Master Thesis Project at Sony Mobile and EIT

Comparison of low-power signal designs for IoT devices

The success of Internet of Things (IoT) has led to an increasing demands on wireless network (WSN) type applications. The devices in WSNs are typically battery powered and have limited energy resources due to the small size of the devices and their possible placement. A long life-time network, where devices can operate over an extended time period, is therefore one of the main design requirements for WSN types of applications. A use of low-power wake-up receiver with dedicated wake-up signals is accounted as a practical solution to reduce the cost of idle channel listening. The type of signal design that allows for such low-power reception can differ depending on system characteristics. For example a choice of carrier frequency, coverage distance, selected modulation, and transmitter characteristics have strong impact on signal detection performance and wake-up receiver design.

In this master thesis project, we address these types of energy efficient signal designs and study their detection performance by performing simulation for candidate use-cases and scenarios. We particularly address energy saving schemes in wireless sensor networks with low-traffic intensity. We also investigate how the signal design choice influences the device power consumption and the required performance of the target application. The goal is to find signal design combinations to improve power saving features in future wireless protocol standards.

This thesis project is preferably for two students. The project requires good knowledge of wireless communication in general and additional experience with low-power communication schemes will be very useful. The work will be carried out at the Research & Standardization department, Sony Mobile Communication AB in Lund, Sweden, in cooperation with the department of Electrical and information Technology at Lund University. The project should start as soon as possible, during the autumn of 2018, and will take approximately 40 weeks of full-time work (20 per student).

The work will be supervised by Nafiseh Mazloum at Sony Mobile Communications (Nafiseh.Mazloum@sony.com) and Ove Edfors at EIT/LU (Ove.Edfors@eit.lth.se).

If you are interested, please send your application, including CV and transcripts, to the above e-mail addresses. Pairs of students who have successfully worked together earlier, on labs, projects, etc. are particularly encouraged to apply.