

Technologies of Information Society: →Project←

2019.02.28. Thursday 10:15 – 11:45
room 204

by

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Subject: TIS

Plan

1. Choose one of the topics I propose
2. Start making a 15 page document in English and a 15 minute GoogleSlide/PPT/Presi/LaTex or similar presentation
3. Have one consultation with me during the semester
4. Submit Your document and presentation slides one week before Your presentation
5. Make Your presentation

Widen the Scope!

Include Societal Aspeccts and Impacts!

Bibliography + references!!!

Source to be acknowledged! Copyright!

Dates planned when I am in Gdansk

- Monday 13:00-15:00 official schedule
What about extending on Monday 15:00-17:00?
- (Thursday 10:00-12:00 Backup)
- March 18-22: ???
- April 1-5: Consultations
- May 6-10: Reports/Presentations

TeamWork

- 2-4 Students work Together
- Focus onto most exciting achievements and developments for each topic
- Document and present your work
- Include Societal Aspects and Impacts!
- Share exciting data and solutions!
- Make a dynamic presentation you will be proud of!

The Topics

1. LPWAN

- (task for 2 students)
- Compare the available Low Power Wide Area Network solutions for massive IoT from the aspects of
 - Power Requirement
 - Range
 - Scalability
 - Maturity
 - Availability of products
 - Openness of Standards



- These techniques should include:
 - NB-IoT
 - Cat-M1
 - LoRa
 - SigFox

EC-GSM-IoT



- What is available in Poland now?
- What will be available soon?
- What is the price of certain services?

2. VoWiFi & VoLTE & UMTS

Seamless Handovers and FallBacks



- (task for 2 students)
- Explain the VoLTE and VoWiFi solutions and investigate the solutions for smooth handover between VoLTE, VoWiFi and UMTS
- What is the role of SIP and IMS?
- Will people prefer VoWiFi to traditional UMTS voice calls?
- What will happen with Fbmessenger, Signal, Viber, Skype, etc. Voice Call Applications?

3. Disasters: Natural, ManMade

- (task for 4 students)
- Collect at least 20 disaster and attack events of the last 20 years that had documented impact onto the communications and informatics infrastructures.
- Make drawings of the shapes of areas impacted by these disasters and attacks.
- Are any of these predictable or non?
- Are these intentional malicious or accidents?
- Consider fires and wildfires, explosions, Earthquakes, Tsunamis, Tornadoes, Hurricanes, Land Slides, Solar Flares, various attacks ranging from DDoS to terror attacks.
- E.g., AnnapolFire, T-MobilePolska, Warsaw (Poland) 31/01/2019: Data Center destroyed. No SMS, Internet and web services for days in almost whole Poland.
 - <https://shilfa.com/poland/t-mobiles-refusal-when-will-it-be-removed-declaration-fraudsters-send-sms-and-t-mobile-alerts-subscribers-to-4-2-2019/>
 - https://www.reddit.com/r/tmobile/comments/alrvh3/we_are_migrating_tmobile_datacenter_to_the_cloud/
 - <http://wbj.pl/t-mobile-services-disrupted-after-fire/>

4. What to do when Communications Fail...

- (task for 2 students)
- Collect recent statistics on causes, frequency and duration of failures in networks
- Differentiate node and link failures, as well as the access and backbone failures - consider the number of users affected by a failure.
- Classify failures according to the causes.
- Make statistics on frequency and duration.
- Provide data on availability.

5. Internet Access evaluations

- (task for 4 students - preferred to have subscription for mobile data and home Internet access at more different operators)
- Make Ookla SpeedTest and WireShark measurements to compare the RTT (ping) the speed and the packet loss ratio over
 - Ethernet at the University
 - the home Internet Access and
 - at least two Mobile Operators
 - Evaluate what is the best offer of what Internet Service Providers at for what price via LTE or home access.

6. Machine / Deep Learning

- (task for 2 students)
- Install Python environment
- Make a Machine Learning/Deep Learning example in Python with illustration...

7. Vehicle communications

- V2V, V2I, I2V (V2X) communications
- Standards:
 - IEEE
 - 3GPP
 - etc?
- Braking?
- Platooning?
- Looking behind the corner?
- Virtual Reality? Augmented Reality? (VR/AR)

8. Industry 4.0?

- Goals?
- Impact onto Society?
- New Industrial Revolution?
- What are the network requirements?
- What networking solutions are of interest?

9. Wearable network devices

- Heart rate, blood oxygen, temperature, blood pressure, NFC connected sensors printed onto the skin, etc. gadgets
- How they impact the society?

10. Autonomous vehicles

- Cars, planes, drones, submarines, boats, etc...
- What is the state of the art?
- Autonomous car excidents?
 - Why?
 - How many?
 - Better than human drivers?
 - Levels of autonomy?
- Why they are not allowed?
 - Where are they allowed?
- Why do we not trust them?
 - Autopilots? Trains, Ships, etc?

11. BlockChain, BitCoin, CryptoCurrencies

- What is BlockChain?
- What can it be used for?
- Why is good to use it?
- How is it related to Bitcoin and other cryptocurrencies?
- Distributed, decentralized, encrypted tracking
- Each record (block) of the blockchain contains:
 - a [cryptographic hash](#) of the previous block
 - a [timestamp](#)
 - transaction data (generally represented as a [merkle tree](#) root hash)

12. 3D printing and its societal impact

- 3D printing SoA (State of the Art)
 - Plastic
 - Colours
 - Metal
 - Solvable
 - Food
 - Buildings
 - Car spare parts
 - Medicine (tooth, bone,...)
- 3D scanning
- SW background
- Market

13. Environmental Impact of ICT

- Radio smog
- Light pollution
- Carbon footprint – 7% of the total is by the ICT
- GFG emission
- Production of ICT devices
- Sustainability
- Does a solar panel produce more electricity during its lifecycle than needed for its production?

14. Smart City, Smart Transportation, Smart Grid, Smart Agriculture etc.

- (4 students)
- Cities are smartening
- Energy grids as well
- Agriculture must significantly improve efficiency or in 2050 we will starve...
- Brazilian rain forest cuts

15. Quantum Computing and Quantum Communications

- SoA?
- What are the newest scientific achievements?
- Can I buy a QC now? Is it expensive?
- What will happen with traditional cryptography?
- Teleportation? “Transporters convert a **person** or object into an energy pattern...”



STAR TREK

