

# 2018 Research Interest/Project Ideas

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## SDIOS: A Complete Software System For IoT Devices

The number of devices connected to the Internet of Things (IoT) are estimated to reach between 20 and 46 billion by 2020. Current IoT architectures exhibit several weaknesses that must be overcome to make IoT easily deployable and safe.

- \* **Hardware Dependencies:** IoT devices currently run embedded software that is closely coupled with the underlying hardware, making it difficult to change existing software easily (e.g., to update to a new version) or to write software that can run on multiple hardware platforms.

- \* **High Maintenance and Deployment Costs:** Because code depends on the underlying hardware, each new IoT device or IoT application requires a huge software investment.

- \* **Long Development Cycle:** Development of a new IoT device or application is time consuming because programmers must write coordinated code that runs on sensor hardware, base stations (or other intermediate gateways), and a server, which typically runs in the cloud. Furthermore, the code is often written by scratch for each new application. A long development cycle for IoT applications presents a barrier to deployment of innovative new IoT systems.

A research effort known as Software Defined IoT (SD-IoT), which is inspired by SDN, promises to make IoT development both quicker and the code less prone to errors. The idea is that IoT applications use a logically centralized operating system that allows software to manage the IoT devices via standard interfaces.

Our project investigates the design and development of a software defined operating system for IoT devices that will provide a set of high-level services to manage, monitor, control IoT devices, and collect information. We will design and implement a southbound Interface that provides communication between a controller and a set of IoT devices. We will also design and implement a northbound interface that allows a programmer to develop IoT applications without learning the details of sensor hardware, and without struggling to develop network communication protocols.

The project will be relevant to any corporation that uses IoT.