Air Pollution Detector

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Contents

Objective & Goal

- Create a system which will monitor the quality of air of our environment.
- Collect information about the air pollution level after every certain period.
- Content of different gases present in air or area around us.
- Send information about the air pollution levels on the cloud.
- Send the information of current air pollution level and weather forecast of next upcoming days to user smartphone.

Introduction

- Causes of air pollution like. Population, Traffic, Industries, etc...
- IOT + Machine Learning
- Weather prediction
- Real-time detection and alert system
- A small chip-set which could carry anyone

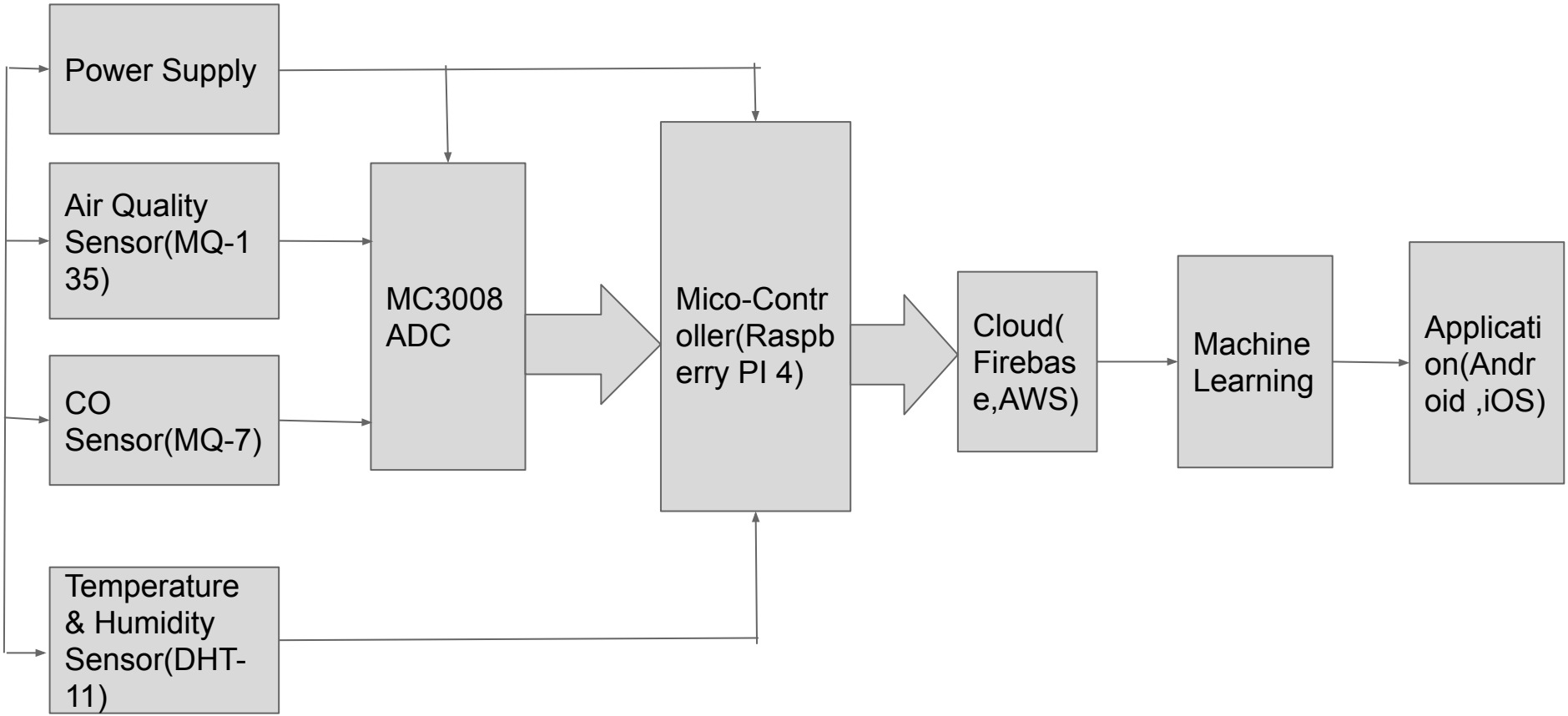
Motivation

- Recent pollution in India
- Asthma patients in adult stage in all around world
- Air pollution kills

Problem Statement

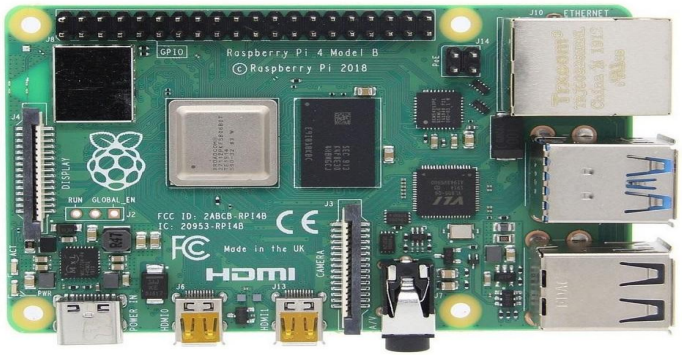
- This project is suitable for air quality monitoring in real time.
- Sense quality of air and display it in real time on smartphone.
- Sense how much amount of gasses are present in air and display it in real time on smartphone.
- Predict weather forecast for a next week depend upon past weather data.

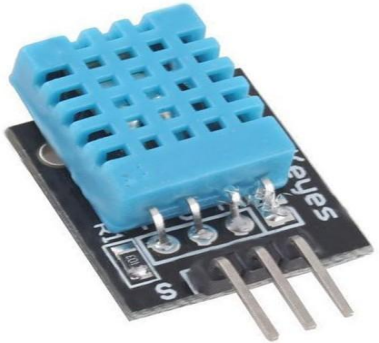
Block Diagram



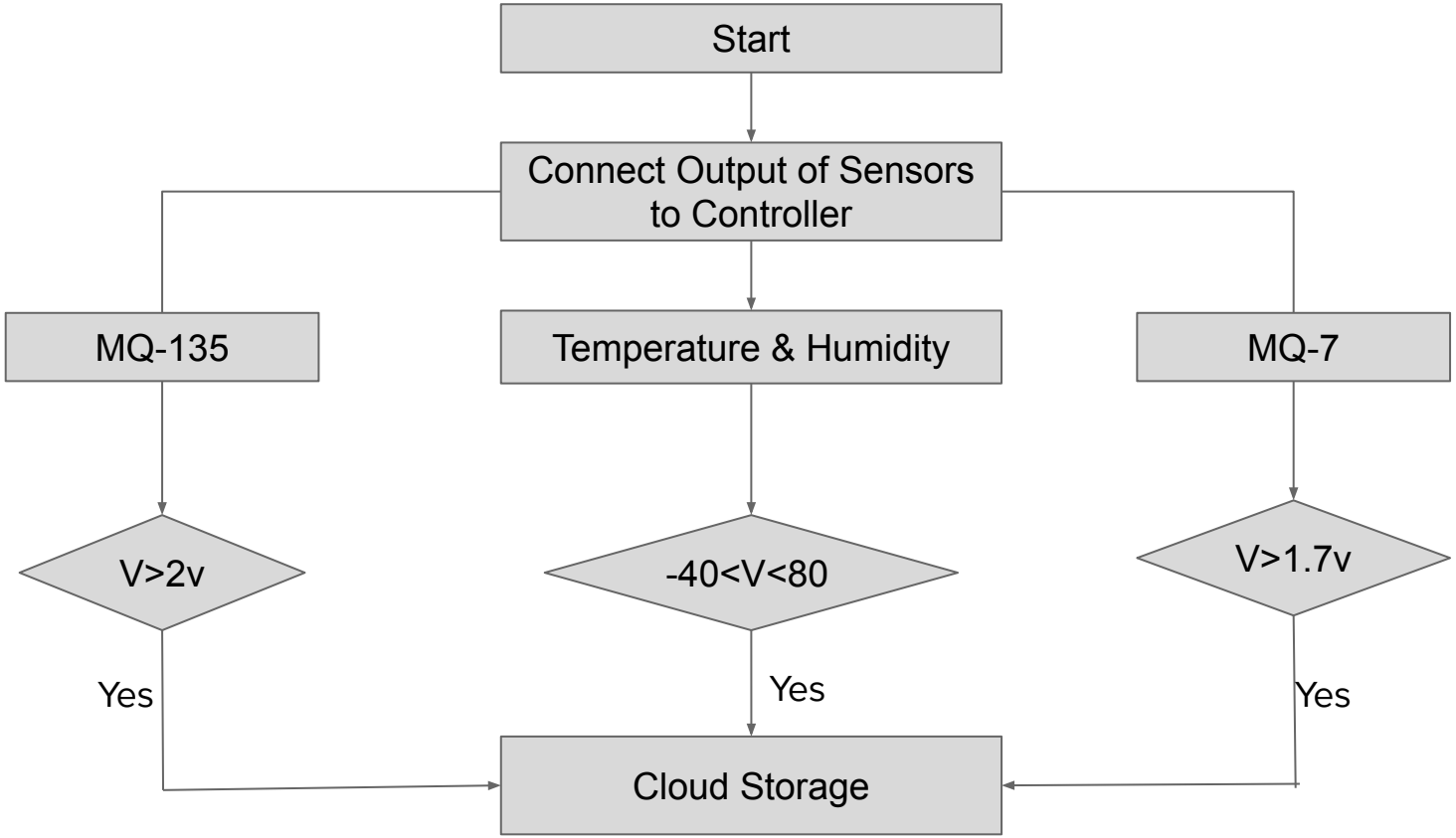
Principle of Working

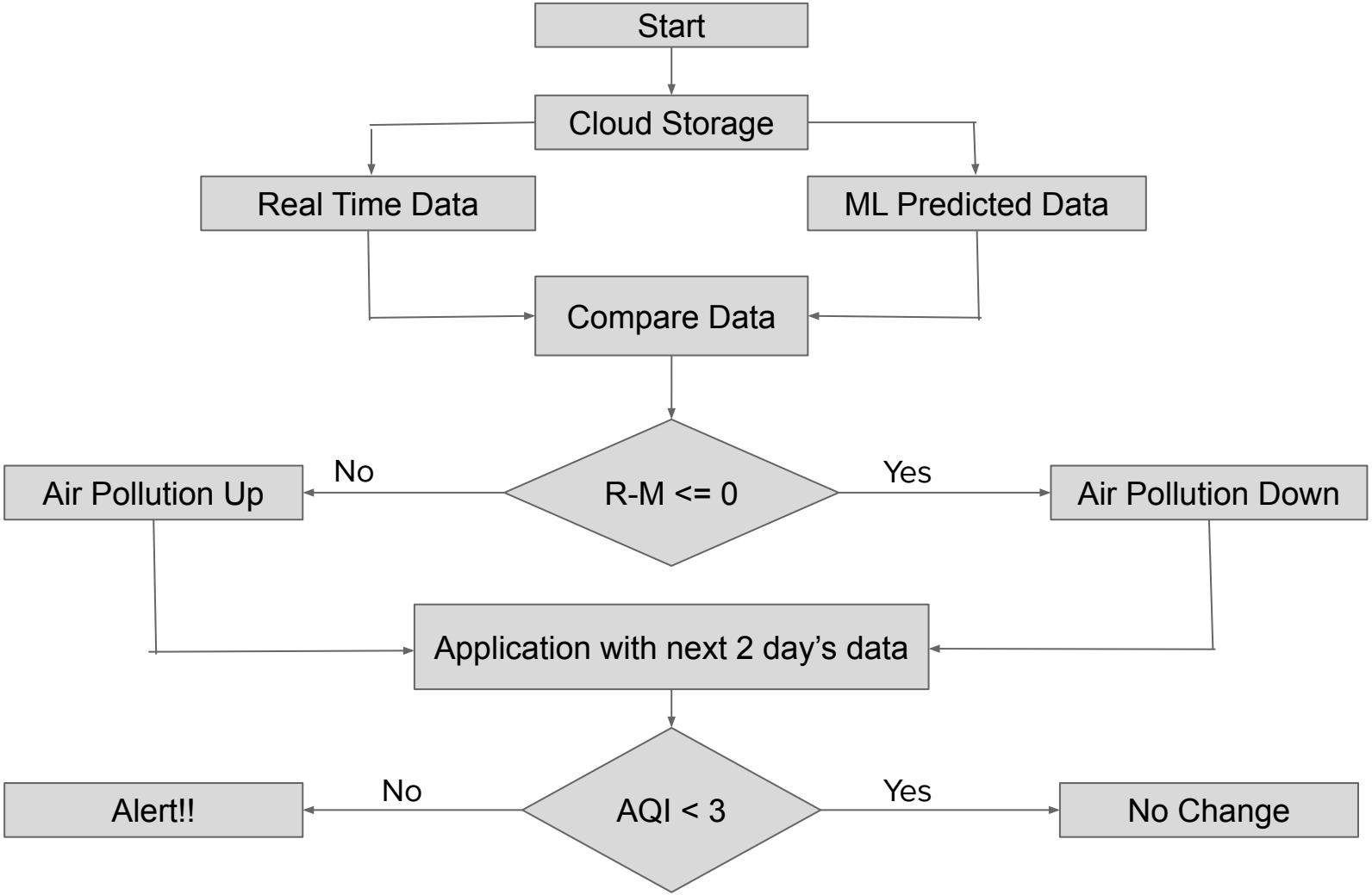
- Project's basic principle of working is the sensing of data from the sensor.
- Convert the analog (voltage) data into digital form.
- Process the digital data and store to cloud.
- Predict feature data and compare with actual data.
- Show result on smartphone.





Flow Chart


Start
Connect Output of Sensors to Controller
MQ-135
Temperature & Humidity
MQ-7
V>2v
-40<V<80
V>1.7v
Yes
Yes
Yes
Cloud Storage


Start
Cloud Storage
Real Time Data
ML Predicted Data
Compare Data
R-M <= 0
No
Yes
Air Pollution Up
Air Pollution Down
Application with next 2 day's data
AQI < 3
No
Yes
Alert!!
No Change

Progress

- Existing system study.
- Understanding working of Microcontroller Raspberry Pi-4, Arduino.
- Tested sensors data with API data.
- Play with different sensor’s.
- Pre-processing of weather API data.
- Next 2 day’s temperature & humidity prediction using various ML algorithms.

References

- Liu, Hai-Ying & Schneider, Philipp & Haugen, Rolf & Vogt, Matthias. (2019). *"Performance Assessment of a Low-Cost PM2.5 Sensor for a near Four-Month Period in Oslo, Norway. Atmosphere".*
- R. D. Dua, D. M. Madaan, P. M. Mukherjee and B. L. Lall(2019). *"Real Time Attention Based Bidirectional Long Short-Term Memory Networks for Air Pollution Forecasting".*
- https://tutorials-raspberrypi.com/configure-and-read-out-the-raspberry-pi-gas-sensor-mq-x/
- https://www.raspberrypi.org/documentation