PRODUCT DEVELOPMENT COURSE
DIP004U3M & DIP005UEM

Final Presentaion

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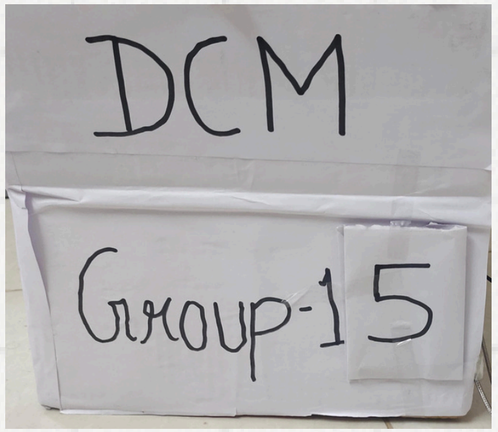
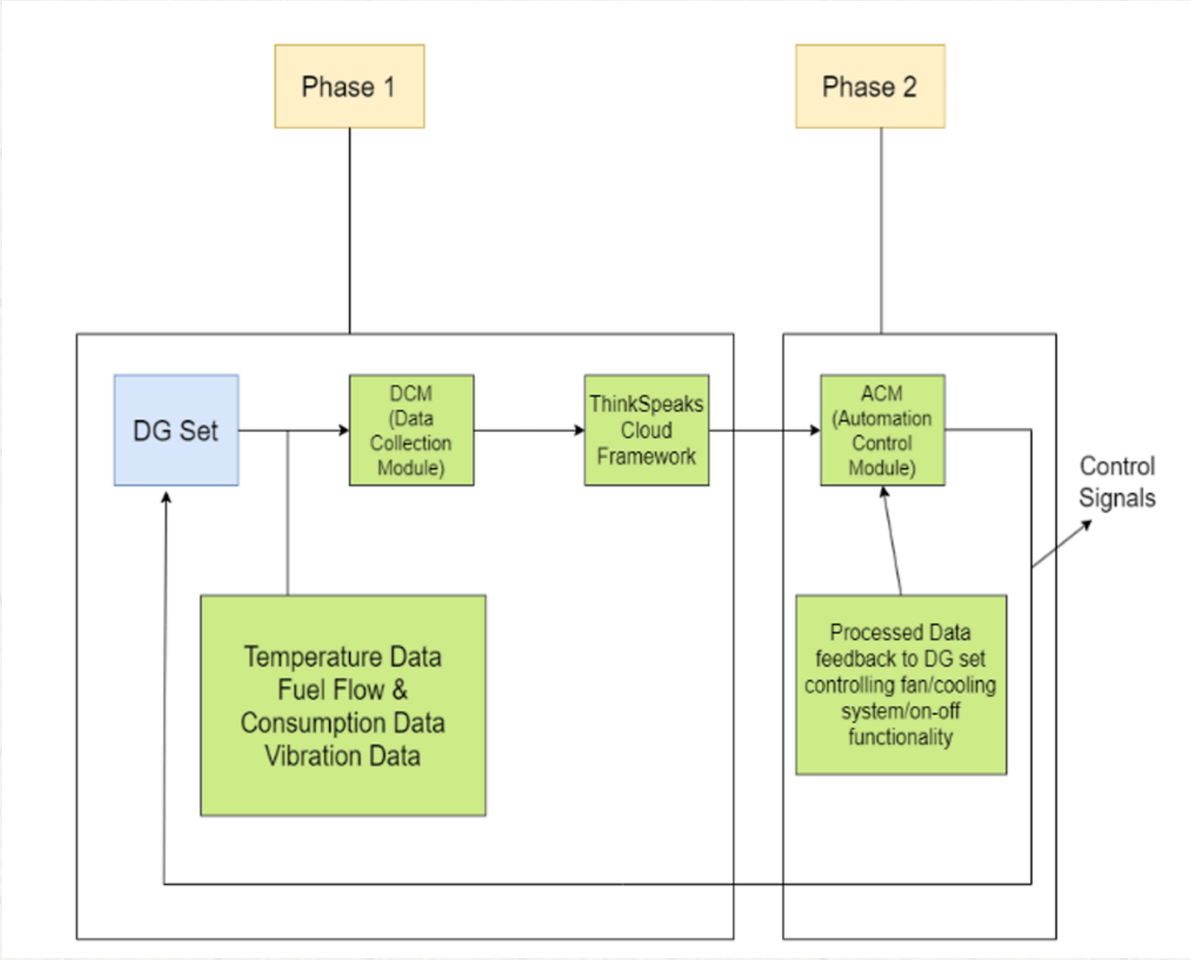
GROUP 15

- Abhinav 2021UEE0125

Phase 1:Data Collection Module(DCM) for DG-SET





Problem

Diesel generator sets (DG sets) are pivotal for maintaining continuous power supply. However, there's a notable lacking in methodologies for analyzing, monitoring, and forecasting diverse parameters of a DG set. This results in suboptimal performance and health monitoring, as well as inadequate tracking of its fuel consumption.

