revenues. The strategic business decisions on the network implementation and upgrade are made based on the results of strategic network planning.

In this dissertation, we take a holistic approach on strategic network planning for converged optical networks. By converged networks we refer to sharing of the phys- ical infrastructure (ducts, sites, etc.) and technologies for different network types that traditionally would be independent (optical access and backhaul networks). The strategic network planning work-flow was implemented in a Automated Map-Based Strategic Fixed Network Planning Tool (AMS) to allow reproducibility and comparability of the results, as well as future extensions.

We start from investigating the possible generalizations of the strategic network planning results by using graph-based road topology models instead of specific area maps. Then, we look into implications of providing for the reliability requirements of the ultra-reliable communication heterogeneous wireless protection for the mission criti- cal communication. The studies are done for the converged Optical Distribution Network (ODN) and for a wireless access network. We continue with analyzing the en- ergy consumption of converged ODNs, its influence on reliability and delay. To enable energy-saving methods, we propose a network-initiated equipment wake-up method (to switch the equipment back to the active state from the sleep or dooze state) for packet switched networks. We compare the delay and energy performance of our proposed method to the measure the state-of-the-art circuit switched method.

Finally, we investigate network migration planning, i.e., multi-period strategic network planning problem. To guarantee the network profitability, we maximize the Net Present Value (NPV) under the condition that user's requirements are satisfied. We further deal with user uncertainty, i.e., users leaving the NP or user churn, with the rational agent based algorithm.

3.10.11 Dirk Gómez Depoorter (TU München)

Title: Modelling and Evaluation of the Required Communication Performance of Air-Ground Data Links based on Erasure Codes

Supervisor: Prof. Dr.-Ing. Wolfgang Kellerer

3.10.12 Murat Gürsu (TU München)

Title: Delay Constrained Reliable Uplink Radio Resource Management for Industrial Internet of Things

Supervisor: Prof. Dr.-Ing. Wolfgang Kellerer

KuVS Newsletter

3.11 Project News

3.11.1 emergenCITY

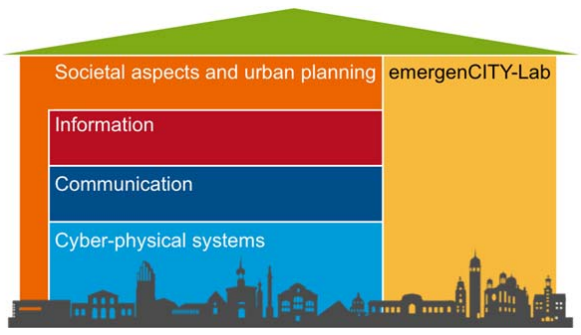
emergenCITY – The Resilient Digital City

The LOEWE Center emergenCITY is an interdisciplinary research center that started in January 2020, funded by the Federal State of Hessen as part of the LOEWE program. TU Darmstadt is leading the project, the University of Kassel and the Philipps-Universität Marburg are partners. The project team includes 23 professors in the fields of computer science, electrical engineering, information technology, mechanical engineering, political science, history, architecture, business, and law.

emergenCITY aims at investigating fundamentals, methods, and solutions towards the resilience of future digital cities and especially the capability of ICT to resist, adapt, and transform in crises. In 2050, roughly two-thirds of the world population is expected to live in urban areas. The sustainable growth in the number and size of cities is only possible due to gains in efficiency in critical infrastructures such as energy, transportation, logistics, and water. ICT is the main driver behind these efficiency gains and acts as the enabler for digital cities. However, this trend also poses a threat to the functioning of cities in crises. Increasing interconnectedness and dependence on digital services make societies more vulnerable to disruptive events that impact on regular ICT functions. ICT-based infrastructures are endangered due to man-made or natural disasters, violence, and terror. The research center emergenCITY investigates fundamentals, methods, and solutions towards enabling so-called „resilient digital cities." emergenCITY focuses on the resilience of future digital cities and the capability of ICT and its users to resist, adapt, and transform in crises. The goal for ICT in digital cities is to evolve towards a self-configuring, self-healing, self-optimizing, and self-protecting way of operation, even if outside the original design envelope, while systematically taking into account human interaction.

To address these challenges *holistically*, emergenCITY comprises four interconnected program areas: The program area **societal aspects and urban planning** covers fundamental historical, political, social, and legal aspects of crises and resilient ICT in digital cities. Within the area **information**, the focus lies on the autonomous composition of ICT services from whatever resources still available. The area **communication** focuses on the design of communication systems that have built-in resilience and are responsive to any kind of crisis/disaster. These systems shall be able to self-prepare decentralized and infrastructure-less operation prior to the disaster and support basic communication services under any circumstances. The area **cyber-physical systems** covers the topic of (semi-)autonomous robotic platforms and systems for emergency response and recovery in complex disaster environments. The four program areas come together in the central emergenCITY lab to evaluate and demonstrate the fundamental research results in practical scenarios. The lab is, therefore, the focal point of the interdisciplinary and holistic emergenCITY approach.

Further information: https://www.emergencity.de/.



3.11.2 Artificial Intelligence in Secure Web Infrastructures with Digital Identity Management

Künstliche Intelligenz in sicheren Web-Infrastrukturen mit digitalem Identitätsmanagement (KIWI)

Motivation

Web-based services are foundation and driver for the ongoing digitalization of our society. They also serve a critical role as management and distribution systems for digital identity information for billions of Internet users. Misuse of digital identities must be reliably prevented to avoid substantial damage for individual private users as well as large-scale companies. With the advent of novel and effective artificial intelligence (AI) techniques a continuously growing interest for their application in IT security has emerged, which in turn inspired several AI-based IT security systems. However, current approaches mainly focus on attack detection and mitigation in isolated domains (e.g., application or network domain) while attacks against web-based services often build up over time and leave traces throughout the entire system. Consequently, AI-based cross-domain attack detection and mitigation constitutes a highly innovative approach to enhance the detection and mitigation capabilities of current security systems.

Objectives and approach

The partners of the BMBF project KIWI contribute to the development and practical testing of AI-supported security management in complex web infrastructures. The project focuses on the application of federated machine learning techniques to merge security-relevant information collected from AI-based detectors co-located in different domains. By combing domain-specific information into an overarching picture of the threat landscape the federated approach of KIWI facilitates it to draw conclusions about the presence, absence and nature of attacks on complex web infrastructures. Due to the sensitive nature of digital identities, one important goal of KIWI is to uphold the data sovereignty of all involved domain operators and organizational units during the cross-domain information exchange. Therefore, methods are investigated to restrict the flow of information to the necessary and legally permitted data. Furthermore, since the quality of training data is of vital importance for the effectiveness of AI models, KIWI will also devise a framework for rigorous Data Governance. In the event that models are trained on deliberately corrupted or unsuited data, it is the frameworks obligation to detect and re-train affected models to ensure the reliable operation of the federated system.

