

An IoT course program to foster the adoption of IoT driven food and agriculture in Sub-Saharan Africa (SSA)

Kuaban, Godlove Suila; Nowak, Mateusz; Czekalski, Piotr; Tokarz, Krzysztof; Tangka, ulius Kewir; Siggursson, Kjartan; Nikitenko, Agris; Berkolds, Karlis; **Sell, Raivo** 2022 International Conference on Electrical, Computer and Energy Technologies (ICECET) 2022 / p. 1-7 <https://doi.org/10.1109/ICECET55527.2022.9872825>

An IoT-based approach to digitalize a manufacturing system

Mahmood, Kashif; Otto, Tauno; Karaulova, Tatjana; Ševtšenko, Eduard 17th International Symposium "Topical Problems in the Field of Electrical and Power Engineering". Doctoral school of energy and geotechnology. III : Kuressaare, Estonia, January 15-20, 2018 2018 / p. 257-261 : ill http://ise.elnet.ee/record=b2950215~S2*est

Analyzing meta-heuristic algorithms for task scheduling in a fog-based IoT application

Rahbari, Dadmehr Algorithms 2022 / art. 397 <https://doi.org/10.3390/a15110397> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Application of artificial intelligence and machine learning for BIM : review

Bassir, David; Lodge, Hugo; Chang, Haochen; **Majak, Jüri**; Chen, Gonfa International journal for simulation and multidisciplinary design optimization 2023 / art. 5 <https://doi.org/10.1051/smdo/2023005>

Application of e-governance solutions in industry 4.0 : The case of e-invoicing

Pappel, Ingrid; Kosenkov, Oleksandr Proceedings of the 18th European Conference on Digital Government (ECDG2018) : University of Santiago de Compostela, Spain, 25-26 October 2018 2018 / p. 321-324 <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85059249500&partnerID=40&md5=1f13e4155021d0e173f1b81582022655>

Application of e-governance solutions in industry 4.0 : The case of e-invoicing

Pappel, Ingrid; Kosenkov, Oleksandr Abstracts of Papers Presented at the 18th European Conference on Digital Government ECDG 2018 : Hosted By University of Santiago de Compostela, Spain, 25 - 26 October 2018 2018 / p. 41-42 <https://www.academic-conferences.org/download/21774/>

Arupuruarendaja Jürjo Preden: tajumatud arvutid meie ümber muudavad maailma paremaks

Preden, Jürjo-Sören Mente et Manu 2021 / lk. 14-19 : fot [Mente et Manu 1/2021](#) https://www.ester.ee/record=b1242496*est

Asjade Internet teeb TTÜ kampupest digilinnaku

Leier, Mairo Mente et Manu 2018 / lk. 40-41 : fot https://ttu.ee/public/mv/mente-et-manu/MM_02_2018/mobile/index.html#p=3 <http://dea.digar.ee/publication/AKmenteetmanu> http://www.ester.ee/record=b1242496*est

Augmented coaching ecosystem for non-obtrusive adaptive personalized elderly care on the basis of cloud-fog-dew computing paradigm [Electronic resource]

Gordienko, Yuri; Stirenko, S.; Alienin, O.; **Jervan, Gert** 2017 40th International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO), May 22 - 26, 2017, Opatija, Croatia : proceedings 2017 / p. 359-364 : ill. [CD-ROM] <https://doi.org/10.23919/MIPRO.2017.7973449>

Automated environmental compliance monitoring of rivers with IoT and open government data

Miasayedava, Lizaveta; McBride, Keegan David Braun; Tuhtan, Jeffrey Andrew Journal of environmental management 2022 / art. 114283, 10 p. : ill <https://doi.org/10.1016/j.jenvman.2021.114283> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Autonomous mobile robots for production logistics: a process optimization model modification

Raamets, Tõnis; Majak, Jüri; Karjust, Kristo; Mahmood, Kashif; Hermaste, Aigar Proceedings of the Estonian Academy of Sciences 2024 / p. 134-141 : ill <https://doi.org/10.3176/proc.2024.2.06>

Blockchain-based applications in shipping and port management : a literature review towards defining key conceptual frameworks

Tsiulin, Sergey; Hegner Reinau, Kristian; **Hilmola, Olli-Pekka Kristian**; Goryaev, Nikolay; Karam, Ahmed International journal of productivity and performance management 2020 / p. 201-224 <https://doi.org/10.1108/RIBS-04-2019-0051>

A cache-based approach toward improved scheduling in fog computing

Khan, Osama Amir; Malik, Saif Ur Rehman; Baig, Faizan M.; Islam, Saif Ul; Pervaiz, Haris; **Malik, Hassan**; Ahmed, Syed Hassan Software - Practice and Experience 2021 / p. 2360 - 2372 <https://doi.org/10.1002/spe.2824> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Channel characterization at 2.4 GHz for aerial base station

Sharma, Navuday; Magarini, Maurizio; Reggiani, Luca; **Alam, Muhammad Mahtab** Procedia computer science 2019 / p. 1092-1099 <https://doi.org/10.1016/j.procs.2019.04.155> [Conference proceeding at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

A comparative framework for cyber threat modelling : case of healthcare and industrial control systems

Balogun, Mobolarinwa; **Bahsi, Hayretidin**; Keskin, Omer F.; Tatar, Unal International Journal of Critical Infrastructures 2021 / 1 p

Condition monitoring and fault detection for electrical machines using IOT

Raja, Hadi Ashraf; Vaimann, Toomas; Rassõlkin, Anton; Kallaste, Ants Proceedings of the Future Technologies Conference (FTC) 2022. Volume 2 2022 / p. 162-173 https://doi.org/10.1007/978-3-031-18458-1_12

Condition monitoring of electrical machines and its relation to industrial internet

