# An Approach Towards Edge Computing of Distributed Sensors Data Through Opportunistic Networks

Aly Saleh

November 8, 2016

## Contents

**1 Introduction** **3**
- 1.1 Introduce Iot and distributed sensor networks . . . 3
  - 1.1.1 Show how Iot is being currently used, its pros and cons . . . 3
  - 1.1.2 Give an idea about the devices used to make a distributed sensor network . . . 3
- 1.2 Motivation . . . 3
  - 1.2.1 Show the need to explore Pervasive Computing . . . 3
  - 1.2.2 Illustrate why it might be better to distribute the data in some cases rather than accumulating it in a single server . . . 3
  - 1.2.3 Explain why Cloud Computing is not always the right solution in some cases . . . 3
  - 1.2.4 Explain the need to find IoT devices capabilities and limitations when used for data computation . . . 3
- 1.3 Scope & Problem Statement . . . 3
  - 1.3.1 What do we want to do in this thesis . . . 3

**2 Background & Related Work** **3**
- 2.1 Introduce Edge, Fog and Pervasive computing, how they are used in this context . . . 3
- 2.2 Explain how sensor data is modeled and distributed in the current published approaches 3
- 2.3 Illustrate what are the ideas and possible network mechanisms and protocols that could be used data transfer . . . 3
  - 2.3.1 Server To Server . . . 3
  - 2.3.2 Server To Device . . . 3
  - 2.3.3 Device To Device . . . 3
- 2.4 Explain Opportunistic networks and SCAMPI architecture . . . 3
- 2.5 Show other approaches in the literature . . . 3

**3 Approach** **3**
- 3.1 Modeling of Input Sensor Data . . . 3
  - 3.1.1 Show how the different sensors have data been modeled to fit our requirements for further use in computations . . . 3
- 3.2 Data Distribution Mechanism Across Different Nodes . . . 3
  - 3.2.1 Explain data distribution among several nodes to apply pervasive computing . . . 3
- 3.3 Moving Data Through the Network . . . 3
  - 3.3.1 Explain how the data travel around the network, which protocols was used and why. . . . 3
- 3.4 Pushing the Computation to the Edges "Nodes" . . . 3

3.4.1 Explain the data computation in the nodes, how it is designed to fit our needs . 3
3.5 Overall System Design . . . . . 3

**4 Evaluation** **3**
4.1 Use Case Implementation . . . . . 3
4.1.1 Explain why did we choose this specific use case in particular . . . . . 3
4.1.2 Explain the Implementation . . . . . 3
4.2 Implementation Evaluation . . . . . 3
4.2.1 Show that the implementation is a proof of concept that the approach is sound . 3
4.2.2 Show why specific implementation details where chosen over others . . . . . 3
4.3 Performance Tests . . . . . 3
4.4 Limitations . . . . . 3

**5 Conclusion** **3**
5.1 Summary . . . . . 3
5.2 Future Work . . . . . 3

**6 References** **3**