

2018FS 11033: Mobile Communications Practical Assignment

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Outline

- Goal: Practice lecture knowledge by programming.
- Team work, 3 students per group
- Topics:
 - MATLAB simulation (1 Task)
 - OMNeT++(1 Task)
 - Python programming (1 Task)
 - Openairinterface (1 Task)
 - DASH server (1 Task)
 - Any proposal by students!?

Topic 1: MATLAB simulation

- Objective:
 - To perform a performance evaluation study that provides insight on the capabilities of spread spectrum technologies (DSSS and FHSS).

- Issues to take into consideration:
 - Bandwidth
 - Interference
 - Bit error
 - Etc.

Topic 2: OMNet ++ Simulation

- Objective:
 - Performance evaluation of LTE handover mechanisms (X2-based and S1-based).

- Issues to take into consideration:
 - User movement speeds
 - Mobility model and range
 - Handover frequency

Topic 3: Python Programming

- Objective:
 - To evaluate performance of Periodicity Based Algorithm to predict next Cell-ID in cellular networks.

- Issues to take into consideration:
 - Prediction accuracy
 - Periodicity Detection using *Fourier Transform* and *autocorrelation*.

Topic 4: Openairinterface

- Objective:
 - The study of the S1-C attachment in LTE. Provide a quantitative study of the protocol delay. Measure the delay between the Attach Request issued by the User Equipment (UE) and the establishment of the bearer in the LTE system.
- Issues to take into consideration:
 - Study of the message exchange in S1-C, S6, S11, S5/S8.
 - Delay between the attachment request and the establishment of the bearer.

Topic 5: Linux client with WiFi and LTE

- Objective:
 - The study of the DASH video delivery in a mobile scenario using WiFi and LTE. The user is connected through LTE, but periodically gets the internet access through WiFi. Evaluate the quality gain in the parallel LTE/WiFi video transmission in comparison to a single LTE transmission using MPTCP
- Issues to take into consideration:
 - Study whether the Linux MPTCP implementation can dynamically recognize new interfaces.
 - Study of the performance gain in terms of throughput in a dynamic multi-interface scenario.
 - Study the performance gain between LTE and WiFi/LTE in video definition

Topic 6 : Proposal by students

- Requirements:
 - Mobility Prediction
 - Location Based Services
 - Mobile/Vehicular ad-hoc Networks
 - Connection to lecture content

Schedule

- 26.02.2018 – Start
- 5.03.2018 – One page proposal
- 30.04.2018 – Intermediate presentation
- 28.05.2018 – Final project presentation

Requirements

- One page proposal
 - Roadmap of your project
 - Explanation of concepts
 - Relevant documentation
 - Details described in ILIAS file

- Presentation:
 - Max 15 min per group
 - Who did what!?

- Final report:
 - Max 6 pages

References

- OMNeT ++
 - <http://www.omnetpp.org/>
- OMNeT ++ INET Framework
 - <https://inet.omnetpp.org/>
 - <https://inet.omnetpp.org/Protocols.html>
- SimuLTE(LTE user plane simulation model)
 - <https://github.com/inet-framework/simulate>
- OpenFlow Extension for the OMNeT ++ INET Framework
 - <https://github.com/lsinfo3/ofomnet>
 - <http://dl.acm.org/citation.cfm?id=2512780>
- MATLAB
 - <https://ch.mathworks.com/help/>
- Python
 - <https://www.python.org/about/help/>
- Openairinterface
 - <http://www.openairinterface.org/>
 - <http://www.dash-if.org>
 - <https://www.multipath-tcp.org>

Contacts

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