Belahcen, Anouar; Gyftakis, Konstantinos N.; Martinez, Javier; Climente-Alarcon, Vicente; Vaimann, Toomas 2015 IEEE Workshop on Electrical Machines Design, Control and Diagnosis (WEMDCD) : proceedings : Castello del Valentino, Torino, Italy, 26-27 March, 2015 2015 / p. 233-241 : ill <http://dx.doi.org/10.1109/WEMDCD.2015.7194535>

Cooperative interference avoidance scheduler for radio resource management in NB-IoT systems

Mwakwata, Collins Burton; Alam, Muhammad Mahtab; Le Moullec, Yannick; Malik, Hassan; Päränd, Sven EuCNC 2020: 2020 European Conference on Networks and Communications (EuCNC), Dubrovnik, Croatia, Croatia, 15-18 June 2020 : proceedings 2020 / p. 154-159 <https://doi.org/10.1109/EuCNC48522.2020.9200967>

Cost-efficient real-time condition monitoring and fault diagnostics system for BLDC motor using IoT and Machine learning

Raja, Hadi Ashraf; Raval, Hardik; Vaimann, Toomas; Kallaste, Ants; Rassõlkin, Anton; Belahcen, Anouar Diagnostika '22 : 2022 International Conference on Diagnostics in Electrical Engineering : conference proceedings 2022 / 4 p. <https://doi.org/10.1109/Diagnostika55131.2022.9905102>

Coverage analysis of NB-IoT and sigfox : two Estonian University campuses as a case study

Poddar, Nishant; Mass, Jakob; Khan, Sikandar Muhammad Zulqarnain 2020 16th International Wireless Communications & Mobile Computing Conference (IWCMC) : Limassol, Cyprus, June 15 - 19, 2020 2020 / p. 1491-1497 : ill <https://doi.org/10.1109/IWCMC48107.2020.9148570>

DADS : decentralized attestation for device swarms

Wedaj, Samuel; Paul, Kolin; Ribeiro, Vinay J. ACM Transactions on Privacy and Security 2019 / Art. 19 <https://doi.org/10.1145/3325822> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Data analysis of building sensors for efficient energy management and future trends in the EU

Crasta, Cletus J.; Agabus, Hannes 2019 Electric Power Quality and Supply Reliability Conference (PQ) & 2019 Symposium on Electrical Engineering and Mechatronics (SEEM), Kärđla, Estonia, June 12-15, 2019 : proceedings 2019 / 8 p. : ill <https://doi.org/10.1109/PQ.2019.8818242>

A decentralized distribution market mechanism considering renewable generation units with zero marginal costs

Yang, Jiajia; Dong, Zhao Yang; Wen, Fushuan; Chen, Guo; Qiao, Yichen IEEE Transactions on Smart Grid 2020 / p. 1724 - 1736 <https://doi.org/10.1109/TSG.2019.2942616> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Decoding the smart city

Vainio, Teija; Hodson, Elise; Sayún, Michel Nader; Soe, Ralf-Martin Interaction design and architecture(s) 2021 / p. 59-62 <https://doi.org/10.55612/s-5002-050-002pfs> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Development of cyber-physical production systems based on modelling technologies

Mahmood, Kashif; Karaulova, Tatjana; Otto, Tauno; Ševtšenko, Eduard Proceedings of the Estonian Academy of Sciences 2019 / p. 348–355 : ill http://www.kirj.ee/32601/?tpl=1061&c_tpl=1064 <https://doi.org/10.3176/proc.2019.4.02> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Development of process optimization model for autonomous mobile robot used in production logistics

Majak, Jüri; Karjust, Kristo; Mahmood, Kashif; Hermaste, Aigar; Raamets, Tõnis AIP conference proceedings 2024 / art. 020008 <https://doi.org/10.1063/5.0189299>

Developments and applications of IoT-based sensors for wastewater and drainage systems : editorial

Sitzenfrei, Robert; Annus, Ivar; Langeveld, Jeroen; Rieckermann, Jörg; Rauch, Wolfgang Water science and technology Water science & technology 2024 / p. 3-5 <https://doi.org/10.2166/wst.2024.058>

Digital twins for designing energy management systems for microgrids: Implementation example based on TalTech Campus project

Korõtko, Tarmo; Zahraoui, Younes; Rosin, Argo; Agabus, Hannes 2023 IEEE 17th International Conference on Compatibility, Power Electronics and Power Engineering (CPE-POWERENG) 2023 / 6 p <https://doi.org/10.1109/CPE-POWERENG58103.2023.10227475>

Digiteerimine, plokiahel ja asjade internet mereveos

Tapaninen, Ulla Pirta; Heering, Dan Meremees : Eesti merendusajakiri = Estonian maritime magazine. Veeteede Teataja 2021 / lk. 22-23 : ill https://www.ester.ee/record=b4646644*est

DORM : narrowband IoT development platform and indoor deployment coverage analysis

Khan, Sikandar Muhammad Zulqarnain; Malik, Hassan; Sarmiento, Jeffrey Leonel Redondo; Alam, Muhammad Mahtab; Le Moullec, Yannick Procedia computer science 2019 / p. 1084-1091 : ill <https://doi.org/10.1016/j.procs.2019.04.154> [Conference proceeding at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

Educating Engineers for Future Industrial Revolutions : Proceedings of the 23rd International Conference on Interactive Collaborative Learning (ICL2020). Vol. 2

2021 <https://link.springer.com/book/10.1007%2F978-3-030-68201-9> <https://doi.org/10.1007/978-3-030-68201-9>

Eesti teadlased töötasid välja meetodi energiamärgise koheseks määramiseks

director.ee 2023 [Eesti teadlased töötasid välja meetodi energiamärgise koheseks määramiseks](#) [Eestis töötati välja uudne energiamärgise määramise lahendus](#) [Eestis töötati välja uudne energiamärgise määramise lahendus](#)

