Research Survey Reports and Presentations

Communication Networks Group

October 12, 2022

This document gives an introduction to the research surveys requested for the communication networks course. It is valid in winter semester 2022/23.

1 General Remarks

One part of your final grade for the course on communication networks is a group research survey. You will be working in groups of three but will be evaluated individually. Your task is to work out a survey on a research field according to the topic you have chosen. You will be supervised by a member of the communication networks group that proposed the topic. This supervision should include regular meetings, in which you present the progress of your work.

For the survey, you will have to write a report (in LaTeX with IEEE paper format) of 4.5 pages (1.5 pages per student). It must be stated which student authored which part of the report. Please be aware that we will use a plagiarism check to discover plagiarism. Plagiarism will immediately lead to failing the survey for the student who tried to copy contents without correctly citing. You can submit preliminary versions of your report to the supervisor to receive feedback. The final report is due on **January 15, 2023**.

At the end of the lecture time in February (as soon as we have the fixed date, you will be informed), you need to give a short presentation with all other students as participants. The presentation will be 10 minutes (per group) plus 5 minutes discussion/questions and again, each group member needs to present a part of the overall presentation.

The project is mandatory for all students that collect 10 credit points from the communication networks course. The others can earn bonus points for the final grade. The project is worth 20% of the final grade.

2 Topics

2.1 HTTP/3 and QUIC

2.1.1 Supervisor

Prof. Jochen Seitz
Office: H 3505 (Helmholtz-Building)
Phone: +49 3677 69-2614
E-Mail: Jochen.Seitz@tu-ilmenau.de

2.1.2 Short Summary

HTTP/3 is the third major version of the Hypertext Transfer Protocol (HTTP) used to exchange information on the World Wide Web. Unlike previous versions which relied on the Transmission Control Protocol TCP, HTTP/3 uses QUIC, a multiplexed transport protocol built on the User Datagram Protocol UDP as suggested by Google. The presentation should compare HTTP/3 to the earlier versions of HTTP and explain QUIC in comparison to TCP.

2.1.3 References to Start with

- **Bishop**, Mike (June 2022): *HTTP/3*. Internet Engineering Task Force (IETF) (Request for Comments, 9114). Online available: https://www.rfc-editor.org/rfc/rfc9114.pdf.
- **Iyengar**, Jana; **Thomson**, Martin (May 2021): *QUIC: A UDP-Based Multiplexed and Secure Transport*. Internet Engineering Task Force (IETF) (Request for Comments, 9000). Online available https://www.rfc-editor.org/rfc/rfc9000.pdf.

2.2 Artificial Intelligence for 6G

2.2.1 Supervisor

Prof. Jochen Seitz
Office: H 3505 (Helmholtz-Building)
Phone: +49 3677 69-2614
E-Mail: Jochen.Seitz@tu-ilmenau.de

2.2.2 Short Summary

In telecommunications, 6G is the sixth generation standard currently under development for wireless communications technologies supporting cellular data networks. In order to enhance the service quality already provided by 5G, Artificial Intelligence (AI) seems a promising technology. Therefore, the survey should concentrate on the application fields of AI in 6G and the expected advantages.

2.2.3 References to Start with

- **Bandi**, Ajay (2022): *A Review Towards AI Empowered 6G Communication Requirements, Applications, and Technologies in Mobile Edge Computing*. In: 2022 6th International Conference on Computing Methodologies and Communication (ICCMC). Erode, India, 3/29/2022 - 3/31/2022, IEEE, pp. 12—17.
- **Kitanov**, Stojan; **Nikolikj**, Vladimir (2022): *The Role of Edge Artificial Intelligence in 6G Networks*. In: 2022 57th International Scientific Conference on Information, Communication and Energy Systems and Technologies (ICEST). Ohrid, North Macedonia, 6/16/2022 - 6/18/2022, IEEE, Spp. 1—4.

2.3 Software-Defined Networking (SDN)

2.3.1 Supervisor

Prof. Jochen Seitz
Office: H 3505 (Helmholtz-Building)
Phone: +49 3677 69-2614
E-Mail: Jochen.Seitz@tu-ilmenau.de

2.3.2 Short Summary

Software-defined networking is a more flexible and adaptive approach to organize and manage communication networks. It separates the forwarding plane (in the SDN switches) from the control plane (in the SDN controller) allowing much quicker forwarding and a central view on the overall networks. This survey should explain the advantages and compare the SDN approach to legacy networks.