Objective

To develop a product that can be used to capture and monitor the real-time data for the following parameters of the Diesel Generator.

- Radiator Temeperature
- Engine Temperature
- Average Body Temperature
- Fuel rate (ml/sec)
- Diesel Consumed since Full Tank
- Mechanical Vibration in the DG-set.

Sensors Used

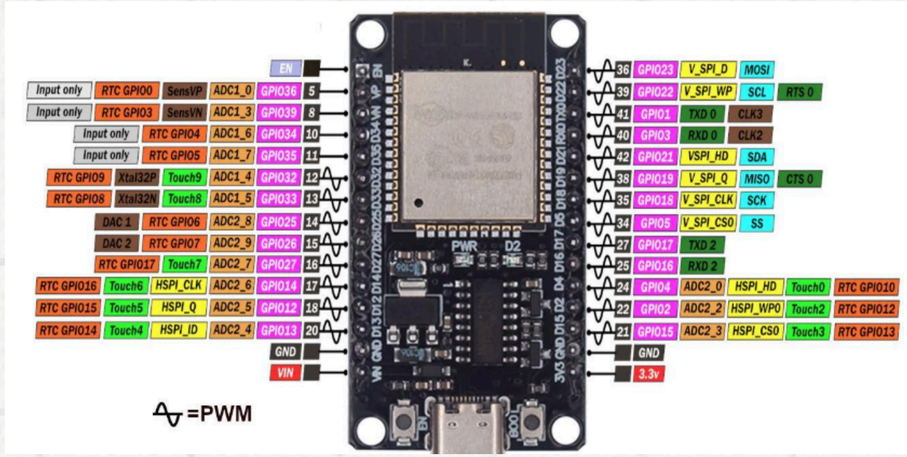
We have installed the following sensors to capture the data for the required parameters.