Eestis töötati välja uudne energiamärgise määramise lahendus

Ehitaja 2023 / lk. 34 : fot https://www.ester.ee/record=b1072123*est

Elektroonikainsener Endrik Salak: minu töö on nutikate lahenduste väljatöötamine

goodnews.ee 2024 [Elektroonikainsener Endrik Salak: minu töö on nutikate lahenduste väljatöötamine](#)

An empirical modeling for the baseline energy consumption of an NB-IoT radio transceiver

Khan, Sikandar Muhammad Zulqarnain; Alam, Muhammad Mahtab; Le Moullec, Yannick; Kuusik, Alar; Päränd, Sven; Verikoukis, Christos IEEE Internet of Things Journal 2021 / p. 14756-14772 : ill <https://doi.org/10.1109/JIOT.2021.3072769> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Energy efficiency and latency optimization for IoT URLLC and mMTC use cases

Elgarhy, Osama Mohamed Mostafa; Reggiani, Luca; Alam, Muhammad Mahtab; Zoha, Ahmed; Ahmad, Rizwan; Kuusik, Alar IEEE Access / p. 23132-23148 <https://doi.org/10.1109/ACCESS.2024.3364349>

Energy-aware task scheduling and offloading using deep reinforcement learning in SDN-enabled IoT network

Sellami, Bassem; Hakiri, Akram; **Ben Yahia, Sadok**; Berthou, Pascal Computer networks 2022 / art. 108957, 12 p. : ill <https://doi.org/10.1016/j.comnet.2022.108957> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Enhanced IoT-based end-to-end emergency and disaster relief system

Ben Arbia, Dhafer; **Alam, Muhammad Mahtab**; Kadri, Abdullah; Ben Hamida, Elyes; Attia, Rabah Journal of sensor and actuator networks 2017 / art. 19, p. 1-18 : ill <http://dx.doi.org/10.3390/jsan6030019>

Ettevõtteid saavad tooteid ja teenuseid testida TalTechi asjade interneti ja 5G platvormil

Mente et Manu 2020 / lk. 11 <https://dea.digar.ee/cgi-bin/dea?a=is&oid=AKmenteetmanu202011&type=staticpdf>

Evaluating RuleCore as event processing network model

Astrova, Irina; Koschel, Arne; Kobert, Sebastian Proceedings of the 15th International Conference on Web Information Systems and Technologies, WEBIST 2019, Vienna, Austria, September 18-20, 2019. Vol. 1 2019 / p. 297-300 : ill <https://doi.org/10.5220/0008192302970300>

Evaluation of low power wide area network technologies for smart urban drainage systems

Malik, Hassan; Kändler, Nils; Alam, Muhammad Mahtab; Annus, Ivar; Le Moullec, Yannick; Kuusik, Alar 2018 IEEE : International Conference on Environmental Engineering, March 12-14, 2018 Milan Italy : conference proceedings 2018 / 5 p. : ill <https://doi.org/10.1109/EE1.2018.8385262>

FOMCONpy: Fractional-order modelling and control library for python

Onyedi, Tobechukwu; Tepljakov, Aleksei; Petlenkov, Eduard 2020 43rd International Conference on Telecommunications and Signal Processing : TSP 2020, Milan, Italy, July 7-9, 2020 2020 / p. 239-245 <http://doi.org/10.1109/TSP49548.2020.9163581>

Formal methods based security for cloud-based manufacturing cyber physical system

Muniasamy, Kandasamy; Srinivasan, Seshadhri; **Vain, Jüri**; Sethumadhavan, M. IFAC-PapersOnLine 2019 / p. 1198-1203 <https://doi.org/10.1016/j.ifacol.2019.11.361> [Conference proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

From private to public governance : The case for reconfiguring energy systems as a commons

Giotitsas, Christos; Nardelli, Pedro H.J.; **Kostakis, Vasileios**; Narayanan, Arun Energy research & social science 2020 / art. 101737 ; 7 p <https://doi.org/10.1016/j.erss.2020.101737> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Going digital, staying secure : cyber ERM activities in a post-pandemic setup

Carlo, Antonio; Casamassima, Francesca IAC 2022 congress proceedings 2022 / art. 70417 <https://iafastro.directory/iac/paper/id/70417/summary/> [Conference proceedings at Scopus](#) [Article at Scopus](#)

Grey wolf optimizer-based task scheduling for IoT-based applications in the edge computing

Satouf, Aram; Hamidoglu, Ali; Gul, Omer Melih; **Kuusik, Alar** 2023 Eighth International Conference on Fog and Mobile Edge Computing (FMEC) 2023 / p. 53-57 <https://doi.org/10.1109/FMEC59375.2023.10306148>

Hans Michael Krause asjade internetist : inimene on tööstuses ikka kõige tähtsam

Einama, Kaido Mente et Manu 2017 / lk. 44-47 http://www.ester.ee/record=b1242496*est

Hruštšovkast smartovkaks ja digikaksikud, ehk kuidas teha linn targemaks? [Võrguväljaanne]

Merivoo-Parro, Maarja novaator.err.ee 2021 ["Hruštšovkast smartovkaks ja digikaksikud, ehk kuidas teha linn targemaks?"](http://www.ester.ee/record=b1242496*est)

Hybrid feature selection models for machine learning based botnet detection in IoT networks

Guerra Manzanares, Alejandro; Bahsi, Hayretidin; Nömm, Sven 2019 International Conference on Cyberworlds : CW 2019 : 2-4 October 2019, Kyoto, Japan : proceedings 2019 / p. 324-327 : ill <https://doi.org/10.1109/CW.2019.00059>

Implementation and benchmarking of a novel routing protocol for tactical mobile ad-hoc networks

Ben Arbia, Dhafer; **Alam, Muhammad Mahtab**; Kadri, Abdullah; Attia, Rabah; Ben Hamida, Elyes 2016 IEEE 12th International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob) : 17-19 October 2016, New York, NY, USA 2016 / p. 118-125 : ill <https://doi.org/10.1109/WIMOB.2016.7763188>

