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Semester project

Low-power network design: work hard, play hard

Looking for a pratical and stimulating project? Read on!

In 2011, the release of the Glossy protocol [1] changed the game of low-power wireless networking. In a nutshell, Glossy is a very efficient *flooding* protocol, *i.e.*, all messages are broadcast (instead of traditional routing). As flooding is stateless, it is very flexible and resilient to sporadic failures, topology changes, etc.

Many protocols building on Glossy have been proposed (LWB [2], Chaos [3], Crystal [4]...). Glossy-based protocols have proved their efficiency, as showcased in the Dependability Competition held yearly during the international conference on Embedded Wireless Systems and Networks (EWSN). However, the design of a Glossy-based communication protocol is an expert task, requiring low-level embedded system programming knowledge, and usually involving long and painful debugging. Or it used to be.

Our group recently designed Baloo, a middleware providing system designers with a programmable networking protocol. It defines a comunication in rounds, similar to LWB or Crystal, where each round is composed of a sequence of Glossy floods. The low-level 'details', like timers and radio management, are performed by the middleware, letting the system designer focus on the protocol logic.

Project description The goal of this project is simple. In February 2019 will be held the next edition of the dependability competition. Your task consists in participating and raising high the ETH colors! You will have to analyse the competition scenario, design a communication protocol that is best suited, implement it and validate it. Baloo will provide an implementation starting point.

Requirements You should have good experience in C programming. Knowledge about embedded systems and communication protocols is a plus.

Needless to say, you should be highly motivated! Our group participated to this competition only once and won 1st place; so expectations are rather high :-) By the way, the 2019 edition will be in Beijing. . .

[1] Efficient network flooding and time synchronization with Glossy, F. Ferrari et al., IPSN 2011
[2] Low-Power Wireless Bus, F. Ferrari et al., SenSys 2012
[3] Chaos: Versatile and Efficient All-to-all Data Sharing and In-network Processing at Scale, O. Landsiedel et al., SenSys 2013
[4] Data Prediction+ Synchronous Transmissions= Ultra-low Power Wireless Sensor Networks, I. Timofei et al., SenSys 2016

Interested?
Contact us for more details!

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