2.3.3 References to Start with

- **Anerousis**, Nikos; **Chemouil**, Prosper; **Lazar**, Aurel A.; **Mihai**, Nelu; **Weinstein**, Stephen B. (2021): *The Origin and Evolution of Open Programmable Networks and SDN*. In: IEEE Communications Surveys & Tutorials 23 (3), pp. 1956–1971. DOI: 10.1109/comst.2021.3060582.
- **Bonfim**, Michel S.; **Dias**, Kelvin L.; **Fernandes**, Stenio F. L. (2019): *Integrated NFV/SDN Architectures*. In: ACM Computing Surveys 51 (6), S. 1–39. DOI: 10.1145/3172866 .

2.4 Automotive Ethernet

2.4.1 Supervisor

Prof. Jochen Seitz
Office: H 3505 (Helmholtz-Building)
Phone: +49 3677 69-2614
E-Mail: Jochen.Seitz@tu-ilmenau.de

2.4.2 Short Summary

Although different communication technologies have evolved in the car, the most recent and promising one is Automotive Ethernet. This technology tries to leverage the best characteristics of traditional ethernet for local area networks, but enhances the technology to suit the needs of in-car communications. This survey should cover the main features of Automotive Ethernet and compare it to the traditional ethernet.

2.4.3 References to Start with

- **Paret**, Dominique; **Rebaine**, Hassina (Eds.) (2022): *Autonomous & Connected Vehicles. Network Architectures from Legacy Networks to Automotive Ethernet*. Hoboken, NJ: Wiley.
- **Matheus**, Kirsten; **Königseder**, Thomas (2021): *Automotive Ethernet*. Third edition. Cambridge, United Kingdom, New York, NY: Cambridge University Press.

2.5 Publish/Subscribe Communication for the Internet of Things

2.5.1 Supervisor

Prof. Jochen Seitz
Office: H 3505 (Helmholtz-Building)
Phone: +49 3677 69-2614
E-Mail: Jochen.Seitz@tu-ilmenau.de

2.5.2 Short Summary

In the Internet of Things (IoT), the number of simple end nodes (e.g., sensor nodes) providing certain information is growing rapidly, as well as the number of applications utilizing this information. Due to this growing number, a point-to-point communication (like a client-server communication) is not possible anymore, demanding for new communication paradigms. One promising paradigm is publish/subscribe communication, for which several different communication protocols exist that shall be introduced and compared in this survey.

2.5.3 References to Start with

- **Kul**, Seda; **Sayar**, Ahmet (2021): *A Survey of Publish/Subscribe Middleware Systems for Microservice Communication*. In: ISMSIT 2021 – 2021 5th International Symposium on Multidisciplinary Studies and Innovative Technologies. Ankara, Turkey, 10/21/2021 – 10/23/2021. IEEE, pp. 781–785.
- **Al Enany**, Marwa O.; **Harb**, Hany M.; **Attiya**, Gamal (2021): *A Comparative Analysis of MQTT and IoT Application Protocols*. In: ICEEM2021 – 2nd IEEE International Conference on Electronic Engineering, Menoufia University, Menouf, Egypt, 7/3/2021 – 7/4/2021. IEEE, pp. 1–6.

2.6 Reinforcement learning in Internet of Things networks

2.6.1 Supervisor

M.Sc. Raheleh Samadi
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-2627
E-Mail: samadi.raheleh@tu-ilmenau.de

2.6.2 Short Summary

- Investigating the application of RL and DRL techniques in communication technologies and Internet of Things network
- Review of issues related to Routing, Energy, Mobility
- Addressing challenges and obstacles

2.6.3 References to Start with

- **Frikha**, Mohamed Said, Sonia Mettali **Gammar**, Abdelkader **Lahmadi**, and Laurent **Andrey**. *"Reinforcement and deep reinforcement learning for wireless Internet of Things: A survey."* Computer Communications 178 (2021): 98-113.