Improved load planning of roro vessels by adopting blockchain and internet-of-things

Henesey, Lawrence; Lizneva, Yulia; **Philipp, Robert; Meyer, Christopher**; Gerlitz, Laima Proceedings of the 22nd International Conference on Harbor, Maritime and Multimodal Logistic Modeling & Simulation (HMS 2020) : Online, September 16-18, 2020 2020 / p. 58-65 <https://doi.org/10.46354/i3m.2020.hms.009>

In-depth feature selection for the statistical machine learning-based botnet detection in IoT networks

Kalakoti, Rajesh; Nömm, Sven; Bahsi, Hayretidin IEEE Access 2022 / p. 94518-94535
<https://doi.org/10.1109/ACCESS.2022.3204001> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Integrating smart energy management system with internet of things and cloud computing for efficient demand side management in smart grids

Saleem, M. Usman; Shakir, Mustafa; Usman, M. Rehan; Bajwa, M. Hamza Tahir; **Shabbir, Noman; Shams Ghahfarokhi, Payam; Daniel, Kamran** Energies 2023 / art. 4835 : ill <https://doi.org/10.3390/en16124835>

Inter-cell interference reduction scheme for uplink transmission in NB-IoT Systems

Mwakwata, Collins Burton; Elgarhy, Osama Mohamed Mostafa; Le Moullec, Yannick; Alam, Muhammad Mahtab; Päränd, Sven; Annus, Ivar IWCMC 2021 Wireless Sensors & IoT: 2021 International Wireless Communications and Mobile Computing (IWCMC), Harbin, China, June 28 - July 2, 2021 2021 / p. 400-405 <https://doi.org/10.1109/IWCMC51323.2021.9498970>

Internet of Things network infrastructure for the educational purpose

Tokarz, Krzysztof; Czekalski, Piotr; Drabik, Gabriel; Paduch, Jaroslaw; Distefano, Salvatore; Di Pietro, Riccardo; Merlino, Giovanni; Scaffidi, Carlo; **Sell, Raivo** 2020 IEEE Frontiers in Education Conference (FIE) 2020 <https://doi.org/10.1109/FIE44824.2020.9274040>
[Conference Proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

Introduction to the IoT : Practical project [Electronic resource]

Sell, Raivo; Puks, Rim; Kingsepp, Mallor 2019 <http://iot-open.eu/download/iot-open-eu-introduction-to-the-iot-practical-projects-in-english/>

Introduction to the IOT [Electronic resource]

Sell, Raivo; Puks, Rim; Kingsepp, Mallor 2019

IoT based tools and methods for electrical machine diagnostics = Asjade interneti põhised tööriistad ja meetodid elektrimasinate diagnostikaks

Raja, Hadi Ashraf 2023 <https://doi.org/10.23658/taltech.20/2023> <https://digikogu.taltech.ee/et/Item/3015334f-c32b-43ae-ba2d-bfcd536aba5>
https://www.ester.ee/record=b5558656*est

IoT based tools for data acquisition and monitoring of electrical machines

Raja, Hadi Ashraf 20th International Symposium "Topical problems in the field of electrical and power engineering. Doctoral school of energy and geotechnology. III" : Tallinn, Estonia, September 8-10, 2021 2021 / p. 85-86 : ill https://www.ester.ee/record=b5457278*est

IoT based tools for data acquisition in electrical machines and robotics

Raja, Hadi Ashraf; Vaimann, Toomas; Rassõlkin, Anton; Kallaste, Ants; Belahcen, Anouar 2021 IEEE 19th International Power Electronics and Motion Control Conference, The Silesian University of Technology Gliwice, Poland, 25 - 29 April, 2021 (PEMC) : proceedings 2021 / p. 737-742 : ill <https://doi.org/10.1109/PEMC48073.2021.9432553>

IoT-based senses for virtual enterprises

Mahmoodpour, Mehdi; **Mahmood, Kashif**; Lobov, Andrei IECON 2018 - 44th Annual Conference of the IEEE Industrial Electronics Society : proceedings 2018 / p. 4181-4186 : ill <http://doi.org/10.1109/IECON.2018.8592796>

Jälle Kert Kingo - Eesti pidurdab 5G tulevikutehnoloogiat

Mürsepp, I. epl.delfi.ee 2019 [Jälle Kert Kingo - Eesti pidurdab 5G tulevikutehnoloogiat](#)

Kas sa oled kodus üksi?

Härmat, Karin Mente et Manu 2019 / lk. 22-25 : fot https://www.ester.ee/record=b1242496*est https://www.ttu.ee/public/m/mente-et-manu/MM_01_2019/mobile/index.html

Küberturvalisuse tippeksperit Urmas Ruuto: "Küberrynnakut saab toime panna ka kaugloetavate veemõõtjatega"

Ruuto, Urmas jarvateataja.postimees.ee 2023 [Küberturvalisuse tippeksperit Urmas Ruuto: "Küberrynnakut saab toime panna ka kaugloetavate veemõõtjatega"](#)

A lightweight Mmssage authentication code for virtual work in future smart cities

Pindar, Zahraddeen A.; Fayomi, Joshua O.; **Waziri, Nazir H.**; Abdulhamid, Bala M.; Jamel, Sapiee 2020 IEEE European Technology and Engineering Management Summit (E-TEMS), 5-7 March 2020, Dortmund University of Applied Sciences and Art 2020 / 5 p <https://doi.org/10.1109/E-TEMS46250.2020.9111859>

Machine learning techniques for wireless-powered ambient backscatter communications : enabling intelligent iot networks in 6g era

Jameel, Furqan; **Sharma, Navuday**; Khan, Muhammad Awais; Khan, Imran; **Alam, Muhammad Mahtab**; Alam, Muhammad Mahtab; Mavromoustakis, Constandinos X. Internet of Things / 2020 https://doi.org/10.1007/978-3-030-44907-0_8 [Article collection metrics at Scopus](#) [Article at Scopus](#)

