

Breakout Session on Mobile Applications

Group Members

Pr. Majid Al Taei (The University of Jordan)

Dr. Mina Guirguis (Texas State University)

Dr. Sinem Ergen (Koc University)

Mr. Seyhan Ucar (Koc University)

Proposed Projects

The group discussed the following three potential applications for collaboration:

1. Inter-vehicular networks

In the vehicular networks, we discussed how we can study the communication security between different sensors on the car. In particular, there has been an effort to replace wires in the cars with wireless connections to reduce the cost and the weight on the vehicle. Interference and noise may significantly impact important information that may trigger an unchecked behaviour. For example, if we have 4 sensors that report their speed to an ABS brakes system, delay or loss of measurement from one the sensor may cause an accident. So the question is how to ensure the security and the safety of the system.

2. Robotic-based e-health systems

In the e-health application, we discussed the involvement of humanoid robots in the management of chronic diseases such as heart disease, respiratory diseases and diabetes, are by far the leading cause of mortality in the world, representing more than 60% of all deaths. The robot which interacts with the patient as a mean of a virtual health carer captures data from the patient (via interactive oral dialogues) and from several medical devices over wireless connections (e.g., Bluetooth, Zigbee, Internet of Things, etc.) and sends them to a remote health centre for analysis. Based on the analysis and the recommendations of the health carers, the robot would engage the patient in different activities that would enhance his/her social and behavioural change towards improved self-management of his/her disease. The privacy and security issues of the medical data were also discussed and how to ensure that no manipulation can trigger an unwanted reactive behaviour from the robot. New healthcare systems based on these technologies are expected to provide significant cost reduction, patient driven and better quality of care.

3. Emergency and disaster management networks

In the emergency application, we discussed an emergency scenario in which the power supplies and telecom infrastructure can be destroyed. To facilitate communication between different groups (e.g. families, rescue teams, etc.) in the cases of disasters and ensure their operation even under attacks, self-configurable ad-hoc networks can be formed using existing smart phones and other mobile devices. Such an ad-hoc network system is expected to be of a vital importance for rescue personnel to obtain an accurate and consistent picture of the situation, and to regain control and coordination on the shortest possible notice. This will minimise the number of casualties and restrict the damage. However, the inherent lack of centralised control and the variability of the network topology demands cross-layer optimisations on the protocol stack of such networks.