2.7 Mobility management for Internet of Things

2.7.1 Supervisor

M.Sc. Raheleh Samadi
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-2627
E-Mail: samadi.raheleh@tu-ilmenau.de

2.7.2 Short Summary

- A review of algorithms developed to address the challenges and techniques of IP integration over WSNs.
- Investigating mobility management features in IPv4 and IPv6.
- Discuss the mechanisms, advantages, and disadvantages

2.7.3 References to Start with

- **Ghaleb**, Safwan M., **Shamala** Subramaniam, **Zuriati** Ahmed Zukarnain, and **Abdullah** Muhammed. *"Mobility management for IoT: a survey."* EURASIP Journal on Wireless Communications and Networking 2016, no. 1 (2016): 1-25. https://link.springer.com/article/10.1186/s13638-016-0659-4

2.8 Machine Learning Techniques Applied to Software Defined Networking (SDN)

2.8.1 Supervisor

M.Sc. Raheleh Samadi
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-2627
E-Mail: samadi.raheleh@tu-ilmenau.de

2.8.2 Short Summary

- An overview of machine learning algorithms
- Review of SDN architecture
- How to apply machine learning algorithms in SDN architecture in the fields of:

  - Traffic classification
  - Routing Optimization
  - The quality of service

2.8.3 References to Start with

- Xie, **Junfeng**, F. Richard **Yu**, Tao **Huang**, Renchao **Xie**, Jiang **Liu**, Chenmeng **Wang**, and Yunjie **Liu**. *"A survey of machine learning techniques applied to software defined networking (SDN): Research issues and challenges."* IEEE Communications Surveys and Tutorials 21, no. 1 (2018): 393-430. https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8444669

2.9 Industrial IoT and Time Sensitive Networking

2.9.1 Supervisor

M.Sc. Ariel Aguirre
Office: H 2512b (Helmholtz-Building)
Phone: +49 3677 69-2698
E-Mail: ariel.aguirre@tu-ilmenau.de

2.9.2 Short Summary

Time Sentitive Networking (TSN) defines a set of protocols for dealing with time-sensitive data over bridged Ethernet networks. TSN promises to drive efficiency, in real-time/time-critical connectivity scenarios, by enabling convergence of traditional data traffic and control traffic with bounded latency under a standardized norm. The work should survey time-critical IoT use cases, compare traditional ethernet networks with TSN and present challenges/trends on the development of TSN.

2.9.3 References to Start with

- L. **Lo Bello** and W. **Steiner**, *"A Perspective on IEEE Time-Sensitive Networking for Industrial Communication and Automation Systems,"* in Proceedings of the IEEE, vol. 107, no. 6, pp. 1094-1120, June 2019, doi: 10.1109/JPROC.2019.2905334.
- **Fedullo**, T.; **Morato**, A.; **Tramarin**, F.; **Rovati**, L.; **Vitturi**, S. *A Comprehensive Review on Time Sensitive Networks with a Special Focus on Its Applicability to Industrial Smart and Distributed Measurement Systems.* Sensors 2022, 22, 1638. https://doi.org/10.3390/s22041638

2.10 Network Softwarization and Virtual Networks

2.10.1 Supervisor

M.Sc. Ariel Aguirre
Office: H 2512b (Helmholtz-Building)
Phone: +49 3677 69-2698
E-Mail: ariel.aguirre@tu-ilmenau.de

2.10.2 Short Summary

Network Softwarization refers to the separation of the software implementing network functionalities and services from the hardware. It empowers networks to exploit benefits of software like agility and flexibility. The concept of Virtual Networks (e.g. slicing, overlay) evolves along with Network Softwarization where, based on service scenarios and conditions, the network is „sliced“ or adjusted. These two concepts play a key role for the sake of flexibilizing the design, implementation, operation and management of network and services in modern networks. The work implies the review of the key enablers of network softwarization, to survey different domains where network virtualization is a relevant component and to examine challenges associated.

2.10.3 References to Start with

- J. H. **Cox** et al., *"Advancing Software-Defined Networks: A Survey,"* in IEEE Access, vol. 5, pp. 25487-25526, 2017, doi: 10.1109/ACCESS.2017.2762291.
- M. **He**, A. M. **Alba**, A. **Basta**, A. **Blenk** and W. **Kellerer**, *"Flexibility in Softwarized Networks: Classifications and Research Challenges,"* in IEEE Communications Surveys & Tutorials, vol. 21, no. 3, pp. 2600-2636, third quarter 2019, doi: 10.1109/COMST.2019.2892806.

2.11 Cyber physical Systems (CPSs) for Intelligent Transport Systems (ITS)

2.11.1 Supervisor

M.Sc. Ashkan Gholamhosseinian
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-1144
E-Mail: ashkan.gholamhosseinian@tu-ilmenau.de

2.11.2 Short Summary

Please consult with the supervisor.