Machine learning-based detection and characterization of evolving threats in mobile and IoT Systems = Masinõppepõhine arenevate ohtude tuvastamine ning kirjeldamine mobiilseadmete ja värgvõrkude jaoks

Guerra Manzanares, Alejandro 2022 <https://doi.org/10.23658/taltech.54/2022> <https://digikogu.taltech.ee/et/Item/f56ae778-e5a5-4147-a8e4-4833e08fa789> https://www.ester.ee/record=b5511898*est

MedBloT : generation of an IoT Botnet Dataset in a medium-sized IoT network

Guerra Manzanares, Alejandro; Medina-Galindo, Jorge; Bahsi, Hayretidin; Nömm, Sven Proceedings of the 6th International Conference on Information Systems Security and Privacy, ICISPP : February 25-27, 2020, La Valletta, Malta. Vol. 1 2020 / p. 207-218 : ill <https://doi.org/10.5220/0009187802070218>

Mis meist saab - elu pärast «suurt pauku»

postimees.ee 2023 [Mis meist saab - elu pärast «suurt pauku»](#)

Model based Test framework for communications-critical internet of things systems

Pal, Deepak; Vain, Jüri Databases and information systems X : selected papers from the thirteenth International Baltic Conference, DB&IS 2018 2019 / p. 79-94 https://www.ester.ee/record=b5203991*est <https://doi.org/10.3233/978-1-61499-941-6-79> [Conference proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

A model-based approach for design and verification of Industrial Internet of Things

Muthukumar, Natarajan; Srinivasan, Seshadhri; Ramkumar, Kannan; **Pal, Deepak; Vain, Jüri**; Ramaswamy, Srin Future generation computer systems 2019 / p. 354-363 : ill <https://doi.org/10.1016/j.future.2018.12.012> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Modeling and implementation of linear energy prediction for energy harvesting in intermittently powered wireless sensor nodes = Katkendliku toitega traadita sensorsõlmede energiakorje tulemuse lineaarne ennustus, modelleerimine ja rakendused

Ahmed, Faisal 2018 <https://digi.lib.ttu.ee/i/?9955>

Monitoring and control of smart urban drainage systems using NB-IoT cellular sensor networks

Roosipuu, Priit; Annus, Ivar; Kuusik, Alar; Kändler, Nils; Alam, Muhammad Mahtab Water science & technology Water science and technology 2023 / p. 339-354 <https://doi.org/10.2166/wst.2023.222>

Narrowband internet of things (NB-IoT) : from physical (PHY) and media access control (MAC) layers perspectives

Mwakwata, Collins Burton; Malik, Hassan; Alam, Muhammad Mahtab; Le Moullec, Yannick; Päränd, Sven; Mumtaz, Shahid Sensors 2019 / art. 2613, 34 p.: ill <https://doi.org/10.3390/s19112613> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Narrowband Internet of Things (NB-IoT) : from physical (PHY) and Media Access Control (MAC) layers perspectives : [an article in collection]

Mwakwata, Collins Burton; Malik, Hassan; Alam, Muhammad Mahtab; Le Moullec, Yannick; Päränd, Sven; Mumtaz, Shahid Internet of things and sensors networks in 5G wireless communications 2020 / p. 39-72 : ill <https://doi.org/10.3390/books978-3-03928-149-7> <https://doi.org/10.3390/s19112613>

Narrowband internet of things (NB-IoT) : from radio network coverage to device energy consumption modeling and energy-efficient application = Kitsaribaline asjade internet (NB-IoT) : raadiovõrgu katvusest seadme energiatarbe modelleerimise ja energiasäästliku rakenduseni

Khan, Sikandar Muhammad Zulqarnain 2022 https://www.ester.ee/record=b5491661*est <https://digikogu.taltech.ee/et/Item/8244be00-273d-4d45-a34a-27f0f4350d32>

Narrowband internet of things (NB-IoT) for industrial automation

Malik, Hassan; Alam, Muhammad Mahtab; Kuusik, Alar; Le Moullec, Yannick; Päränd, Sven Wireless automation as an enabler for the next industrial revolution 2020 / p. 65-87 <https://doi.org/10.1002/9781119552635.ch4>

NarrowBand-IoT performance analysis for healthcare applications

Malik, Hassan; Alam, Muhammad Mahtab; Le Moullec, Yannick; Kuusik, Alar Procedia computer science 2018 / p. 1077–1083 <https://doi.org/10.1016/j.procs.2018.04.156> [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

NB-IoT based visual smart waste management system

Zulqarnain Khan, Sikandar; Hein, Haigo; Alam, Muhammad Mahtab; Le Moullec, Yannick; Päränd, Sven 2022 18th Biennial Baltic Electronics Conference (BEC) 2022 / 6 p. : ill <https://doi.org/10.1109/BEC56180.2022.9935601>

NB-IoT network field trial : indoor, outdoor and underground coverage campaign

Malik, Hassan; Khan, Sikandar Muhammad Zulqarnain; Sarmiento, Jeffrey Leonel Redondo; Kuusik, Alar; Alam, Muhammad Mahtab; Le Moullec, Yannick; Päränd, Sven IWCMC 2019 : 15th International Wireless Communications & Mobile Computing Conference (IWCMC), June 24–28, 2019, Tangier, Morocco 2019 / p. 537-542 : ill <https://doi.org/10.1109/IWCMC.2019.8766568>

NB-IoT-võrgu uuring : katvus sise-, välis- ja maa-alustes tingimustes

Malik, Hassan; Khan, Sikandar Muhammad Zulqarnain; Sarimento, Jeffrey Leonel Redondo; Mwakwata, Collins Burton; Alam, Muhammad Mahtab; Le Menach, Yvonnick; Päränd, Sven Elektriala 2019 / lk. 14-18 : ill http://www.ester.ee/record=b1240496*est

