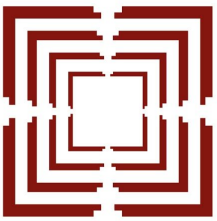


Ahmedabad University

Product Requirement Specification
Know Your Own Surrounding(KYOS)

By,

Group - 13

Saloni Chudgar - 1641013

Manav Chotalia - 1641036

Dhruvi Gajjar - 1641038

Poojan Prajapati - 201501081

CONTENTS

1 INTRODUCTION

1.1 Purpose of the Document

Project_name is a wearable product which will allow the user to monitor Air-quality of his/her surroundings.The product is made for personal usage, which allows the user to customise threshold as per user's requirements. Moreover, the device can be linked to cell phone via bluetooth or wifi. User can select any one for the connectivity. User will get an alert or update via mail and message.

1.2 Intended Audience

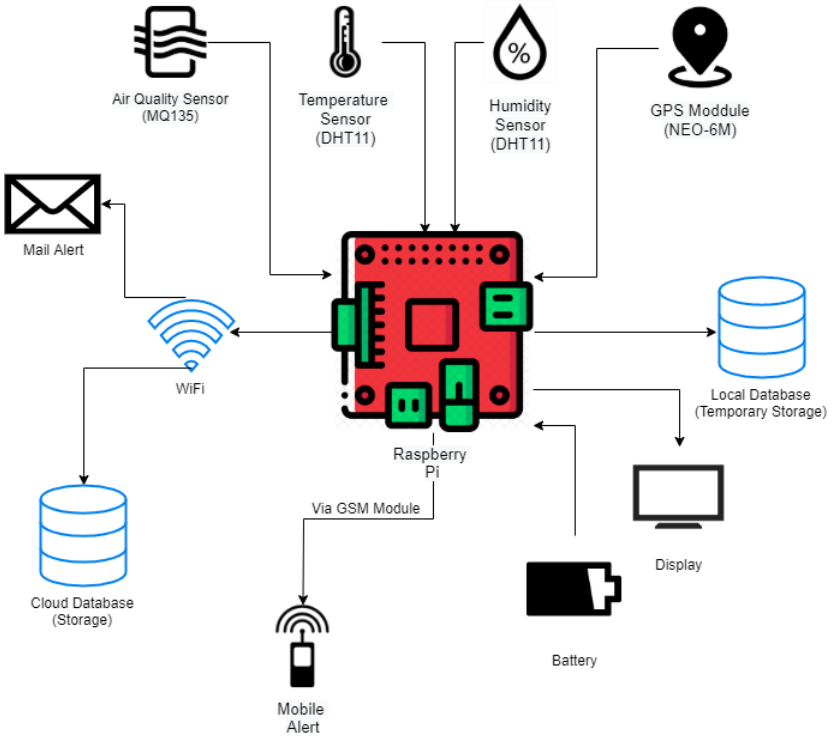
This document is intended for the developers, testers, the project team as well as the user.

2 PRODUCT OVERVIEW

2.1 Overview

This product created by amalgamation of various sensors will help in increasing the awareness about the surrounding air quality. The product sensor can detect the gases like NH3, NOx, Alcohol, Benzene, Smoke, CO2 etc. which are enough to give results about air quality. The product will be programed to get the ideal value of gases based on the location. It can compare the ideal values with the values received by the sensors. If the sensors' values have any discrepancies, it will notify the user via message or mail.

It leads to an understanding of whether national or regional air quality standards, guidelines, objectives and environmental outcomes are being met, and whether areas of concern are being identified and give Real-time monitoring to remote device.It will supply information to determine the population at risk from exposure to poor air quality in order to evaluate the potential and actual health effects in a region (eg, personal exposure assessments).



2.2 Product Features

1. It will display Air Quality, Temperature and Humidity.
2. It will detect the level of individual components in the air and generate alert to mobile device or send mail to respected person in case of discrepancies.
3. It will have warning systems for the prevention of undesired air pollution episodes for people with specific medical conditions.
4. It facilitates Real Time Air Monitoring
5. It can customize thresholding of concentration/s if and when required
6. Remote Viewing is possible and the database can be remotely monitored
7. Additional button for immediate measurement of air-quality at any given time
8. Reset feature clears all the data.
9. Automatic measurement of data through sensors every two minutes.

3 FUNCTIONAL REQUIREMENTS

- The device allows user to keep a record of the Air Quality Parameters
- Alert is generated if Air Quality Parameters exceed certain levels
- Sensor data can be viewed by user
- Location must be updated as soon as network connectivity is available
- On reset, all data must be deleted
- Backup must be available in case of data loss

Term	Description
REQ ID	RQ01
Purpose	Allows user to keep a record of the Air Quality Parameters
Description	The sensor will sense individual gases. The gases such as NH3,NOx, Alcohol, Benzene, CO2 and smoke.
Constraints	
Effects on other systems/sub system	Database of that individual id is updated with the latest values. Display is updated.
Testability with respect to test environment (Yes/No)	Yes
Acceptance criteria	When Display is updated with the latest value detected by the sensor and the database it updated successfully with the same data for that instance.