Innovations and perspectives

The project partners focus on the open European login standard netID, which is highly relevant for Germany due to the direct competition with similar offers from US corporations. The netID standard enables users to achieve data sovereignty through transparency. Project findings can be incorporated into the future development of web identity management based on netID. This can strengthen the position of European companies in international competition. In addition, the approach developed in the project ensures will be transferred to other use cases.

Funded by:

Federal Ministry of Education and Research (BMBF)

KuVS Newsletter

Participating KuVS Members:
Oliver Waldhorst (Hochschule Karlsruhe), Christian Zirpins (Hochschule Karlsruhe), Martina Zitterbart (Karlsruher Institut für Technologie)

Partners:

- 1&1 Mail & Media Development & Technology GmbH, Montabaur
- adesso as a service GmbH, Dortmund
- adesso SE, Dortmund
- Hochschule Karlsruhe - Technik und Wirtschaft
- Karlsruher Institut für Technologie (KIT)
- secuvera GmbH, Gäufelden
- Technische Universität Carolo-Wilhelmina zu Braunschweig

Event Reports

4.1 Report on the 2. KuVS Fachgespräch "Network Softwarization" and the 1^{st} ITG Workshop on IT Security (ITSec)

Michael Menth, Uni Tübingen

https://kn.inf.uni-tuebingen.de/kuvs-fg-netsoft/2020

https://kn.inf.uni-tuebingen.de/itg-itsec/2020/

The workshops were organized by the University of Tübingen, the Technical University of Munich, and SySS GmbH, respectively. They were technically supported by the MWK-funded collaboration project bwNET (https://bwnet.belwue.de/). Its objective is a flexible high-performance network for education and research in Baden-Württemberg. Network softwarization and security are focal points of the project and its participants are rooted both in the KuVS and ITG community.

The workshops took place online from April 1-3 2020, i.e., right after the beginning of the COVID19 pandemic. Therefore, the preparation of the workshops was a particular challenge. The workshops were planned as a 4-days presence event, but with the advent of COVID19 at the end of February in Europe, participants and presenters were no longer allowed to go on business trips. It was the days before the lockdown in Germany which were characterized by unprecedented measures for public safety and uncertainty. Thanks to committed presenters, the workshop format could be converted into a 3-days online event. While we are now used to online conferences, lectures, and project meetings, those were the days we were all eagerly looking for scalable video conference solutions, trying out many tools with different quality of experience.

The Fachgespräch and the ITSec workshop attracted 65 and 85 participants, respectively, which is more than we expected for comparable presence events. Easy access without travelling and other meetings cancelled due to COVID19 made it possible. The contributions for both workshops summarized work previously published in prestigious conferences and journals, e.g., ACM Sigcomm, ACM CoNEXT, or IEEE Infocom, or presented work in progress with published abstracts. Project presentations informed the audience about ongoing collaborations. The Fachgespräch featured 23 presentations structured into 6 sessions: TSN and industrial networks, low latency and automotive networking, performance, resilience, and two sessions on P4-based applications. The ITSec workshop discussed 14 presentations in the fields of performance and deployment of security protocols, intrusion detection and pentesting, attacks and vulnerabilities, containers and clouds. In addition, two mini-tutorials on "Automated Discovery of Security Vulnerabilities Using Fuzzing" and "Container Security", and an encompassing tutorial on "5G Mobile Network Security Essentials" provided education and advanced training. A panel on

"Digitization over Night" led to a lively discussion with many participants sharing their views and experiences of the recent days and weeks.

On the one hand, the organization of online workshops revealed to be a challenge. A few home offices struggled with insufficient Internet connections, which was backed up with pre-recorded video presentations. Discussions and involvement of the audience are integral workshop elements. With online events, these goals are more difficult to achieve as participants are hidden in cyberspace, most of them without video. This can be tackled with experienced session chairs who know how to start and lead discussions, as well as focussed and high-quality presentations that really attract the interest of the audience. Showing the videos of at least the session chair, the presenter, and the protagonists of discussions retains an important aspect of typical workshop atmosphere. Due to the lack of social interaction, making friends and gaining ground in the scientific community is rather difficult, which we believe is a problem in particular for young researchers. There is a potential for advanced online meeting tools that allow self-initiated meetings of subgroups, parallel conversations beyond chat, and support for establishing contact with other researchers. So far, we have only little experience with basic tools so that there is hope for improvement of social interaction possibilities during online events.

On the other hand, online events can be successful and come with many benefits. The workshops showed that technical presentations, discussions, panels, and tutorials are well feasible via video conference. The events even kick-started joint work and new community building. The many successful online events – not only workshops and conferences but also project and standardization meetings – proved that lots of in-person meetings are no longer indispensable. Low registration fees, no travelling costs, no time overhead, and the possibility to participate only part-time in sessions of interest make online formats very attractive. This resulted in a continuously large number of attendees at both workshops. Thus, online formats have a large savings potential for financial expenses, leisure time, and carbon emissions. Especially the latter is important for sustainable, global research.

Below the line, online events are demanding for both organizers and participants. There is still a potential for improvements with respect to tool support and human interaction. However, the mentioned benefits are significant. Therefore, we think that online formats may also be useful for some academic events beyond the COVID19 pandemic.

4.2 Konferenzbericht MAKI Scientific Workshop 2020

https://blog.multimedia-communications.net/wenn-maschinen-sicht-nicht-sicher-sind/

Maschinen sich nicht sicher sind

Unter dem Titel Autonomous decision making in network systems under uncertainty lud der Sonderforschungsbereich MAKI internationale Experten zum jährlichen MAKI Scientific Workshop ein. Deren Vorträge befassten sich mit der Frage, wie und auf welcher Basis Systeme automatisierte Entscheidungen unter Unsicherheit treffen. Die Überlegungen betrafen die verwendeten Daten, deren automatisierte Verarbeitung und nicht zuletzt die ethisch motivierte Verantwortung für die getroffenen Entscheidungen.

Entscheidend sind Datengrundlage und Testumgebung

Prof. Simon Dobson, University of St. Andrews, Schottland, griff ein grundsätzliches Problem auf. Welche vorhandenen Datensätze sind überhaupt für welche Problemstellungen geeignet? Dazu schlug er ein Modell vor, das Datensätze systematisch evaluiert und kategorisiert. Aus dem Ergebnis der Evaluierung lässt sich ableiten, für welche Art der weiteren algorithmischen Verarbeitung sich die Daten eignen, damit sie die nötige Performanz in der Anwendung entfalten.

Dr. Andreas Blenk, Technische Universität München, konstatierte, dass viele verwendete Algorithmen auf sehr spezielle Modelle getrimmt sind und dort zuverlässige Ergebnisse liefern. Außerhalb dieser Modelle haben die Algorithmen aber häufig Schwachstellen, welche im schlimmsten Fall unentdeckt bleiben und die Performanz der entwickelten Systeme langfristig verschlechtern. Sein Ansatz identifiziert diese Schwachstellen in Algorithmen und plädiert somit für eine möglichst unsichere und allgemeine Testumgebung. Nur dann kann ein Algorithmus auch unter unsicheren Bedingungen adaptiv und flexibel auf realistische Szenarien reagieren. Sowohl die Evaluation von Datensätzen als auch geeignete Testumgebungen sind für MAKI entscheidend, um das Konzept der Transition erfolgreich unter echten Bedingungen einzusetzen.