2.11.3 References to Start with

- D. P. F. Möller and H. Vakilzadian, "Cyber-physical systems in smart transportation," 2016 IEEE International Conference on Electro Information Technology (EIT), 2016, pp. 0776-0781, doi: 10.1109/EIT.2016.7535338
- Xiong, Gang & Zhu, Fenghua & Liu, Xiwei & Dong, Xisong & Huang, Wuling & Chen, Songhang & Zhao, Kai. (2015). Cyber-physical-social System in Intelligent Transportation. IEEE/CAA Journal of Automatica Sinica. 2. 320-333. 10.1109/JAS.2015.7152667
- Graja, Imen & Kallel, Slim & Guermouche, Nawal & Cheikhrouhou, Saoussen & Hadj Kacem, Ahmed. (2018). A comprehensive survey on modeling of cyber-physical systems: Survey on modeling CPS. Concurrency and Computation: Practice and Experience. 32. e4850. 10.1002/cpe.4850.

2.12 Blockchain in Intelligent Transport Systems (ITS)

2.12.1 Supervisor

M.Sc. Ashkan Gholamhosseinian
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-1144
E-Mail: ashkan.gholamhosseinian@tu-ilmenau.de

2.12.2 Short Summary

Please consult with the supervisor.

2.12.3 References to Start with

- Cocîrlea, Dragoş & Dobre, Ciprian & Hîrţan, Liviu-Adrian & Purtan, Raluca. (2020). Blockchain in Intelligent Transportation Systems. Electronics. 9. 1682. 10.3390/electronics9101682.
- R. Jabbar et al., "Blockchain Technology for Intelligent Transportation Systems: A Systematic Literature Review," in IEEE Access, vol. 10, pp. 20995-21031, 2022, doi: 10.1109/ACCESS.2022.3149958
- Yuan, Yong. (2016). Towards Blockchain-based Intelligent Transportation Systems. 10.1109/ITSC.2016.7795984.

2.13 Cooperative Driving Technologies and Approaches

2.13.1 Supervisor

M.Sc. Ashkan Gholamhosseinian
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-1144
E-Mail: ashkan.gholamhosseinian@tu-ilmenau.de

2.13.2 Short Summary

Please consult with the supervisor.

2.13.3 References to Start with

- Malik S, Khan MA, El-Sayed H. Collaborative Autonomous Driving-A Survey of Solution Approaches and Future Challenges. Sensors (Basel). 2021 May 29;21(11):3783. doi: 10.3390/s21113783. PMID: 34072603; PMCID: PMC8198430.
- Maytheewat Aramrattana, Tony Larsson, Jonas Jansson and Cristofer Englund, Dimensions of Cooperative Driving, ITS and Automation, 2015 IEEE Intelligent Vehicles Symposium (IV), Piscataway, NJ: IEEE Press, 2015, p. 144-149
- Mariani, Stefano & Cabri, Giacomo & Zambonelli, Franco. (2021). Coordination of Autonomous Vehicles: Taxonomy and Survey. ACM Computing Surveys. 54. 1-33. 10.1145/3431231

2.14 Security and Privacy in Intelligent Transport Systems (ITS)

2.14.1 Supervisor

M.Sc. Ashkan Gholamhosseinian
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-1144
E-Mail: ashkan.gholamhosseinian@tu-ilmenau.de

2.14.2 Short Summary

Please consult with the supervisor.

2.14.3 References to Start with

- D. Hahn, A. Munir and V. Behzadan, "Security and Privacy Issues in Intelligent Transportation Systems: Classification and Challenges," in IEEE Intelligent Transportation Systems Magazine, vol. 13, no. 1, pp. 181-196, Spring 2021, doi: 10.1109/MITS.2019.2898973
- Takahito Yoshizawa, Dave Singelée, Jan Tobias Mühlberg, Stéphane Delbruel, Amir Taherkordi, Danny Hughes, and Bart Preneel. 2022. A Survey of Security and Privacy Issues in V2X Communication Systems. ACM Comput. Surv. Just Accepted (August 2022). https://doi.org/10.1145/3558052
- Zeddini, Besma & Maachaoui, Mohamed & Inedjaren, Youssef. (2022). Security Threats in Intelligent Transportation Systems and Their Risk Levels. Risks. 10. 91. 10.3390/risks10050091.

2.15 Disruptive Technologies for Intelligent Transport Systems (ITS)

2.15.1 Supervisor

M.Sc. Ashkan Gholamhosseinian
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-1144
E-Mail: ashkan.gholamhosseinian@tu-ilmenau.de

2.15.2 Short Summary

Please consult with the supervisor.