01. OF05ZAT G1/2 DN15 Oil Flow Sensor

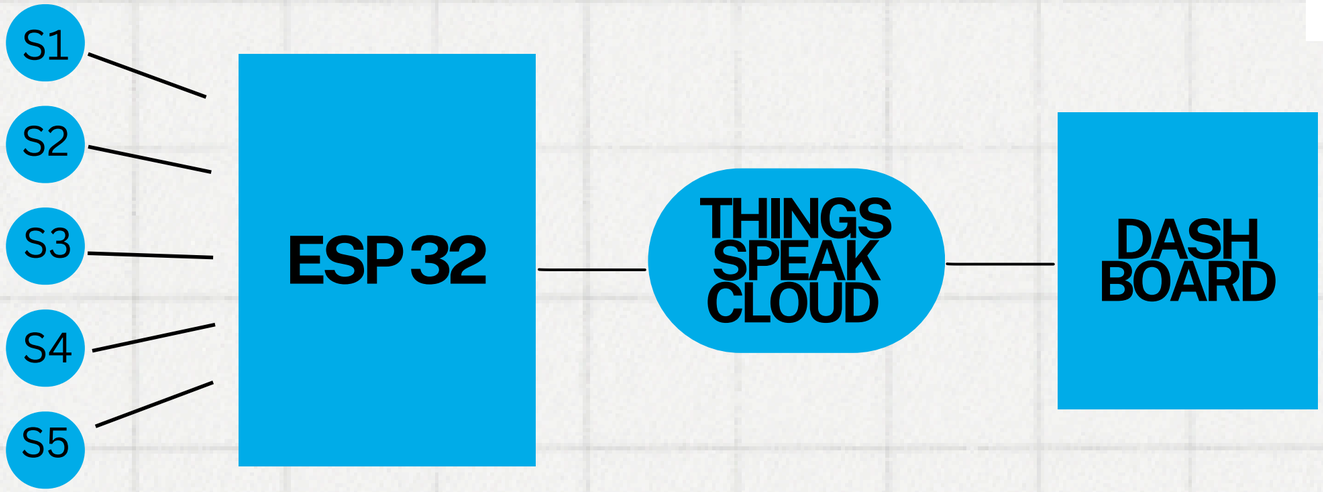
02. MAX6675 Thermocouple Sensor Module

03. MPU-6050 3-Axis Accelerometer:

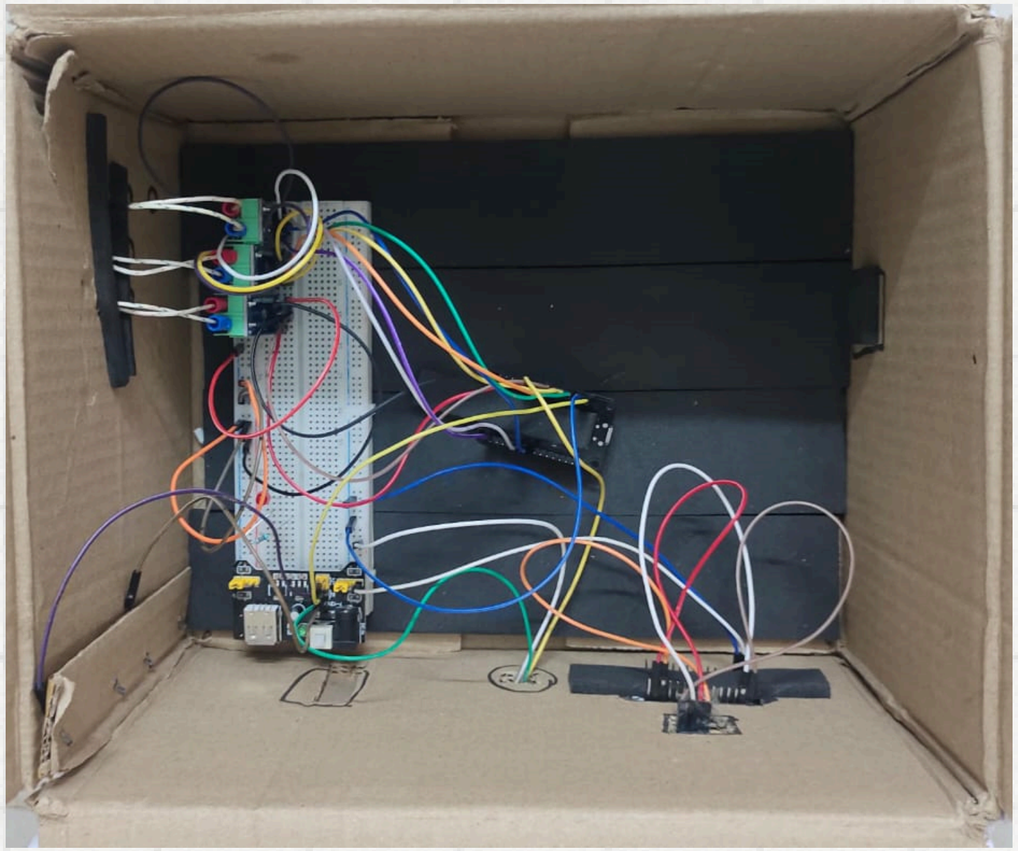
Microcontroller Used :ESP 32



Sensors



HARDWARE SETUP



Data Collection & Monitoring on Thingspeak Cloud Services

RADIATOR LAMP

a few seconds ago

Engine Temperature Lamp

a few seconds ago

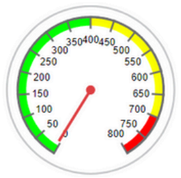
Body Temperature

a few seconds ago

Low Fuel

a few seconds ago

Fuel Consumed since last full tank



4.79358
litres

Horizontal Vibration

65.5

g

a minute ago

Vertical Vibration

72.4

g

a minute ago

Linear Vibration (To-fro)

11.0

g

a minute ago

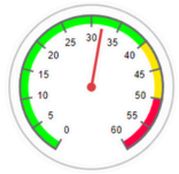
Radiator Temperature

27.25
°C

Enigne Temperature

31
°C

Average Body Temperature

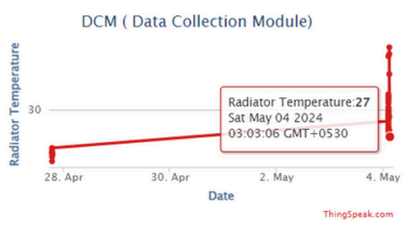


32
°C

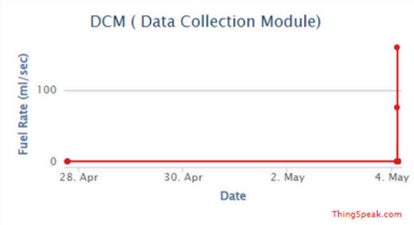
Fuel Rate

0.18542
mL/sec

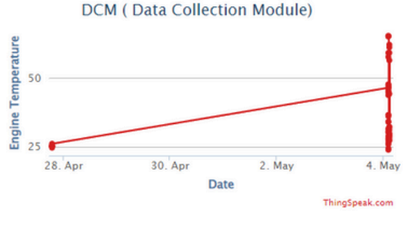
Field 1 Chart



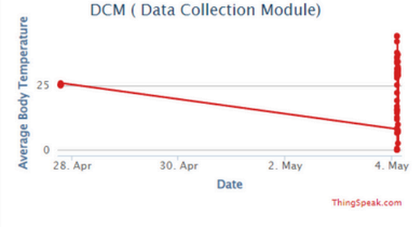
Field 4 Chart



Field 2 Chart



Field 3 Chart



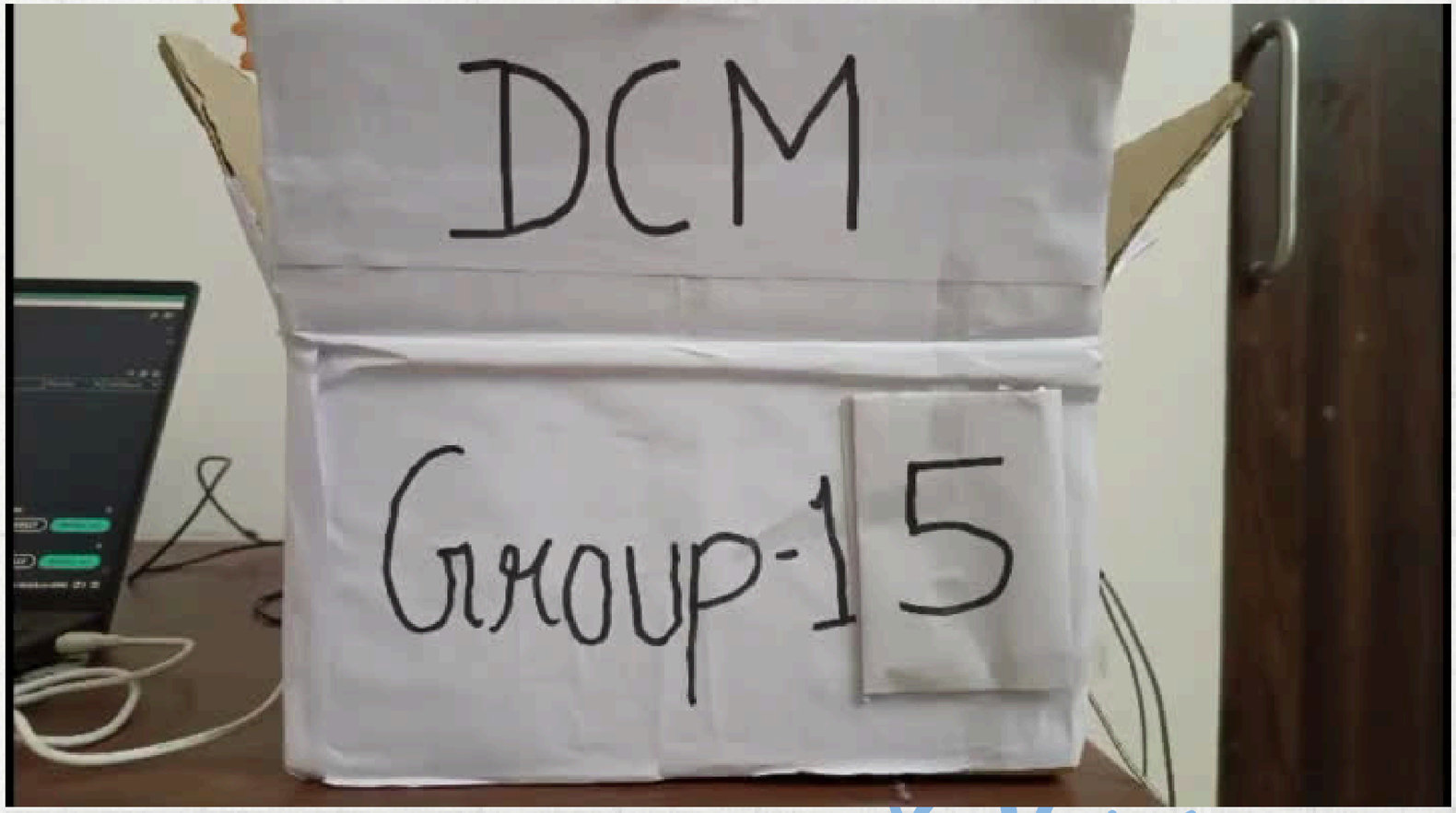
Shortcomings

- Requires regular maintenance and replacements due to continuous use.
- Long time data is required as for Digital Twin of DG Set, seasonal data is required.
- Sensor Data got 1-2% error due to environmental conditions.

Future Scope

- Forming working model of 2nd Phase of Digital Twin (Automation & Control Module)
- Developing Virtual Model with 3D models.
- Minimising error in data collected from DCM.

Video Of the Real Time Working of the Project



Thank you!