Dr. Thomas Grothe, Universität Tübingen, beleuchtete ethische Aspekte solcher maschinell gefällten Entscheidungsprozesse. Gerade in Anwendungen wie dem autonomen Fahren oder der Medizin sind Fragen der Verantwortung und rechtlichen Haftung ein heiß diskutiertes Thema. Er machte klar, dass die Nachvollziehbarkeit maschinell gefällter Entscheidungen gegeben sein muss, um eine Situation im Nachhinein angemessen bewerten zu können. Nach seiner Ansicht können Mensch und Maschine lediglich in einem kooperativen und reflexiven Verhältnis zu gelingenden Ergebnissen kommen.

Systematisch mit Unsicherheiten umgehen lernen

Prof. Stephan Weiss, Universität Klagenfurt, stellte Verfahren vor, die Fehlmessungen von Sensorik identifizieren und die Weiterverarbeitung der gelieferten Informationen in geeigneter

Weise modifizieren. Seine Forschung versucht zum einen, das „Rauschen“ aus den Sensordaten zu filtern, und zum anderen, die ungenauen Daten sinnvoll zu verarbeiten, um das Endergebnis so präzise wie möglich zu berechnen. An diese Problematik knüpft Tobias Meuser an, der selbst am Sonderforschungsbereich MAKI an der Technischen Universität Darmstadt forscht. Seine Arbeit befasst sich mit der Priorisierung von Sensordaten innerhalb eines Netzwerks am Beispiel des autonomen Fahrens. Meuser entwickelte im Rahmen seiner Dissertation ein Verfahren, das die Sensordaten in einem Netzwerk auf deren Genauigkeit hin bewertet. Die präzisere Auswahl von Daten erhöht die Effizienz des Netzwerkes, indem zwar gleich viele, aber dafür genauere und relevantere Sensordaten verschickt werden.

Prof. Falko Dressler, Heinz Nixdorf Institut, Paderborn, verfolgte in seinem Vortrag einen Ansatz, der ebenfalls in Netzwerken im Bereich des autonomen Fahrens verwendet werden kann. Er zeigt auf, dass ein permanenter Datenaustausch zwischen Fahrzeugen zu sicherem Straßenverkehr führen würde. Gleichwohl droht damit eine Netzüberlastung, was die Realisierung von entsprechenden Fahrassistenzsystemen verhindert. Deshalb sind auch hier adaptive Netzkonzepte gefragt, die vor allem dann kommunizieren, wenn es nötig ist: in der Verkehrspraxis also bei starken Bremsungen oder Beschleunigungen. Das entlastet damit automatisch den Rest des Netzwerks. Das macht deutlich, wie adaptive und kontextabhängige Netzwerke, wie MAKI sie seit 2013 beforscht, einen Beitrag zu realen Anwendungen leisten können.

KuVS Newsletter

Calls and Announcements

5.1 Master program "eXtended Artificial Intelligence" at University of Würzburg

Tobias Hossfeld, Universität Würzburg

Artificial Intelligence systems are surrounding us everywhere we go: They enhance photos you take with your phone, recommend you websites, products or adds. They can even establish medical diagnoses, assist doctors during operations, drive cars or let you create and interact in virtual worlds. With AI applications in apps, programs and services increasing every day, you may have caught yourself on several occasions asking yourself: How do these AIs work?

With eXtended Artificial Intelligence (XtAI), the Julius-Maximilians-University of Würzburg is now offering a new, English computer science master's course that allows students to explore the idea, implementation and application of AIs from old proven systems all the way to the newest state-of-the-art. Additionally, students are able to put their AI knowledge into use when creating their own extended reality (augmented and virtual reality) applications.

The new English-language program "eXtended Artificial Intelligence" (XtAI) starts in the winter semester 2020/21 at the University of Würzburg. XtAI is a master's program in computer science with a special focus on the theoretical foundations and practical applications of artificial intelligence (AI) in combination with extended reality (XR). The objective of the program is to provide students with the key competences and knowledge that will enable them to design, develop, interact with and manage complex artificial intelligence systems. One focus of the program is the application area Extended Reality (Virtual/Augmented Reality).

Further information on the XtAI program and the application procedure can be found under XtAI: https://go.uniwue.de/xtai Nachfolgend finden Sie eine Übersicht über aktuelle Calls und Events im deutschsprachigem Raum.

5.2 Calls for Participation

- Annual CODE Conference postponed. Now planned for November, 10-12. Information available at https://www.unibw.de/code-events
- Capture The Flag 2020: Cube - Apocalypse scheduled for November 27.-28. Information available at https://www.unibw.de/code-events/ctf-registration

2nd KuVS Fachgespräch "Machine Learning and Networking" - 08/09 October 2020 - Würzburg, Germany (virtual event)

After the success of the first KuVS Fachgespräch "Machine Learning and Networking" in Munich in February 2020, the second edition of this workshop will be held in Würzburg on October 8 and 9, 2020. However, due to the current Corona Pandemic, the Fachgespräch will be held online.

Machine learning and artificial intelligence (ML/AI), in particular deep learning, has led to breakthroughs in various domains such as image recognition or natural language processing. This workshop focuses on the topic of ML/AI in the context of communication networks. It aims to discuss research visions and results as well as opportunities and challenges in the intersection of these two areas. The workshop looks for contributions and ideas that provide useful combinations of ML/AI approaches to address networking challenges on all layers from MAC to Application. See more details in the call for http://www.comnet.informatik.uni-wuerzburg.de/veranstaltungen/local-events/2nd-kuvs-fachgespraech-machine-learning-and-networking/call-for-papers/. The program is already available at http://www.comnet.informatik.uni-wuerzburg.de/veranstaltungen/local-events/2nd-kuvs-fachgespraech-machine-learning-and-networking/program/.

5.3 Calls for Papers

5.3.1 NetSys Call for Extended Abstracts and Hot Topic Papers

NetSys meets Hanse
08 - 11 March 2021 – Lübeck, Germany

The Conference on Networked Systems (NetSys 2021) is a traditional biennial event that provides an international forum for engineers and scientists in academia, industry, and government to present and discuss recent innovations in the realm of networked systems.

NetSys21 is again a joint event organized by GI KuVS (GI, Communication and Distributed Systems) and VDE ITG (VDE, Information Technical Society). The NetSys21 technical program focusses on original contributions in the area of networking and distributed systems and also features invited presentations on hot topics in networking and distributed systems, an industry session, separate workshops, tutorials, posters, demos, an early work track, and a Ph.D. forum. Also included is the annual 1-day ITG expert symposium "Future of Networking" (Zukunft der Netze, ZdN) with invited technical presentations on advanced topics in networking. The

German GI FG on Operating Systems also plans to hold its annual workshop in combination with NetSys 2021 in Lübeck.