2.15.3 References to Start with

- L. F. Herrera-Quintero, J. Chavarriaga, K. Banse, D. Bermudez and G. Proeller, "Disruptive Technologies in Intelligent Transportation Systems," 2019 2nd Latin American Conference on Intelligent Transportation Systems (ITS LATAM), 2019, pp. 1-6, doi: 10.1109/ITSLATAM.2019.8721343.
- Ang, K.L.-M.; Seng, J.K.P.; Ngharamike, E.; Ijemaru, G.K. Emerging Technologies for Smart Cities' Transportation: Geo-Information, Data Analytics and Machine Learning Approaches. ISPRS Int. J. Geo-Inf. 2022, 11, 85. https://doi.org/10.3390/ijgi11020085
- Agachai Sumalee, Hung Wai Ho, Smarter and more connected: Future intelligent transportation system, IATSS Research, Volume 42, Issue 2, 2018, Pages 67-71, ISSN 0386-1112, https://doi.org/10.1016/j.iatssr.2018.05.005.
- Radu, L.-D. Disruptive Technologies in Smart Cities: A Survey on Current Trends and Challenges. Smart Cities 2020, 3, 1022-1038. https://doi.org/10.3390/smartcities3030051

2.16 Sensor Technologies for Intelligent Transportation Systems (ITS)

2.16.1 Supervisor

M.Sc. Ashkan Gholamhosseinian
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-1144
E-Mail: ashkan.gholamhosseinian@tu-ilmenau.de

2.16.2 Short Summary

Please consult with the supervisor.

2.16.3 References to Start with

- Guerrero-Ibáñez, J.; Zeadally, S.; Contreras-Castillo, J. Sensor Technologies for Intelligent Transportation Systems. Sensors 2018, 18, 1212. https://doi.org/10.3390/s18041212
- Tasgaonkar, P. P., Garg, R. D., and Garg, P. K., "Vehicle Detection and Traffic Estimation with Sensors Technologies for Intelligent Transportation Systems", Sensing and Imaging, vol. 21, no. 1, 2020. doi:10.1007/s11220-020-00295-2.

2.17 Survey on Vehicular Cloud Computing and Big Data

2.17.1 Supervisor

M.Sc. Ashkan Gholamhosseinian
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-1144
E-Mail: ashkan.gholamhosseinian@tu-ilmenau.de

2.17.2 Short Summary

Please consult with the supervisor.

2.17.3 References to Start with

- Yash Soni and Jangirala Srinivas, Survey on Vehicular Cloud Computing and Big Data, EasyChair Preprint no. 8551, August 2022
- Alsayfi, M.S., Dahab, M.Y., Eassa, F.E., Salama, R., Haridi, S., & Al-Ghamdi, A.S. (2022). Big Data in Vehicular Cloud Computing: Review, Taxonomy, and Security Challenges. Elektronika ir Elektrotechnika
- Gaouar, Nihal & Lehsaini, Mohamed. (2021). Toward vehicular cloud/fog communication: A survey on data dissemination in vehicular ad hoc networks using vehicular cloud/fog computing. International Journal of Communication Systems. 34. 10.1002/dac.4906.

2.18 An Overview of Flying Ad Hoc Networks (FANETs)

2.18.1 Supervisor

M.Sc. Ashkan Gholamhosseinian
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-1144
E-Mail: ashkan.gholamhosseinian@tu-ilmenau.de

2.18.2 Short Summary

Please consult with the supervisor.

2.18.3 References to Start with

- Guillen-Perez, A.; Cano, M.-D. Flying Ad Hoc Networks: A New Domain for Network Communications. Sensors 2018, 18, 3571. https://doi.org/10.3390/s18103571
- Noor, F.; Khan, M.A.; Al-Zahrani, A.; Ullah, I.; Al-Dhlan, K.A. A Review on Communications Perspective of Flying Ad-Hoc Networks: Key Enabling Wireless Technologies, Applications, Challenges and Open Research Topics. Drones 2020, 4, 65. https://doi.org/10.3390/drones4040065
- Mukherjee, Amartya & Keshary, Vaibhav & Pandya, Karan & Dey, Nilanjan & Satapathy, Suresh. (2016). Flying Ad-hoc Networks: A Comprehensive Survey.

2.19 Software Defined Networks (SDNs) and Intelligent Transport Systems (ITS)

2.19.1 Supervisor

M.Sc. Ashkan Gholamhosseinian
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-1144
E-Mail: ashkan.gholamhosseinian@tu-ilmenau.de

2.19.2 Short Summary

Please consult with the supervisor.