Non orthogonal multiple access: basic concepts and misconceptions

Hassan, Syed Rizwan; Shabbir, Noman; Unbreen, Arooj; Rehman, Ateeq Ur; Iqbal, Ahmad NFC IEFR journal of engineering and scientific research 2020 / 4 p <http://doi.org/10.24081/nijesr.2019.1.0001>

Novel digital twin development methodology for the robot cell connectivity in a smart industry environment = Uudne digitaalsete kaksikute arendusmetoodika robottootmisrakkude sidustamiseks targa tööstuse keskkonnas

Kuts, Vladimir 2019 <https://digi.lib.ttu.ee/i/?12252> Tehnikaülikooli doktoritöö tõhustas roboti juhtimist virtuaalkaksikuga

Nutikalt rajatud teed aitavad ohutumalt liigelda

Sillasoo, Signe; Puust, Märt Äripäev 2020 / Ehitusuudised, lk. 6-7 : ill https://www.ester.ee/record=b1071975*est

A penalty scheme for mitigating uninstructed deviation of generation outputs from variable renewables in a distribution market

Yang, Jiajia; Dong, Zhao Yang; Wen, Fushuan; Chen, Qixin; Luo, Fengji; Liu, Weijia; Zhan, Junpeng IEEE Transactions on Smart Grid 2020 / p. 4056 - 4069 <https://doi.org/10.1109/TSG.2020.2993049> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

A Performance evaluation concept for production systems in an SME network

Mahmood, Kashif; Lanz, Minna; Toivonen, Ville; Otto, Tauno Procedia CIRP 2018 / p. 603-608 : ill <https://doi.org/10.1016/j.procir.2018.03.182> [Conference Proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

Preliminary analysis of cyberterrorism threats to internet of things (IoT) applications

Balogun, Mobolarinwa; Bahsi, Hayrettdin; Karabacak, Bilge Terrorists' use of the Internet 2017 / p. 49-58 <http://doi.org/10.3233/978-1-61499-765-8-49>

Preliminary analysis of cyberterrorism threats to internet of things (IoT) applications [Online resource]

Bahsi, Hayrettdin Advanced Research Workshop supported by the NATO Science for Peace and Security Programme, Terrorists' Use of the Internet : assessment and response 2016 / p. 8 <http://www.cyberterrorism-project.org/wp-content/uploads/2016/11/Terrorists%E2%80%99-Use-of-the-Internet-Assessment-and-Response.pdf>

Pöörasel kiirusel arenev eriala: arukad süsteemid tekitavad vajaduse uut laadi IT-spetsialistide järele [Võrguväljaanne]

digi.geenius.ee 2022 [Pöörasel kiirusel arenev eriala: arukad süsteemid tekitavad vajaduse uut laadi IT-spetsialistide järele](#)

Q-Learning based joint energy-spectral efficiency optimization in multi-hop device-to-device communication

Khan, Muhidul Islam; Reggiani, Luca; Alam, Muhammad Mahtab; Le Moullec, Yannick; Sharma, Navuday; Yaacoub, Elias; Magarini, Maurizio Sensors 2020 / art. 6692, 23 p.: ill <https://doi.org/10.3390/s20226692> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Radio resource management in NB-IoT systems : empowered by interference prediction and flexible duplexing

Malik, Hassan; Alam, Muhammad Mahtab; Pervaiz, Haris; **Moullec, Yannick Le;** Al-Dulaimi, Anwer; Päränd, Sven; Reggiani, Luca IEEE Network 2020 / Art. nr. 8839971 <https://doi.org/10.1109/MNET.001.1900087> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Radio resource management scheme in NB-IoT systems

Malik, Hassan; Pervaiz, Haris; **Alam, Muhammad Mahtab;** **Le Moullec, Yannick;** **Kuusik, Alar;** Imran, Muhammad Ali IEEE Access 2018 / p. 15051-15064 : ill <https://doi.org/10.1109/ACCESS.2018.2812299> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Rate-latency optimization for NB-IoT with adaptive resource unit configuration in uplink transmission

Elgarhy, Osama Mohamed Mostafa; **Reggiani, Luca;** **Malik, Hassan;** **Alam, Muhammad Mahtab;** Imran, Muhammad Ali IEEE Systems Journal 2021 / p. 265 - 276 <https://doi.org/10.1109/JSYST.2020.2991073> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Reducing energy consumption with IoT prototyping

Saari, Mika; Sillberg, Pekka; Grönman, Jere; **Henno, Jaak** Acta Polytechnica Hungarica : journal of applied sciences at Budapest Polytechnic Hungary 2019 / p. 73–91 : ill <https://doi.org/10.12700/APH.16.9.2019.9.5> http://acta.uni-obuda.hu/Saari_Sillberg_Gronman_Kuusisto_Rantanen_Jaakkola_Henno_96.pdf [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Reliability management approach for a virtual enterprise of SMEs in a manufacturing domain = Usaldusväärsuse juhtimise raamistik tootmisvaldkonna väikese ja keskmise suurusega virtuaalettevõtetele

Mahmood, Kashif 2019 <https://digi.lib.ttu.ee/i/?11235>

A report on the survey. Attitudes of Estonian healthcare professionals to internet-delivered cognitive behavioural therapy

Sogomonjan, Melita; **Kerikmäe, Tanel;** Ööpik, Pille; **Ross, Peeter** Cogent psychology 2019 / art. 1637623, 12 p <https://doi.org/10.1080/23311908.2019.1637623> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Ring-oscillator with multiple transconductors for linear analog-to-digital conversion

Alvero-Gonzalez, Leidy Mabel; Medina, Victor; **Kampus, Vahur;** Paton, Susana; Hernandez, Luis; Gutierrez, Eric Electronics (Switzerland) 2021 / art. 1408 <https://doi.org/10.3390/electronics10121408> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