So, NetSys 2021 solicits the **submission of extended abstracts** presenting original and novel research and ideas as well as **hot topic papers**, i.e. presentations of papers that have already been accepted or published at other conferences or journals in the field during the last two years.

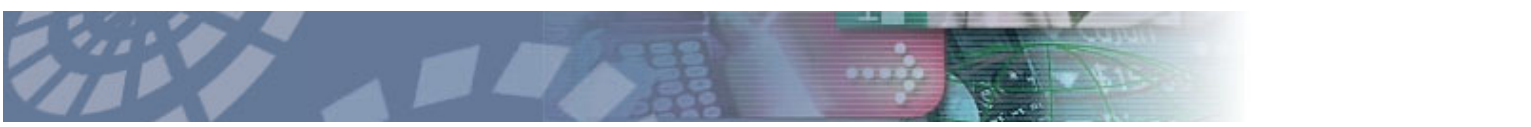
The NetSys21 TPC will select extended abstract papers for presentation and inclusion in the NetSys 2021 proceedings to be published open access via the journal Electronic Communications of the EASST ECEASST.

In addition, the **PC of NetSys'21 will select the best submitted abstracts and invite their authors to submit extended versions to a special issue of ACM TOIT**: SI on Recent Advances in Networks and Distributed Systems

Hot topic presentations shall highlight recent and highly significant results in networked and distributed systems to be presented in a highly innovative, thought-provoking and stimulating format - containing, e.g., new research topics, directions, and methods. This includes recent papers which appeared (or are to appear) in top journals (such as TON or CCR) or top conferences (such as SIGCOMM, IMC, MobiCom, CoNEXT, INFOCOM, ICDCS) that are of high interest for the NetSys community.

Both, extended abstracts and hot topic papers, can include, but are not limited to the following topics:

- Network architectures and protocols
- Transport- and application-layer protocols
- Software-defined networking, network function virtualization, and further network softwarization
- Mobile, ad-hoc, opportunistic, vehicular, and sensor networks
- Novel concepts for tactile and low-latency communication
- Pertinent middleware architectures, platforms, and programming support for networked systems
- Internet of Things (IoT)
- Cloud computing, mobile cloud computing, fog and edge computing
- Network security and privacy
- Information-centric networking, content distribution and retrieval, and their co-existence with classical networks



- SoA, web services, and mobile services
- Consistency, reliability, availability in networking and distributed systems
- Advancements in social networks, social computing, data-intensive computing (big data)
- Methods for design, implementation and analysis of networked systems
- Cyber-physical networked systems
- Green and energy-efficient networks / networked systems
- Artificial Intelligence and Machine Learning as well as their application in, and impacts on, networking
- Distributed ledger systems and applications
- Emerging and future networked applications and distributed systems

Important Dates

Extended abstract submissions

- **Registration & submission:** Friday, October 16th, 2020
- **Notification of acceptance:** Monday, November 30th, 2020
- **Camera-ready due:** Friday, January 29th, 2021

Hot topic submissions

- **Registration & submission:** Friday, December 18th, 2020
- **Notification of acceptance:** Friday, January 15th, 2021

For other dates (workshop proposals, demo papers, PhD Forum, etc.) see netsys2021.org.

Submission Guidelines for Extended Abstracts All abstract submissions must be original, unpublished, and not considered elsewhere for publication. Extended abstracts are limited to 4 pages including references, figures and tables (at least 10pt font, one-column format). LaTeX and Microsoft Word templates, as well as formatting instructions, are available online here.

Contributions should be submitted electronically as PDF via EasyChair (https://easychair.org/conferences/?conf=netsys2021).

The abstracts will undergo a thorough process of peer reviews by at least three members of the technical program committee.

Submission implies that at least one author will register and attend the conference to present the extended abstract via a talk or potentially via a poster.

Accepted and presented extended abstracts will be published in the conference proceedings. The authors of the best extended abstracts will be invited to submit a long version of their research to a special issue of ACM TOIT.

Submission Guidelines for Hot Topic Papers We expect submissions of papers already published or accepted at top-tier venues. Please submit the full paper or at least the front page (at least including title, authors, abstract, and publication venue) of the published paper as well as its complete reference via this EasyChair link.

Accepted hot topic papers have to be presented at the conference. The presentations will be 15-20 minutes per talk (at the discretion of the NetSys organizers).

PC Chairs

- Mathias Fischer
  mfischer@informatik.uni-hamburg.de
  Universität Hamburg, Germany
- Winfried Lamersdorf
  lamersdorf@informatik.uni-hamburg.de
  Universität Hamburg, Germany

5.3.2 NetSys Call for Demos

The conference on Networked Systems (NetSys 2021) is a traditional biennial event that provides an international forum for engineers and scientists in academia, industry, and government to present and discuss recent innovations in the realm of networked systems. NetSys21 is again a joint event organized by GI KuVS (GI, Communication and Distributed Systems) and VDE ITG (VDE, Information Technical Society).

The NetSys 2021 demo session showcase work-in-progress in an informal setting. We strongly encourage student and industry submissions. The NetSys 2021 Demo committee will review all demo proposals. Authors of accepted papers in NetSys 2021 may not submit the same work to this call.

The topics of interest are identical, but are not limited, to the ones of the main conference:

- Network architectures and protocols
- Transport- and application-layer protocols
- Software-defined networking, network function virtualization, and further network softwarization
- Mobile, ad-hoc, opportunistic, vehicular, and sensor networks
- Novel concepts for tactile and low-latency communication
- Pertinent middleware architectures, platforms, and programming support for networked systems
- Internet of Things (IoT)
- Cloud computing, mobile cloud computing, fog and edge computing
- Network security and privacy
- Information-centric networking, content distribution and retrieval, and their co-existence with classical networks
- SoA, web services, and mobile services

- Consistency, reliability, availability in networking and distributed systems
- Advancements in social networks, social computing, data-intensive computing (big data)
- Methods for design, implementation and analysis of networked systems
- Cyber-physical networked systems
- Green and energy-efficient networks / networked systems
- Artificial Intelligence and Machine Learning as well as their application in, and impacts on, networking
- Distributed ledger systems and applications
- Emerging and future networked applications and distributed systems

IMPORTANT DATES

- **Submission deadline:** Friday, Friday, October 16th, 2020
- **Notification of acceptance:** Monday, November 30th, 2020
- **Camera-ready due:** Friday, January 29th, 2021

For other dates (Hot Topics, workshop proposals, PhD Forum, etc.) see netsys2021.org.

SUBMISSION PROCEDURE All submissions must be original, unpublished, and not considered elsewhere for publication. Demo papers must be 4 pages in total including all content, references and acknowledgments (at least 10pt font, one-column format). Demo submissions should incorporate a brief description of the demo and a system architecture illustration.

The papers will undergo a thorough process of peer reviews by at least three members of the technical program committee.

Submission implies that at least one author will register and attend the conference to present the demo. Furthermore, a brief introduction of the topics (One-Minute-Madness) is used to attract attention of conference participants to the demo.

