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# Thesis Tittle

Bachelor Thesis (6 EAP)

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## **Abstract**

Nowadays, mobile applications are becoming more context aware due to technological achievements which enable the applications to anticipate users intentions. This is achieved through using the devices own micromechanical artifacts that can be used to perceive the environment. However, this is constrained to the hardware limitations of devices.

A proposed solution for this has been made in the thesis Context Sensor Data on Demand for Mobile Users Supported by XMPP by Kaarel Hanson. The solution is to use XMPP for transporting sensor data from Arduino microcontroller to the cloud. Arduino provides low-cost hardware, while the cloud offers the reliable and high- availability means for storing and processing sensor data.

This solution shows that running on a 9V battery the microcontroller lasts for 101 minutes when using an Ethernet module for communications, and 161,5 minutes with a WiFi module. These results are not good enough for remote data collection with limited access to the microcontroller.

This thesis proposes an optimisation for the system so that instead of reading and sending sensor data every 10 seconds, the cloud server would notify the controller when to start sending data and when to stop. This means implementing an algorithm for detecting similar sensor data readings and notifying the microcontroller of needed operations. With similar readings, the microcontroller could be put to an idle state for limiting power consumption, which would prolong battery life.

The aim is to optimise the sensor reading process enough to prolong the Arduino microcontrollers battery life on a 9V battery.

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# 1

## Introduction

### 1.1 Introduction

Briefly summarize the question (you will be stating the question in detail later), and perhaps give an overview of your main results. (it is not just a description of the contents of each section)

#### 1.1.1 Motivation

Some of the reasons why it is a worthwhile question.

#### 1.1.2 Contributions

Solution developed - (e.g. algorithm, tools, etc.)

#### 1.1.3 Outline

Brief introduction of each chapter

## **2**

# **State of the Art**

The state of the art used in the thesis highlighted the advances in the cloud computing domain and the mobile domain...

## **2.1 Jabber and XMPP**

Description of Jabber and XMPP protocol and its usage.

## **2.2 Arduino**

Introduction to Arduino.

### **2.2.1 Arduino Mega ADK**

Overview of the Arduino Mega ADK board and its components.

### **2.2.2 TinkerKit**

Overview of the TinkerKit module, components and sensors.

### **2.2.3 Modules**

Overview of the Ethernet and Wireless Shields and WiFly wireless module.

## **2.3 Fuzzy Logic**

Description of fuzzy logic and its uses.

## 2.4 Power supply

Overview of the PeakTech 1890 power supply.

## **3**

# **Problem Statement**

### **3.1 Current Solution**

#### **3.1.1 Arduino**

Current Arduino implementation

#### **3.1.2 XMPP Communication**

Description of the communication between the Arduino board, XMPP server and data collection server.

#### **3.1.3 Power Consumption**

Show how much power is consumed with the current implementation.



# 4

## Problem Solution

Transition - Several are the issues that were discussed in previous chapter, regarding the use of cloud services from the mobile...

### 4.1 Arduino Improvements

Description of improvements made to the current solution

#### 4.1.1 Software

List of software improvements and their effects on power consumption

#### 4.1.2 Hardware

Might not include this...

### 4.2 Communication

Description of improvements made to the communication between the Arduino board and the server.

#### 4.2.1 Fuzzy Logic Implementation

Description of the fuzzy logic implementation used.

### 4.2.2 Communication Interval

Effects of the improvements on power consumption, etc

# 5

## Conclusions

### 5.1 Conclusions

### 5.2 Summary of Contributions

## 6

# Related Work

Compare your solution with existing projects. How your solution is better than the others?, why to use your solution?, etc.

7

## Future Research Directions

Briefly indicate how your current research can be extended, some improvements, etc.

8

## Sisukokkuvõte

Eesti abstract...

Cloud Services from Mobiles, in: The 9th International Conference on Advances in Mobile Computing & Multimedia (MoMM-2011), ACM, 2011, pp. 87–95.

# Bibliography

- [1] H. Flores, S. N. Srirama, C. Paniagua, A Generic Middleware Framework for Handling Process Intensive Hybrid