Designing and Creating IoT Devices with Pre-service Teachers

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Abstract

The rapid growth of the Internet of Things (IoT) is changing our world and the price reduction of typical IoT components is allowing to innovate new designs and products at home, school, university etc. IoT developer must have fundamental knowledge of computer science, mathematics and physics, skills of designing and implementation components of complex systems.

We believe that Implementation in secondary school curriculum elements of creating and designing IoT devices will help students to develop creative skills and to increase their learning motivation. Work on IoT projects gives students unique opportunity to appreciate practical usage of what they have learned at math, physics and computer science lessons in real-life situations. Therefore the question of training teachers for comprehensive implementation of the IoT development in schools is arised.

We present here some of our experience in designing and implementing series of workshops "Fundamentals of Designing and Creating IoT Devices" for pre-service computer science teachers. Every workshop has structure which includes list of equipments, theoretical background, main problem task, step-by-step practical instructions accompanied by the scheme of connections and code plus video of implementation; also students can practice new skills and knowledge with additional tasks or work on their own projects. The workshop collection covers basics of using Arduino and Raspberry Pi platforms, sensors and actuators; aspects of managing and collecting data remotely.

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