Term	Description
REQ ID	RQ02
Purpose	Alert is generated if Air Quality Parameters exceed certain levels
Description	Whenever the Air Quality is exceeded to a certain point w.r.t. ideal Air Quality of that particular location as well as the specified requirements set by the user
Constraints	User must have a device connected to the product in order to receive the alerts generated
Effects on other systems/sub system	Notifications are sent to connected device.
Testability with respect to test environment (Yes/No)	Yes
Acceptance criteria	When there is unacceptable Air-Quality, and alert generated is successfully recived as a message or a mail

Term	Description
REQ ID	RQ03
Purpose	Sensor data can be viewed by user
Description	User can view latest data on display. The older data can be viewed upto 2 months on the mobile app. the data older than 2 months is seen as averaged data in the mobile app
Constraints	
Effects on other systems/sub system	Latest Data is displayed on lcd screen. The older data is seen in mobile application.
Testability with respect to test environment (Yes/No)	Yes
Acceptance criteria	If data displayed is not corrupted or successfully loaded.

Term	Description
REQ ID	RQ04
Purpose	Location must be updated as soon as network connectivity is available
Description	With major change in the location of the device, the ideal Air-quality and weather data is updated via API call to national weather site.
Constraints	GPS Module is needed..
Effects on other systems/sub system	None

Testability with respect to test environment (Yes/No)	Yes
Acceptance criteria	Check weather requirements based on location.

Term	**Description**
REQ ID	RQ05
Purpose	On reset, all data must be deleted
Description	If the user gives reset instruction to the device, all the existing data must be forgotten even that stored in the cloud for backup purposes
Constraints	A special/different button for reset will have to be provided.
Effects on other systems/sub system	On pressing of the reset button, an interrupt will be generated to all other functionalities. Each of the functionalities will have to be stopped, and the system will be completely reset as well as restarted
Testability with respect to test environment (Yes/No)	Yes
Acceptance criteria	Pressing reset button leads to clearance of data in cloud and local storage and system is restarted.

Term	**Description**
REQ ID	RQ06
Purpose	Backup must be available
Description	Data of the past two months is available in cloud storage as a backup
Constraints	A cloud storage will have to be provided which will store data for backup. Strong network connectivity is required to implement this feature
Effects on other systems/sub system	The data has to be collected from sensor every two minutes and uploaded to cloud through network.
Testability with respect to test environment (Yes/No)	Yes
Acceptance criteria	Data is stored in device every two minutes and can be accessed through a monitoring device.

4 EXTERNAL INTERFACE

4.1 User Interface

The device will be connected to a server through ethernet and can be viewed by a user on a laptop/computer. If needed the same can be done on mobile through WiFI.

The user interface will be simple to use with only two major options. 1. View the data from database 2. Customize the threshold for alerts.

4.2 Hardware Interface

- Raspberry pie
- Air Quality Sensors (MQ135)
- Temperature Sensor(DHT11)
- Humidity Sensor(DHT11)
- GSM Module
- GPS Module(NEO-6M)
- LCD Display
- Power Supply

4.3 Software Interface

- Database Software – MySQL
- API of web mapping service
- Mobile apk

5 SPECIAL USER REQUIREMENTS

5.1 Performance Requirements

Parameter	Performance Requirement
Response Time	less than a minute
Data Storage	every 2 minutes
Backup and Recovery	data backup for 2 months
Duration between data collection by sensors	every 2 minutes

5.2 Security

Cloud Data storage System, Mobile App and Device Sensors Must be Protected.

5.3 Reliability

Given appropriate power supply and network connectivity, the device will function accurately about 99 percent of the time

5.4 Usability

One Step threshold Setting, Easily use one step immediate Reset etc.

5.5 Backup and Recovery

Data of past two months will be stored in the cloud and can be recovered in case of some sort of accidental loss. Data older than that will be averaged on monthly scale and then stored and the daily values cannot be recovered.

5.6 Installation

The app required for control must be installed in your mobile phone or electronic device if you want to change the default values or view past data.

5.7 User Manual and Help

The User Manual must explain

1. How to Reset the device
2. How to customize the thresholds
3. How to backup the data
4. How to view the data
5. How to set-up a connecting device where alert will be generated.

6 ACCEPTANCE CRITERIA

6.1 Overall Acceptance Criteria

All the functional requirements are completed.

6.2 Acceptance Test Scenarios

1. The device is displaying the correct values captured by sensor.
2. The thresholds can be customized.
3. The device can be reset properly
4. Data is being properly stored in cloud
5. All sensors are giving accurate results.
6. Alert is being generated.

7 ASSUMPTIONS

1. User is aware about the concentration levels necessary for health safety when he/she changes the levels from default.
2. All the sensors are functioning properly.
3. Network connectivity is available constantly
4. Power Supply is connected.
5. Database is functioning properly and accessible only by user.
6. The API call made to National value report receives correct values.

8 RISK ANALYSIS

1. Air Quality Sensor starts malfunctioning or stops working
2. Problem in Network Connection
3. Delay in data transmission leading to a delay in alert
4. The device programmed for alert is disconnected from network