BatSignal:
System Design Document

Bryan Young
youngb2@wit.edu

Joe Moraal
moraalj@wit.edu

Zach Thornton
thorntonz@wit.edu

Computer Science 2015
Wentworth Institute of Technology

June 21, 2015

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1 Introduction

1.1 Purpose and Scope

This document describes the hardware and software components of the BatSignal distributed sensor network. This document is intended for use by developers implementing BatSignal.

1.2 Project Executive Summary

BatSignal is a distributed sensor network designed to collect audio and analyze the captures for ques indicating distress or emergency, and to alert staff of such situations. The system is designed to be physically scaled according to the needs of the location of installation.

1.2.1 System Overview

1.2.2 Design Constraints

1.2.3 Future Contingencies

1.3 Points of Contact

1.4 Project References

1.5 Glossary

1.5.1 System Specific Definitions

System Specific Definitions	

1.5.2 Technical Definitions

Technical Definitions	
CPU	Central Processing Unit
GPIO	General Purpose Input Output
GPU	Graphical Processing Unit
MHz	Mega-Hertz
USB	Universal Serial Bus
SoC	System on a Chip

1.5.3 Industry Definitions

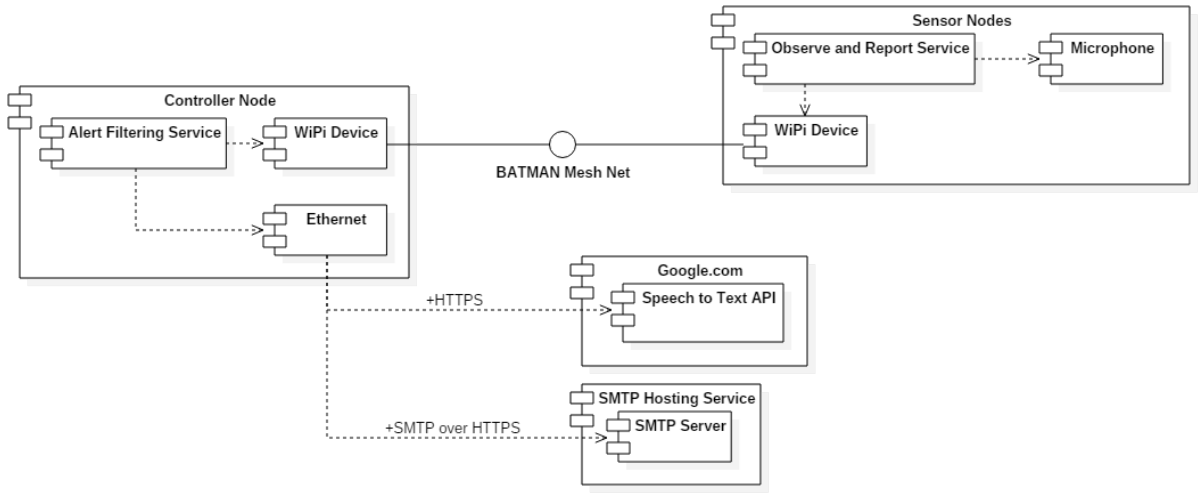
Industry Definitions	
B.A.T.M.A.N	Better Approach to Mobile Ad-hoc Networking

1.6 Document Organization

2 System Architecture

2.1 System Hardware Architecture

2.2 System Software Architecture



2.3 Internal Communications Architecture

3 Human-Machine Interface

3.1 Inputs

3.2 Outputs

4 Detailed Design

4.1 Hardware Detailed Design

4.1.1 Raspberry Pi 2

Both versions of BatSignal nodes target the Raspberry Pi model 2 board. These systems have the following capabilities:

Raspberry Pi 2 Specifications	
Cost:	$35 USD
SoC:	Broadcom BCM2836
CPU:	900MHz quad-core ARM Cortex-A7
GPU:	Broadcom VideoCore IV, OpenGL ES 2.0, OpenVG 1080p30 H.264 high-profile encode/decode
Memory (SDRAM)iB:	1024 MiB
USB 2.0 Ports:	4 (via intergrated USB hub and LAN9512)
Onboard Storage:	Micro Secure Digital / MicroSD slot
Onboard Network:	10/100 wired Ethernet RJ45
Real-time Clock:	None
Power Ratings:	650 mA, (3.0 W)
Power Source:	5 V (DC) via Micro USB type B or GPIO header
Size:	85.0mm x 56.0 mm x 17mm
Weight:	40g

4.1.2 Wi Pi Module

Wi Pi Module Specifications	

4.1.3 Microphone

Microphone Specifications	

4.2 Software Detailed Design

A Appendix