The rising role of big data analytics and IoT in disaster management : recent advances, taxonomy and prospects

Shah, Syed Attique; Seker, Dursun Zafer; Hameed, Sufian; **Draheim, Dirk** IEEE Access 2019 / Art. nr. 8698814 <https://doi.org/10.1109/ACCESS.2019.2913340> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Risk assessment approach for a virtual enterprise of small and medium-sized enterprises

Mahmood, Kashif; Ševtšenko, Eduard; Karaulova, Tatjana; **Otto, Tauno** Proceedings of the Estonian Academy of Sciences 2018 / p. 17-27 : ill <https://doi.org/10.3176/proc.2017.4.27> http://www.ester.ee/record=b2355998*est [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

A scalable key and trust management solution for IoT sensors using SDN and blockchain technology

Hameed, Sufian; Shah, Syed Attique; Saeed, Qazi Sarmad; Siddiqui, Shahbaz; Ali, Ihsan; **Vedešin, Anton;** **Draheim, Dirk** IEEE sensors journal 2021 / p. 8716-8733 <https://doi.org/10.1109/JSEN.2021.3052009> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Sec-IoT: A framework for secured decentralised IoT using blockchain-based technology

Khan, Muhidul Islam; Lawal, Isah A. Proceedings of Fifth International Congress on Information and Communication Technology : ICICT 2020, Vol. 1 2020 / p. 269-277 https://doi.org/10.1007/978-981-15-5856-6_27 [Article collection metrics at Scopus](#) [Article at Scopus](#)

Secure, context-aware and QoS-enabled SDN architecture to improve energy efficiency in IoT-based smart buildings

Hakiri, Akram; Sallemi, Bassem; Ghandour, Fatma; **Ben Yahia, Sadok** Distributed computing for emerging smart networks : Second International Workshop, DiCES-N 2020, Bizerte, Tunisia, December 18, 2020, proceedings 2020 / p. 55-74 : ill https://doi.org/10.1007/978-3-030-65810-6_4 [Conference proceeding at Scopus](#) [Article at Scopus](#)

Self-aware fog computing in private and secure spheres

Tammemäe, Kalle; Jantsch, Axel; **Kuusik, Alar;** Preden, Jürjo-Sören; **Õunapuu, Enn** Fog computing in the internet of things : intelligence at the edge 2018 / p. 71-99 : ill http://www.ester.ee/record=b4692402*est https://doi.org/10.1007/978-3-319-57639-8_5

Situation awareness via Internet of things and in-network data processing

Ehala, Johannes; **Kaugerand, Jaanus;** **Pahtma, Raido;** **Astapov, Sergei;** **Riid, Andri;** **Tomson, Timo;** **Preden, Jürjo-Sören;** **Mõtus, Leo** International journal of distributed sensor networks 2017 / p. 1-21 : ill <https://doi.org/10.1177/1550147716686578>

Smart chair : IoT based health telemetry for air traffic controllers and emergency response center operators

Yusupov, Nodirkhon; Akhinko, Sergii; Sambath Kumar, Rohin; Khan, Rida Proceedings of the 29th International DAAAM Symposium "Intelligent Manufacturing & Automation" : 24-27th October 2018, Zadar, Croatia 2018
<http://dx.doi.org/10.2507/29th.daaam.proceedings.184>

Smart Energy and power systems modelling: an IoT and Cyber-Physical Systems perspective, in the context of Energy Informatics

Bordin, Chiara; Hakansson, Anne; **Mishra, Sambeet** Procedia computer science 2020 / p. 2254–2263
<https://doi.org/10.1016/j.procs.2020.09.275> [Conference Proceedings at Scopus](#) [Article at Scopus](#)

Smart healthcare : disease prediction using the cuckoo-enabled deep classifier in IoT framework

Kumar, Ashwani; Reddy, S. Sai Satyanarayana; Mahommad, Gouse Baig; Khan, Baseem; **Sharma, Rahul** Scientific Programming 2022 <https://doi.org/10.1155/2022/2090681> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Smart sustainable agrivoltaics systems: The future of sustainable agricultural technology (Agri-tech) and green energy

Kuaban, Godlove Suila; Czekalski, Piotr; Nwobodo, Onyeka Josephine; **Sell, Raivo**; Nikitenko, Agris; Berkolds, Karlis; Tanko, Kenedy Tabah 2023 3rd International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME) 2023 / 6 p <https://doi.org/10.1109/ICECCME57830.2023.10253215>

Supply chain and ICT issues of Estonia: survey findings

Kisler, Ain; Solakivi, Tomi; **Hilmola, Olli-Pekka Kristian** Procedia computer science 2020 / p. 828–837
<https://doi.org/10.1016/j.procs.2020.09.078> [Conference Proceedings at Scopus](#) [Article at Scopus](#)

A survey on the roles of communication technologies in IoT-based personalized healthcare applications

Alam, Muhammad Mahtab; Malik, Hassan; Khan, Muhidul Islam; Pardy, Tamas; Kuusik, Alar; Le Moullec, Yannick IEEE Access 2018 / p. 36611–36631 : ill <https://doi.org/10.1109/ACCESS.2018.2853148> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Synchronizing physical factory and its digital twin through an IIoT middleware : a case study

Kuts, Vladimir; Modoni, Gianfranco E.; **Otto, Tauno**; Sacco, Marco; **Tähemaa, Toivo**; Bondarenko, Yevhen; Wang, Ruxin Proceedings of the Estonian Academy of Sciences 2019 / p. 364–370 : ill http://www.kirj.ee/32660/?tpl=1061&c_tpl=1064
<https://doi.org/10.3176/proc.2019.4.03> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

TalTech ootab logistikasektorilt koostööd

Transport ja Logistika : infoleht 2020 / lk. 2 https://www.ester.ee/record=b1975868*est