LaTeX and Microsoft Word templates, as well as formatting instructions, are available online here.

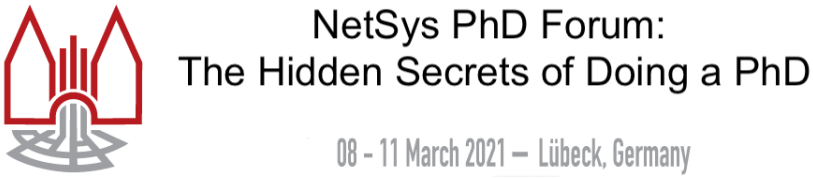
Contributions should be submitted electronically as PDF via this EasyChair link.

There will be a best demo award.

Demo Chairs

- Andreas Timm-Giel Hamburg University of Technology, Germany
- Alexey Vinel Halmstad University, Sweden
- Koojana Kuladinithi Hamburg University of Technology, Germany

5.3.3 Netsys Call for PhD Forum & Early Work Track



The PhD Forum at the Networked Systems 2021 follows the tradition and format of similar events at international conferences such as ICNP, PerCom, or UbiComp. The aim is twofold. First, it should provide PhD students in any phase of their career with an opportunity to discuss the hidden secrets behind doing a PhD and general career advice – topics that are rarely openly discussed (e.g., finding research problems, managing your supervisor, ...) - during the PhD Forum on Monday. Second, it additionally provides PhD students the option to present their early work as poster and to discuss it with experts to gain general technical feedback during the Early Work Presentation taking place at the main conference. Beyond, attending the PhD Forum is an excellent opportunity for young researchers to start a personal network with other PhD students as well as with already established experts.

What can I Expect?

PhD Forum: The hidden secrets when doing your PhD

This is a dedicated meeting on Monday before the main conference, full of discussions and fun with your direct peers and us. The aim of the PhD Forum is the discussion of meta aspects and experiences regarding a PhD – the hidden secrets when doing your PhD and general career advice. Potential topics will be:

- Deep PhD study in the time of digital distraction
- Having a family + doing a PhD – are you crazy?
- Continuously improving my skills: e.g., speed reading and ultra learning
- Doctoral supervision: being supervised and being a supervisor
- Best paper stories: targeting high and being rejected
- Academic peer review: what are factors that determine paper acceptance / rejection and why are some of them random?
- How dare you to steal my contributions?! Working in teams and writing a PhD thesis
- Working internationally

- Becoming a team leader and how to find good students
- Hints on writing papers and making presentations – please don't overload

To tailor the discussion of meta aspects to your interest, attendance requires the submission of input in advance (e.g., questions on which we will organize the day) mentioned in the call below.

As done at NetSys 2019, we will also invite keynote speakers who will report about their research journey from a PhD student to a leading expert.

Early Work Poster Presentation:

In addition to the PhD Forum, an early work poster presentation of selected participants will take place during a poster session at the main conference. A brief introduction of the topics (One-Minute-Madness) during the main conference program is used to attract attention of conference participants to this early work poster session.

The PhD Forum + Early Work Poster Presentation are special opportunities to discuss research plans and results face-to-face with professors and senior researchers in individual groups outside the own lab.

What should I submit – One Forum but Two Calls!

Call PhD Forum attendance (always required):

The first call concerns the participation at the PhD Forum on Monday that focuses on discussing meta aspects concerning the PhD process (e.g., research, publication strategies, time management, . . .). If you plan to attend on Monday, submit to this call (no poster abstract required). If you plan to also submit an Early Work Poster Presentation (see next call), you must also submit to this call in addition.

What to submit: Prospective participants should prepare an application that includes the following information:

- Curriculum Vitae: a brief CV that lists the education and research interests of the PhD student.
- A motivational letter ($\sim$ 1 page): the motivational letter should discuss the following aspects in the following order:
  - Motivation: why do do want to attend the PhD Forum and what do you expect from it? (1 paragraph)

- Your research area and the specific problem that you would think to work on. (1 paragraph)
- Questions you would like to discuss at the PhD Forum (e.g., how to find a good research problem, how to manage time, how to manage your supervisor, ...). We will structure the PhD Forum on Monday around discussing your questions (¿3 questions)

Submission should be done electronically as PDF, via https://easychair.org/conferences/?conf=netsys2021

Call Early Work Poster Presentation (optional, but expected for more experienced (> 1 year) PhD students):

For more experienced PhD students (¿ 1 year of their PhD) that want to present their preliminary work during our poster and madness session during the main conference. Note, however, also fresh PhD students can submit an early work proposal.

Student research competition: We will award the best early work poster presentation (i.e., madness presentation and poster).

The early work submissions will be peer reviewed by experts from the main conference.

Submission implies that the PhD student registered for the PhD forum. That is, when submitting an early work poster, you must additionally have submitted to the PhD Forum call for attendance before (see above).

Submission should be done electronically as PDF, via https://easychair.org/conferences/?conf=netsys2021

Submission Guidelines for Early Work Poster Presentation

All early work poster presentation submissions must be original, unpublished, and not considered elsewhere for publication.

Early work submissions are limited to 4 pages including figures and tables (at least 10pt font, one-column format) plus 1 page for references. LaTeX and Microsoft Word templates, as well as formatting instructions, are available online here: https://netsys2021.org/participation

Accepted and presented extended abstracts will be published in the conference proceeding. Submission implies that at least one author will register and attend the conference to present the poster.

Important Dates:

Call Early Work Poster submissions

- Registration & submission: Friday, October 16, 2020
- Notification of acceptance: Monday, November 30, 2020

Call PhD Forum submissions

- Registration & submission: Friday, December 18, 2020
- Notification of acceptance: Friday, January 15, 2021
- PhD Forum: Monday, March 3, 2020

PhD Forum Chairs

- Andreas Blenk – Technical University of Munich, Germany/University of Vienna, Faculty of Computer Science, Austria
- Oliver Hohlfeld – Brandenburg University of Technology (BTU), Germany

5.3.4 Netsys Call for Workshop Papers - Machine Learning in Networking (MaLeNe)

Call for Papers

The First International Workshop on Machine Learning in Networking (MaLeNe) will be held in conjunction with the Conference on Networked Systems (NetSys 2021) in Lübeck, Germany, from March 08-11, 2021.

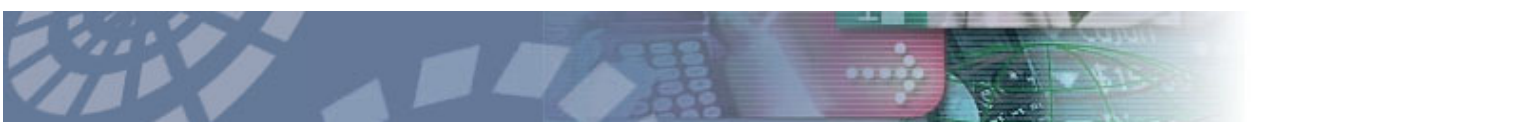
Aims of the Workshop

In recent years, communication networks have become highly flexible through the employment of virtualization and softwarization paradigms. Still networks are highly complex, dynamic and time-varying systems, such that the statistical properties of networks and network traffic cannot be easily understood and modeled. Furthermore, the interplays between networking and the dynamic and heterogeneous requirements, expectations, and experiences of applications and users are increasing the complexity of the systems, which makes fault, configuration, performance, and security management in networks a hard problem. As observed in other disciplines, the successful application of machine learning can help to overcome these issues by following a more data-driven approach. Also in the networking domain, the technological advancements in the area of machine learning, the increasing availability of network analytics data, and the flexibility of programmable networks and virtualized network resources have made this approach applicable, which creates exciting new opportunities.

