

Architectural Requirements Documentation

Urban Environments Monitoring

by:

Excella

Members:

Christopher Moodley - 10457489

Lutfiyya Razak - 10198408

Juan Maree - 28004265

for:

Dr Laurie Butgereit of CSIR

V1.1

23 May 2014

Change Log/History

Date	Version	Description
17/05/2014	V0.1	Created skeleton of requirement specification
19/05/2014	V0.2	Added Vision
20/05/2014	V0.3	Added Scope
21/05/2014	V0.4	Added Use Case Figure
22/05/2014	V0.5	Added Limitations/Exclusions
23/05/2014	V1.0	Final Document Formatting

Contents

<u>1. Access channel requirements</u>	<u>4</u>
<u>2. Quality requirements</u>	<u>4</u>
<u>2.1 Scalability</u>	<u>4</u>
<u>2.2 Usability</u>	<u>4</u>
<u>2.3 Auditability</u>	<u>4</u>
<u>2.4 Testability</u>	<u>4</u>
<u>Software</u>	<u>4</u>
<u>Hardware</u>	<u>5</u>
<u>2.5 Performance Requirements</u>	<u>5</u>
<u>2.6 Security</u>	<u>5</u>
<u>3. Integration requirements</u>	<u>5</u>
<u>4. Architecture constraints</u>	<u>5</u>
<u>5. Glossary</u>	<u>6</u>

1. Access channel requirements

The system will be accessible by human users through the following channels:

1. From a PC through a Java UI.
2. From a mobile device with an Android operating system.

2. Quality requirements

2.1 Scalability

Scalability is the highest quality requirement of the system. It should be able to handle parking lots of various sizes and layouts. This would be achieved by adding and removing secondary micro-controllers that interface with the sensors in the parking bays.

The only limit in terms of scalability would be the memory of the main micro-controller, as it determines the number of references to parking bays that may exist.

The deployed system must be able to operate effectively under the load of 5 concurrent users.

2.2 Usability

95% of the users should be able to use the system without prior training.

The system functions for Administrators and Security personnel that may need initial training and will also be highlighted in the system's user manual.

2.3 Auditability

Audit logs will be created periodically by the system, which will contain statistical information about the usage of the parking lot related to the time of day.

The system will provide functionality to view information from the audit logs, It will not allow the audit log to be modified.

2.4 Testability

Software

All services offered by the system must be testable through unit tests which will test

1. That a service is only provided if all pre-conditions are met and that an exception will be raised if one of the pre-conditions is not met.
2. That once a service is provided, post-conditions will hold true

Hardware

Hardware will use sub-assembly tests to ensure correct functionality of independent units.

It will be possible for sensors to be overridden with manual switches for debugging purposes.

2.5 Performance Requirements

Performance is not the highest priority of the system.

- The system should update within 1 second of a parking bay changing state.
- A user should receive the latest version of the parking lot map within 10 seconds.

2.6 Security

Administrator functionality is only accessible after authentication of user credentials.

Security Officials will also need credentials to gain access to the functionality.

Users will gain access to the system when they are within range of the WI-Fi server or extender located within the parking bay.

3. Integration requirements

There currently exists no system that can be integrated to, this is an initial system.

The components of the system will have separated concerns to allow for parts of the system to be reused if other systems are developed.

The system will allow for manual integration through exporting and importing of CSV files.

4. Architecture constraints

No architecture constraints have been made by the client, the current choices include:

- Micro-controllers will be programmed using C
- The Server, User-Interface and Mobile Application will be programmed in java.
- Data storage will be in CSV file format.

5. Glossary

Android - is an operating system based on the Linux kernel with a user interface based on direct manipulation, designed primarily for touchscreen mobile devices such as smartphones and tablet computers.

CSV - comma-separated values file stores tabular data (numbers and text) in plain-text form.

Proximity Sensor - is a sensor able to detect the presence of nearby objects without any physical contact, in this instance using infrared radiation.

Microcontroller - a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals.