Quality Rate Reporter

Team members:

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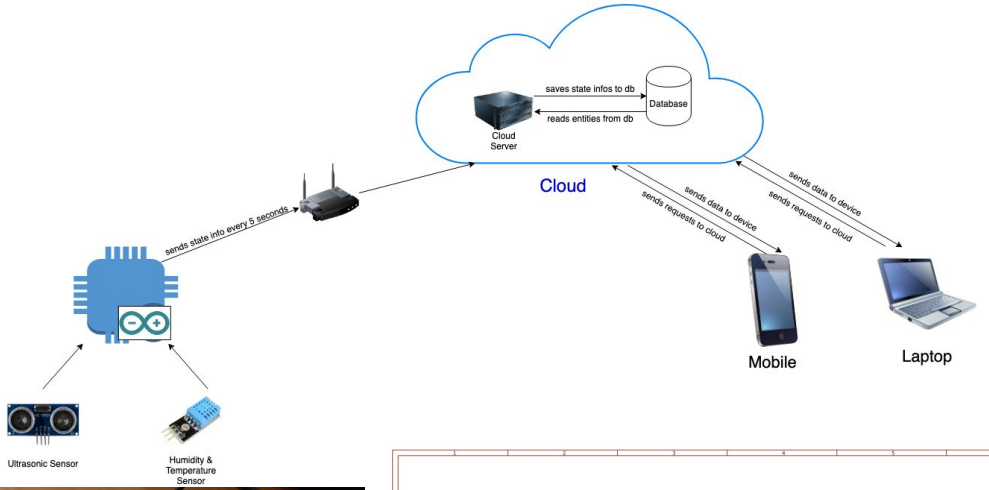
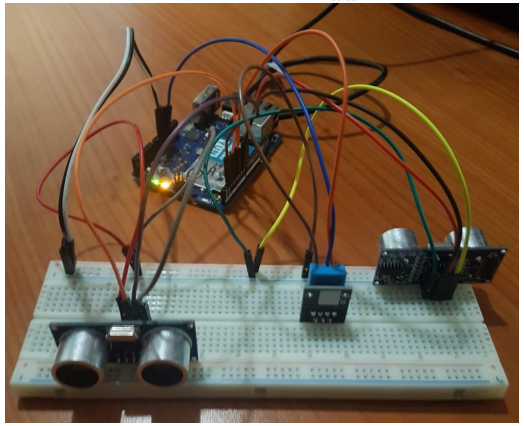
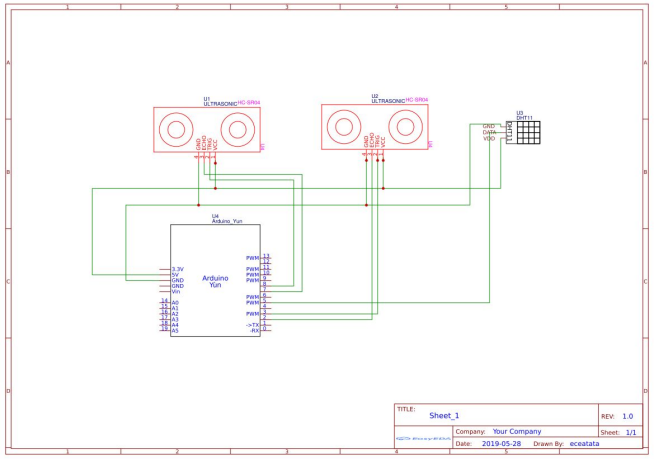


Problem: People are unable to know about quality of a public place beforehand.





Solution:

- Using ultrasonic and humidity sensors, people coming in and out of the place, as well as temperature and humidity of the place is measured
- Connected to Bluemix using MQTT and WiFi
- Using sensor data, cloud computes crowdedness and air quality
- Application reports these data to mobile application and user gets a detailed report

Technologies: *Arduino YUN, HC-SR04 Ultrasonic sensor, DHT11 Humidity Temperature Sensor, Node.js, React Native, IBM Bluemix, etc.*

See https://github.com/eceatata/Cmpe490_Project.git for further details.

Problem Statement

- Crowdedness, air quality and temperature of the public places vary during time, and it is not possible for a user to know this information about the place beforehand
- When people go to public places such as libraries, shopping malls or museums, their experience might be affected greatly by these factors.
- In our university, there are many reported cases for people who can’t find a place to sit, or library is very cold that they can’t focus on their work.

Problem Solution

- Ultrasonic sensors mounted at the entrances helps counting people coming in and out of the public places
- Humidity & Temperature sensors placed at various locations in the public place helps to obtain a general air quality measurement
- Gathering information from sensors and collecting them at the cloud, our app can report detailed information about public place and an overall score calculated according to the user’s priorities

Components Used

Component	Name	Action	Expected Challenge
Ultrasonic Sensor	HC-SR04	Counts people coming in and out	Sensor data is not very reliable
Humidity & Temperature Sensor	DHT11	Measures temperature and humidity of the air	Sensor readings give local information
Connectivity	Wifi and MQTT	Allows connection to cloud	Relatively high energy consumption
Arduino	Arduino YUN	Reads and computes sensor data	May not work reliably over long period
Embedded SW	Arduino		
Cloud Platform	IBM Cloud		
Cloud SW	NodeJS		
Mobile/Web Client SW	React Native		

Challenges

- Sometimes ultrasonic sensors interfere with each other and gives incorrect readings
- Ultrasonic sensor readings are not always reliable and occasionally outputs extreme sensors readings
- It is hard to establish a reliable connection between Arduino and cloud

Learnings

- How to build a complete IoT from scratch, including steps
  - Collecting data via sensors
  - Reading and reporting these data to clouds
  - Fetching cloud data to mobile applications
  - Designing an application that takes user experience into account
- Network techniques for sending/receiving data