MaLeNe 2021 aims at providing an international forum for researchers addressing emerging concepts and challenges related to machine learning in networking. The workshop will aim to address opportunities where machine learning can bring benefits to networking in different facets, such as network monitoring, management, and security. Together with flexible and programmable networks this paves the way towards a more proactive and autonomous network design and “self-driving” networks. The long-term vision is that configuration decisions can be made in real-time in an automated fashion before service and experience degradation occurs. The workshop will combine original paper presentations with a motivating keynote to thoroughly explore this challenging topic.

Topics of Interest

- Methodology
  - Data sets for benchmarking, verification, proof of concept
  - Data augmentation
  - Performance evaluation methodology (best practices)
  - Good standards for data publishing
  - Data prediction and generation (e.g., GANs)
  - Dimensionality reduction (e.g., autoencoder)
- Methodology
  - Classical methods like supervised, unsupervised, reinforcement learning
  - Deep methods vs non-deep methods
  - Advanced methods like adversarial, transfer
- Generalizability
  - Transfer of trained models (e.g., small to large networks, enterprise to data center)
  - Federated learning (combine models trained for different data sets)
  - Machine unlearning
  - Catastrophic forgetting
- Explainability
  - Visualization
  - Understanding decisions of ML-based systems (management, traffic engineering, etc.)
  - Game-theory-based approaches to approximate guarantees
- Networking for Machine Learning and AI
  - Network architectures
  - Network applications
  - Network use cases (data center, enterprise, etc.)
  - Network resource management (algorithms, schedulers, etc.)
  - In-network processing
- Applications in Networking



  - Network monitoring, especially from encrypted traffic (e.g., traffic classification, QoE)
  - Network configuration (e.g., suggest optimal configurations, "spell-check" text-based configuration data)
  - Network planning (e.g., reconfigurable data centers, job placement)
  - Network management (e.g., autonomous management, self-driving networks)
  - Network security (e.g., intrusion detection, covert channels, firewall)
  - Advanced networks (e.g., 5G to 6G, industry, slicing)
- Hot Topics from Machine Learning
  - Self-supervised learning
  - Intrinsic motivation, empowerment, curiosity
  - Language processing in networking
  - Meta-artificial intelligence (learning to learn)

Workshop Chairs

- Michael Seufert, Julius-Maximilians-Universität Würzburg, Germany
- Andreas Blenk, Technical University of Munich, Germany/University of Vienna, Faculty of Computer Science, Austria

Submission

Paper submissions must present original, research or experiences. Late-breaking advances and work-in-progress reports from ongoing research are also encouraged. Only original papers that have not been published or submitted for publication elsewhere can be submitted. Also extended versions of conference or workshop papers that are already published may be considered as long as the additional contribution is at least 30 % new content from the original. Each submission must be written in English, accompanied by a 75 to 200 word abstract and a list of up to 5 key words. There is a length limitation of 6 A4 (210 mm x 297 mm) pages for full papers (including title, abstract, figures, tables) plus 1 page for references. Submissions must be in 2-column IEEE conference style with a minimum font size of 10 pt. Papers exceeding these limits, multiple submissions, and self-plagiarized papers will be rejected without further review. Authors should submit their papers electronically via the EasyChair online submission system under the following link: https://easychair.org/conferences/?conf=netsys2021 (select track: Workshop MaLeNe).

Important Dates:

- Paper submission deadline: December 6, 2020
- Acceptance notification: January 15, 2021
- Camera ready papers: January 29, 2021

International Conference on Networked Systems 2021 8-11 March 2021 - Lübeck, Germany https://netsys2021.org

Call for Extended Abstracts and Hot Topic Papers

The conference on Networked Systems (NetSys 2021) is a traditional biennial event that provides an international forum for engineers and scientists in academia, industry, and government to present and discuss recent innovations in the realm of networked systems.

NetSys21 is again a joint event organized by GI KuVS (GI, Communication and Distributed Systems) and VDE ITG (VDE, Information Technical Society). The NetSys21 technical program focusses on original contributions in the area of networking and distributed systems and also features invited presentations on hot topics in networking and distributed systems, an industry session, separate workshops, tutorials, posters, demos, an early work track, and a PhD forum. Also included is the annual 1-day ITG expert symposium "Future of Networking" (Zukunft der Netze, ZdN) with invited technical presentations on advanced topics in networking. The German GI FG on Operating Systems also plans to hold its annual workshop in combination with NetSys 2021 in Lübeck.

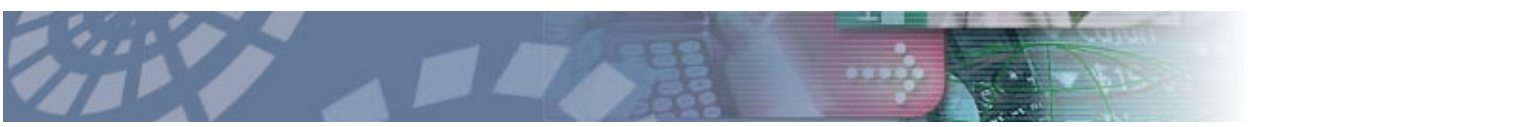
So, NetSys21 solicits the submission of extended abstracts presenting original and novel research and ideas as well as hot topic papers, i.e. presentations of papers that have already been accepted or published at other conferences or journals in the field during the last two years.

The NetSys21 TPC will select extended abstract papers for presentation and inclusion in the NetSys21 proceedings to be published open access via the journal Electronic Communications of the EASST (ECEASST) (https://journal.ub.tu-berlin.de/eceasst). In addition, the PC of NetSys'21 will select the best submitted abstracts and ask their authors to submit extended versions to a special issue of ACM TOIT (https://dl.acm.org/journal/toit/).

Hot topic presentations shall highlight recent and highly significant results in networked and distributed systems to be presented in a highly innovative, thought-provoking and stimulating format - containing, e.g., new research topics, directions, and methods. This includes recent papers which appeared (or are to appear) in top journals (such as TON or CCR) or top conferences (such as SIGCOMM, IMC, MobiCom, CoNEXT, INFOCOM, ICDCS) that are of high interest for the NetSys community.