2.19.3 References to Start with

- R. I. Meneguette, "Software Defined Networks: Challenges for SDN as an Infrastructure for Intelligent Transport Systems based on Vehicular Networks," 2020 16th International Conference on Distributed Computing in Sensor Systems (DCOSS), 2020, pp. 205-212, doi: 10.1109/DCOSS49796.2020.00042
- Arif, M.; Wang, G.; Geman, O.; Balas, V.E.; Tao, P.; Brezulianu, A.; Chen, J. SDN-based VANETs, Security Attacks, Applications, and Challenges. Appl. Sci. 2020, 10, 3217. https://doi.org/10.3390/app10093217
- Ben Jaballah, Wafa & Conti, Mauro & Lal, Chhagan. (2019). A Survey on Software-Defined VANETs: Benefits, Challenges, and Future Directions

2.20 Simulation Tools and Techniques for Vehicular Ad-hoc Networks (VANETs)

2.20.1 Supervisor

M.Sc. Ashkan Gholamhosseinian
Office: H 2516 (Helmholtz-Building)
Phone: +49 3677 69-1144
E-Mail: ashkan.gholamhosseinian@tu-ilmenau.de

2.20.2 Short Summary

Please consult with the supervisor.

2.20.3 References to Start with

- Weber, J., Neves, M. & Ferreto, T. VANET simulators: an updated review. J Braz Comput Soc 27, 8 (2021). https://doi.org/10.1186/s13173-021-00113-x
- S. A. Ben Mussa, M. Manaf, K. Z. Ghafoor and Z. Doukha, "Simulation tools for vehicular ad hoc networks: A comparison study and future perspectives," 2015 International Conference on Wireless Networks and Mobile Communications (WINCOM), 2015, pp. 1-8, doi: 10.1109/WINCOM.2015.7381319.
- sraa A Aljabry and Ghaida A Al-Suhail., “A Survey on Network Simulators for Vehicular Ad-hoc Networks (VANETS),” International Journal of Computer Applications, Vol. 174, No. 11, pp. 1-9, January 2021
- M. S. Ahmed, M. A. Hoque and P. Pfeiffer, "Comparative study of connected vehicle simulators," SoutheastCon 2016, 2016, pp. 1-7, doi: 10.1109/SECON.2016.7506701

3 Overview of all offered topics

Topic	Supervisor
HTTP/3 & QUIC	Prof. Jochen Seitz
Artificial Intelligence for 6G	Prof. Jochen Seitz
Software-Defined Networking (SDN)	Prof. Jochen Seitz
Automotive Ethernet	Prof. Jochen Seitz
Publish/Subscribe Communication for the Internet of Things	Prof. Jochen Seitz
Reinforcement learning in Internet of Things networks	M.Sc. Raheleh Samadi
Mobility management for Internet of Things	M.Sc. Raheleh Samadi
ML Techniques Applied to Software Defined Networking (SDN)	M.Sc. Raheleh Samadi
Industrial IoT and Time Sensitive Networking	M.Sc. Ariel Aguirre
Network Softwarization and Virtual Networks	M.Sc. Ariel Aguirre
Cyber physical Systems (CPSs) for Intelligent Transport Systems (ITS)	M.Sc. Ashkan Gholamhosseinian
Blockchain in Intelligent Transport Systems (ITS)	M.Sc. Ashkan Gholamhosseinian
Cooperative Driving Technologies and Approaches	M.Sc. Ashkan Gholamhosseinian
Security and Privacy in Intelligent Transport Systems (ITS)	M.Sc. Ashkan Gholamhosseinian
Disruptive Technologies for Intelligent Transport Systems (ITS)	M.Sc. Ashkan Gholamhosseinian
Sensor Technologies for Intelligent Transportation Systems (ITS)	M.Sc. Ashkan Gholamhosseinian
Survey on Vehicular Cloud Computing and Big Data	M.Sc. Ashkan Gholamhosseinian
An Overview of Flying Ad Hoc Networks (FANETs)	M.Sc. Ashkan Gholamhosseinian
Software Defined Networks (SDN) and Intelligent Transport Systems (ITS)	M.Sc. Ashkan Gholamhosseinian
Simulation Tools and Techniques for Vehicular Ad-hoc Networks (VANETs)	M.Sc. Ashkan Gholamhosseinian

Table 1: Overview on all offered topics