Dear Reviewer,

Author would like to thank you for your comments and suggestions, which gave him the opportunity to improve the MSc Dissertation Proposal. In the revised proposal, author hopes to address all the issues raised. In this document author answers to all the questions raised by the reviewer.

Comments are shown in bold font, followed by the answer in normal font. The major changes in the dissertation proposal are displayed in red font.

1. **How you will develop the dataset.**

   The Raspberry Pi 3 B will act as an Internet of Things (IoT) gateway (receiver), receiving the environmental sensor data from the IoT devices, the cluster of Raspberry Pi 3 A with DockerPi Sensor Hub (transmitter) attached. The Raspberry Pi B will run a Python script, responsible for receiving, decrypting, and parsing the data payload from the sensor. Received data in JSON format will contain external temperature data, onboard temperature data, humidity data, light sensitivity data and pressure data.

   The dataset for this project will be constructed from transactions sent between the receiver and transmitters. Author will measure Packet Error Rate (PER) by counting the number of packets received by the IoT gateway out of a series of consecutive packets transmitted by the sensors. Additionally, author will attempt to measure Round Trip Time (RTT) which can be defined as the amount of time it takes a packet to get from the transmitter to the receiver and back.

2. **Why you choose specifically Raft and Paxos algorithm in IoT network and is there any other techniques exist for IoT.**

   Author decided to focus on Paxos and Raft algorithms as he gained exposure to both consensus protocols during MSc course in TUD. Both protocols were shown during Advanced Databases module to be very beneficial in respect of distributed databases. While learning about their implementation, author began wondering if either of those could have been implemented in IoT world as well. One of the examples where consensus among wireless sensors would be applicable and beneficial is constructing schedules for time critical data delivery. Further research has shown that there were multiple attempts on implementing consensus algorithms in IoT domain but none of those used Raft consensus algorithm and Paxos is shown as promising but not yet fully explored. Additionally, Raft consensus algorithm is seen as more understandable than Paxos and easier to implement. Both of those algorithms are working fine for the distributed systems, so author questions if those can be implemented in IoT domain as well.

   Consensus algorithms, when adopted for IoT, provide mechanism for balanced decision making on the edge nodes, and avoiding losing data from IoT devices in the presence of a number of malfunctioning processes. While doing preliminary research for this project, author came across different approaches that address the consensus in Internet of Things domain. Solutions range from combination of blockchain-like shared data structure, consensus algorithm and containerized monitoring application to the

formulation of a new distributed multi-cast algorithm to achieve average consensus over IoT environments. Most of the research focus on the various blockchain based consensus methods that are applicable to IoT devices and networks. As mentioned before, Paxos consensus algorithm was researched but not fully explored in IoT domain, and Raft algorithm was not mentioned or adapted to IoT architecture before.

3. Do you need any specific hardware for this project?

This project requires:

Component	Quantity
Raspberry Pi 3 Model B	1
Raspberry Pi 3 Model A	7
DockerPi Sensor Hub Development Board (EP-0106)	7
IZOKEE FT232RL FTDI USB to TTL Serial Converter Adapter Module	1
MB102 Breadboard Power Supply module	8
Solderless Breadboard 400	8
TTGO Lora32 868/915mhz Sx1276 Esp32 Wifi Lora module	8
Lenovo Laptop (debugging)	1

Author of this project acquired already above components in anticipation of this proposal submission.

Thank you.

Sincerely,
Bartosz Czapski
Student Number: D10123621
Email: D10123621@mytudublin.ie