Both, extended abstracts and hot topic papers, can include, but are not limited to the following topics:

- Network architectures and protocols
- Transport- and application-layer protocols
- Software-defined networking, network function virtualization, and further network softwarization
- Mobile, ad-hoc, opportunistic, vehicular, and sensor networks



- Novel concepts for tactile and low-latency communication
- Pertinent middleware architectures, platforms, and programming support for networked systems
- Internet of Things (IoT)
- Cloud computing, mobile cloud computing, fog and edge computing
- Network security and privacy
- Information-centric networking, content distribution and retrieval, and their co-existence with classical networks
- SoA, web services, and mobile services
- Consistency, reliability, availability in networking and distributed systems
- Advancements in social networks, social computing, data-intensive computing (big data)
- Methods for design, implementation and analysis of networked systems
- Cyber-physical networked systems
- Green and energy-efficient networks / networked systems
- Artificial Intelligence and Machine Learning as well as their application in, and impacts on, networking
- Distributed ledger systems and applications
- Emerging and future networked applications and distributed systems

IMPORTANT DATES

Extended abstract submissions

- Registration & submission: Friday, October 16th, 2020
- Notification of acceptance: Monday, November 30th, 2020
- Camera-ready due: Friday, January 29th, 2021

Hot topic submissions

- Registration & submission: Friday, December 18th, 2020
- Notification of acceptance: Friday, January 15th, 2021

For other dates (workshop proposals, demo papers, early work and PhD Forum) see https://netsys2021.org.

SUBMISSION GUIDELINES FOR EXTENDED ABSTRACTS

All abstract submissions must be original, unpublished, and not considered elsewhere for publication. Extended abstracts are limited to 4 pages including references, figures and tables (at least 10pt font, one-column format) in ECEASST-Style. LaTeX and Microsoft Word templates, as well as formatting instructions, are available online here: https://netsys2021.org/participation

Contributions should be submitted electronically as PDF, via EasyChair: https://easychair.org/conferences/?conf=netsys2021

KuVS Newsletter

The 19th International Conference on Pervasive Computing and Communications (PerCom 2021), March 22-26, 2021 in Kassel, Germany

http://www.percom.org

In 2021, IEEE PerCom will visit Kassel, situated at the geographic center of Germany and a dynamic industrial and cultural city. It is known for its UNESCO World Heritage site "Bergpark Wilhemshöhe" and famous for a leading exhibition of contemporary art "documenta".

PerCom is the premier annual scholarly venue in pervasive computing and communications. Pervasive computing has found its way into many commercial systems due to tremendous advances in a broad spectrum of technologies and topics such as wireless networking, mobile and distributed computing, sensor systems, ambient intelligence, and smart devices.

SCOPE

PerCom 2021 solicits research contributions in all areas pertinent to pervasive computing and communications, especially those that cross traditional research boundaries. In particular, we target:

- Advances in pervasive systems and infrastructures: middleware systems and services; data engineering for pervasive computing; clouds, fog and edge computing; integrations of smartphones in pervasive experiences; applications of device-to-device coordination
- Theories, models, and algorithms: context modeling and reasoning; adaptive computing; activity and emotion recognition; programming paradigms; applied machine learning; deep machine learning; federated learning; casual learning; cognitive computing; complex networks; spatio-temporal modeling techniques
- Domain-specific challenges and novel applications: urban/mobile crowdsensing & intelligence; PerCom for healthcare and well-being; cyber-physical PerCom; smart homes and

virtual assistants; innovative PerCom applications (e.g., sports analytics, crime prevention, pervasive nowcasting).

- Intersections of PerCom with: opportunistic networks; IoT and sensor systems; RFID systems; pervasive data science, cyber physical systems.
- New techniques for user-level concerns: participatory and social sensing; trust, security, and privacy; user interface, interaction, and persuasion; online and offline social networking and pervasive computing.
- Technological innovations: architectures, protocols, and technologies for pervasive communications; energy-harvesting, self-powered, or battery-less systems; mobile and wearable systems; smart devices and environments; positioning and tracking technologies; wireless crowd-recharging; device-free human sensing.

Contributions can be analytical, empirical, technological, methodological, or a combination. Papers reporting strong systems engineering contributions backed by solid and appropriate evaluations are strongly encouraged. The impact of the contributions should be demonstrated in the context of pervasive computing and communications applications.

Special note: PerCom 2021 will follow a double-blind review process. As a result, authors must make a good faith effort to anonymize their submissions.

IMPORTANT DATES:

- Paper registration in EDAS: September 28, 2020
- Submission via EDAS: October 4, 2020
- Notification: December 22, 2020
- Camera Ready: February 5, 2021

ORGANIZING COMMITTEE: General Chairs

- Klaus David, University of Kassel, Germany
- Jadwiga Indulska, The University of Queensland, Australia

Technical Program Chair

- Amy L. Murphy, Bruno Kessler Foundation, Italy

Program Vice Chairs

- Chiara Boldrini, IIT-CNR, Italy

- Paul Castro, IBM Watson, USA
- Mahbub Hassan, University of New South Wales, Australia

Workshop Chairs

- Peizhao Hu, Rochester Institute of Technology, USA
- Stephan Sigg, Aalto University, Finland

CONTACT INFORMATION: percom2021@gmail.com
http://www.percom.org

5th International Workshop on Emotion Awareness for Pervasive Computing with Mobile and Wearable Devices

In conjunction with

2021 IEEE International Conference on Pervasive Computing and Communications (PerCom 2021), March 23-27, 2021, in Kassel, Germany.

An important goal of pervasive computing is to integrate computer devices into the users' everyday life seamlessly. This allows context-aware applications to gather information about the users to support them in their daily tasks. A newly attractive source of information for pervasive computing is provided by mobile devices, wearable devices, and pervasive sensors able to detect the emotional state of the users. In many real-world scenarios, it is essential to use wearable sensors, embedded in mobile devices such as smartphones and smartwatches, to measure the emotional state of the user. This would help to understand how emotions influence processes such as decision making and reasoning. However, emotion recognition remains to be a complex and challenging task mainly regarding the following aspects: sensing modalities, data analysis, and its application in real life.

- Sensing Modalities – what to sense and what kind of sensors can be used? Physical sensors in mobile devices or biosensors in wearable devices and pervasive sensors (e.g. RF sensors) are currently available.
- Data analysis – different approaches to emotion recognition are based on different types of collected data.
- Application – how to effectively use the emotion information in pervasive computing and context-aware applications.

While there have been, many contributions targeting some of these challenges, there are still unsolved problems. The proposed workshop will explore the challenges of the sensing, modelling, and recognizing of emotions by using embedded sensors in smartphones, in wearable devices, and pervasive sensors (e.g. RF sensors) for pervasive computing. We aim to have

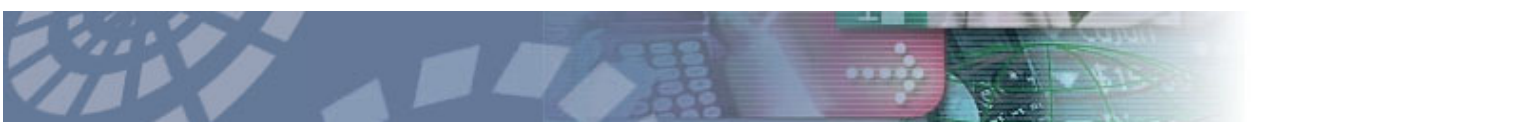
unique contributions addressing these challenges and to provide a discussion space to facilitate collaboration among researchers interested in emotion recognition for pervasive computing.

