PhD Opportunity

From IoT to the Cloud: Efficient Management of Data from the Internet of Things

Objectives

With advances in Smart City Deployments, Wireless Sensor Networks, the Internet of Things (IoT), Cloud Computing and Big Data Analytics, the ability to collect and analyse large volumes of live data in real-time is becoming a reality [1]. Using such platforms and technologies we can collect data from various sensors on everyday ‘Things’, stream them to Cloud-based hosting environments, and process the live data quickly and efficiently in conjunction with other data and knowledge sources [2]. Such functionality allows for the possibility of merging online data with established historical databases to improve understanding and extract more meaning from the data as well as providing alerts and predictions in real-time that assist in decision support. Healthcare provides a particularly important and challenging use case for such technologies, where we can collect patient health data from sensors and other devices, use them to provide alerts and alarms and also store these data in the Cloud environment where we can combine them with data from sources such as prescription, GP and hospital databases, to predict likely future health pathways and suggest appropriate preventative measures [3].

Brief Description

However, the downside is that such strategies can generate huge amounts of data with resulting high impact on digital memory, processing and battery usage on IoT enabled devices, such as smart phones, as well as massively overloading the access and core network links with traffic to and from the Cloud. Techniques are required to identify and prevent unnecessary data, that do not provide new knowledge, being stored on the devices or entering the network. This project focuses on developing high performing data analytic methods which require minimum load on the IoT-Cloud system, with regard to the processing, storage and transmission of data [4]. We will employ techniques such as data summarisation, sufficient statistics, and the use of proxy data as well as developing lightweight analytic strategies and algorithms. The project will utilise healthcare data to evaluate the approach.

References

3. Manhyung Han, Jae Hun Bang, Chris Nugent, Sally McClean and


**Personnel Involved**

**First Supervisor:** McClean, SI Prof  
**Second Supervisor:** Scotney, BW Prof  
**Third Supervisor:** Parr, GP Prof

**Synopsis:**

Using wireless sensor networks in the Internet of Things we can collect data from various sensors, and stream to Cloud-based Big Data environments for processing, storage and fusion with other knowledge and data. This allows us to provide alerts and predictions in real-time. This project focuses on developing high performing data analytic methods which require minimum load on the IoT-Cloud system, with regard to the processing, storage and transmission of data. We will employ techniques such as data summarisation, sufficient statistics, and the use of proxy data as well as developing lightweight analytic strategies and algorithms. The project will utilise healthcare data to evaluate the approach.