TalTechi targad liftid jätaavad külastajad meelde

Ehitaja 2019 / lk. 9 : fot https://www.ester.ee/record=b1072123*est

TalTechis valminud doktoritöö aitab asjade interneti seadmetel koostööd teha

Mente et Manu 2020 / lk. 33 <https://dea.digar.ee/cgi-bin/dea?a=is&oid=AKmenteetmanu202011&type=staticpdf>
<https://digikogu.taltech.ee/et/Item/67dab11b-894d-4903-b4ff-f4652e58bf81>

Task offloading in mobile fog computing by classification and regression tree

Rahbari, Dadmehr; Nickray, Mohsen Peer-to-Peer networking and applications 2020 / p. 104–122 <https://doi.org/10.1007/s12083-019-00721-7>

Teaching and promoting smart internet of things solutions using the serious-game approach

Õunapuu, Enn Fusion of smart, multimedia and computer gaming technologies : research, systems and perspectives 2015 / p. 73–90 : ill

Teadlased selgitasid välja asjade interneti seadmete energiavajaduse

Härmat, Karin Mente et Manu 2021 / lk. 33 [Mente et Manu 2/2021](#)

Teadus 3 minutiga : päikesepatareid annavad vunki värvkõrguseadmetele [Võrguväljaanne]

Krautmann, Robert novaator.err.ee 2022 ["Teadus 3 minutiga : päikesepatareid annavad vunki värvkõrguseadmetele"](#)

Tehnikaülikooli targad liftid oskavad sõita sinna, kuhu kundel vaja

Mente et Manu 2019 / lk. 8 : fot https://www.ttu.ee/public/m/mente-et-manu/MM_05_2019/mobile/index.html
https://www.ester.ee/record=b1242496*est

Toimiva digiühiskonna tagavad usaldusväärne tarkvara, turvaline riistvara ning energiasäästlikud ja nutikad asjad

Härmat, Karin Mente et Manu 2022 / lk. 32–33 https://www.ester.ee/record=b1242496*est

Toward software-defined networking-based IoT frameworks : a systematic literature review, taxonomy, open challenges and prospects

Siddiqui, Shahbaz; Hameed, Sufian; Shah, Syed Attique; Aneiba, Adel; **Draheim, Dirk**; Dustdar, Schahram IEEE Access 2022 / p. 70850-70901 <https://doi.org/10.1109/ACCESS.2022.3188311> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Towards disaster resilient smart cities : can internet of things and big data analytics be the game changers?

Shah, Syed Attique; Seker, Dursun Zafer; Rathore, M. Mazhar; Hameed, Sufian; **Ben Yahia, Sadok**; **Draheim, Dirk** IEEE Access 2019 / art. 8759905, p. 91885–91903 <https://doi.org/10.1109/ACCESS.2019.2928233> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Towards green and smart seaports : renewable energy and automation technologies for Bulk Cargo Loading Operations

Philipp, Robert; Prause, Gunnar Klaus; Olaniyi, Eunice Omolola; Lemnke, Florian Environmental and Climate Technologies 2021 / p. 650 - 665 <https://doi.org/10.2478/rtuct-2021-0049> [Journal metrics at Scopus](#) [Article at Scopus](#) [Journal metrics at WOS](#) [Article at WOS](#)

Towards SDN-based smart contract solution for IoT access control

Khalid, Mizna; Hameed, Sufian; Qadir, Abdul; Shah, Syed Attique; **Draheim, Dirk** Computer communications 2023 / p. 1-31 <https://doi.org/10.1016/j.comcom.2022.11.007>

TTÜs käivitub Telia toel uus IT teadusgrupp ja asjade interneti platvorm

Mente et Manu 2017 / lk. 8 http://www.ester.ee/record=b1242496*est

Unsupervised anomaly based botnet detection in IoT networks

Nömm, Sven; **Bahsi, Hayret** 17th IEEE International Conference on Machine Learning and Applications : ICMLA 2018, 17–20 December 2018, Orlando, Florida, USA : proceedings 2018 / p. 1048-1053 <https://doi.org/10.1109/ICMLA.2018.00171>

Using games to understand and create randomness

Henno, Jaak; Jaakkola, Hannu; Mäkeläinen, Jukka Proceedings of the SQAMIA 2018: 7th Workshop of Software Quality, Analysis, Monitoring, Improvement, and Applications, Novi Sad, Serbia, 27-30. August 2018 2018 <https://www.scopus.com/record/display.uri?eid=2-s2.0-85054376554&origin=inward&txGid=738e163a0c73e3a2a124039455cafce7> [Conference Proceedings at Scopus](#) [Article at Scopus](#)

Using MedBloT dataset to build effective machine learning-based IoT botnet detection systems

Guerra Manzanares, Alejandro; **Medina-Galindo, Jorge**; **Bahsi, Hayret**; **Nömm, Sven** Information Systems Security and Privacy : 6th International Conference, ICISP 2020, Valletta, Malta, February 25–27, 2020 : revised selected papers 2022 / p. 222–243 https://doi.org/10.1007/978-3-030-94900-6_11 [Conference proceedings at Scopus](#) [Article at Scopus](#) [Article at WOS](#)

Wearable m-assessment system for neurological disease patients

Kuusik, Alar; **Alam, Muhammad Mahtab**; **Kask, Triin**; **Gross-Paju, Katrin** Proceedings : IEEE 4th World Forum on Internet of Things 2018 / p. 201-206 : ill <https://doi.org/10.1109/WF-IoT.2018.8355165>

5G tehnoloogia lükkab käima uued idufirmad ja aitab kaasa tööstuse digitaliseerimisele

Hämat, Karin Mente et Manu 2019 / lk. 40-41 : fot https://www.ester.ee/record=b1242496*est https://www.ttu.ee/public/m/mente-et-manu/MM_04_2019/mobile/index.html