Topics of interests include, but are not limited to the following areas:

- Theory, experimental design, computational models, algorithms, and evolutional investigation in emotion detection for pervasive computing.
- Emotion representations and signal characteristics that describe and identify emotions or stress.
- Mobile data measurement and collection platforms for emotion detection.
- Approaches to obtaining reliable ground truth and affective data annotation for emotion research.
- Emotion detection algorithms/approaches using data collected with mobile devices, wearable devices and pervasive sensors (e.g. RF sensors)
- User studies and evaluation techniques for emotion detection and automated systems that model and detect emotions.
- Awareness of emotions in collaboration or crowdsourcing.
- The novel use of emotion information in pervasive computing applications.
- The application of emotion information for the work-life balance, for a healthier life and behavior.
- The combined research of emotion recognition and artificial intelligence (AI).
- The investigation of the human-robot interaction.
- Privacy issues
- Presentation of emotions
- Applications of emotions
- Integration of emotions into lifelogging applications

Technical Program Committee

- Dr. Chelsea Dobbins (School of Information Technology and Electrical Engineering, University of Queensland, Australia)
- Prof. Dr. Klaus David (Chair for Communication Technology (ComTec), University of Kassel, Germany)



- Prof. Bernd Radig (Technical University of Munich, Germany)
- Prof. Dr. Sandra Ohly (Business Psychology Group, University of Kassel, Germany)
- Prof. Dr. Tadashi Okoshi (Graduate School of Media and Governance, Keio University, Japan)
- M. Sc. Judith Heinisch (Chair for Communication Technology (ComTec), University of Kassel, Germany)
- Prof. Dr. Joyce Westerink (Chair of Wellbeing and Psychophysiology in the Human Technology Interaction, Eindhoven University of Technology, Netherlands)
- Prof. Midori Sugaya (Department of Computer Science and Engineering, Shibaura Institute of Technology (SIT), Japan)

Workshop Policies:

- The workshop will be affiliated to IEEE PerCom 2021, to be held in Kassel, Germany.
- Each accepted workshop paper requires a full PerCom registration (no registration is available for workshops only).
- Workshop papers will be included and indexed in the IEEE digital libraries (Xplore)

Important Dates
Paper submission: November 9, 2020
Paper notifications: January 5, 2021
Camera ready: January 11, 2021

Organizers Prof. Dr. Klaus David (Kassel University, Germany)
Prof. Dr. Tadashi Okoshi (Keio University, Japan)
Dr. Chelsea Dobbins (University of Queensland, Australia)

Email: emotionaware@comtec.eecs.uni-kassel.de

KuVS Newsletter

Passive & Active Measurement (PAM) Conference 2021

https://www.pam2021.b-tu.de/

The Passive and Active Measurement (PAM) conference brings together researchers and operators to discuss novel and emerging work in the area of network measurement and analysis. PAM is inclusive of all areas of network measurement, but focuses on systems-based research and real-world data. Indeed, measurement technology is needed at all layers of the network stack, ranging from power profiling of hardware components to virtualization in data centers to application profiling and even user experience. Work with operational impact or relevance to the broader network research community is especially welcome, as is early and promising measurement technique.

Important Dates

- Paper Registration: October 16th, 2020
- Paper Submission: October 23rd, 2020
- Notification to Authors: December 18th, 2020
- PAM Conference: Late March / early April - to be announced

General Chair

- Oliver Hohlfeld (Brandenburg University of Technology)

PC Chairs

- Andra Lutu (Telefónica)
- Dave Levin (University of Maryland)

Fun

How 2 Shor10 English Texts

Riddles Based on a "Mathematically Oriented Reform" of English Orthography

Rolf Windenberg (alias: Nigel Fred Brown)

The Rules:

1. Usage of mathematical symbols and of numbers
2. Capital letters are pronounced as in the alphabet

Examples:

(Trafalgar)² [meaning: Trafalgar Square]
√66 [meaning: Route 66]
Y R U so Z 2dA ? [meaning: why are you so sad today ?]

Fig. 1: Illustration to assist the reader in solving the third riddle (source: [1])

The Riddles *(Solutions on the next page)*:

- *Beginners:* **1st V R drinking T**
- *Playing with Capital letters:* **HNC**
- *Advanced Persons:*
  (gr+pa) + (gr+ma) still 0 2 walk h+ in h+
  [hint: 0 pronounced "love" (as in tennis)]
- *Experts:*
  his per4mance was the bSt of ∀ c+id8s
- *Geniuses:* **R U sure th@ ∀ this ⇒ ⊘**

[1] Windenberg, R., Hasselfang, R.W.: How 2 Shor10 English Texts. Shaker Media Verlag, Düren, ISBN 978-3-95631-590-9, 2017

Solutions for riddles (by Rolf Windenberg):

- first we are drinking tea [because: *first*-*V*-*R*-drinking-*T*]
- agency [because: *H*-*N*-*C*]
- grandpa and grandma still love to walk hand in hand [because: gr-*and*-pa-*and*- gr-*and*-ma-still-*love*-*two*-walk-h-*and*-in-h-*and*]
- his performance was the best of all candidates [because: *his*-*per*-*four*-mance-was-the-b-*S*-t-of-*all*-c-*and*-id-*eight*-s]
- are you sure that all this implies nothing ? [because: *R*-*U*-sure-th-@-*all*-this-*implies*-*nothing* ?]

KuVS Newsletter

Next Newsletter 2020 - 08 Back to Contents

Next Newsletter

Nächster Newsletter : Februar 2020

Einreichungsfrist für Beiträge : 15. Januar 2021

We ask you for submissions in English. Topics can be from the following time frame: August 2020 - January 2021.

- Fachgruppe KuVS
  - Geschäftsberichte der GI – KuVS – Fachgruppe
  - ...
- News from the working groups
  - Dissertations
  - Awards
  - News form persons
  - Open positions
  - ...
- New projects (DFG, BMBF, KMU, etc.)
  - Initiatives
  - Larger projects
  - ...
- Calls and news from events, conferences, etc.
  - Reports (Conferences, workshops, Fachgespräche, Dagstuhl, doctoral summer/winter schools, ...)
  - Call for papers and participation
    (conferences (supported by or hosted in Germany/Austria/Switzerland), Fachgespräche, Summer Schools, ...)
  - ...
- Announcements and important dates

The preferred submission format is text, e.g., using markdown language. Call for papers can also be submitted as PDFs.

Submissions should be done by sending emails to the editors:

mailto:oliver.hohlfeld@b-tu.de mailto:mathias.fischer@uni-hamburg.de

mailto:corinna.schmitt@unibw.de mailto:andreas.blenk@tum.de