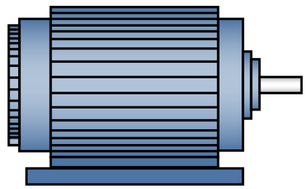


ABSTRACT

The project involves the **Lift maintenance and analyzing system** to improve the safety and reliability of lift functionality, as well as optimize maintenance. It employs advanced features like **Acoustic sound Monitor** [OUR OWN TECH], temperature sensing of bearings and pulleys etc. The sensors are strategically placed on the critical lift components, among others, and consistently monitoring vibrations, acoustic signatures, and mild change in temperatures and other parts as well and enable detection of the earliest indications to mechanical wear or failure. The data is sent in real-time, and is available on system, which could be accessed with help of a tablet/display **without any interruption of lift service for the technician**. Since our system has all the A-Z informations,It will suggest what parts has to be replaced in advance and **solves unpredictable issues** as well.This is a proactive approach to early fault detection, reduced downtime and decreased, optimized maintenance costs. The system provides contactless, continuous monitoring, thereby contributing to zero-downtime maintenance options, and promoting improved safety, reliability, and performance of the lift.

We confidently assure that The technician never needs to shut the service or bring complex tools with them for the monthly inspection. Instead, All they need is the admin access and our external display to visualize the data recorded from the data port.

PROPOSED SOLUTION

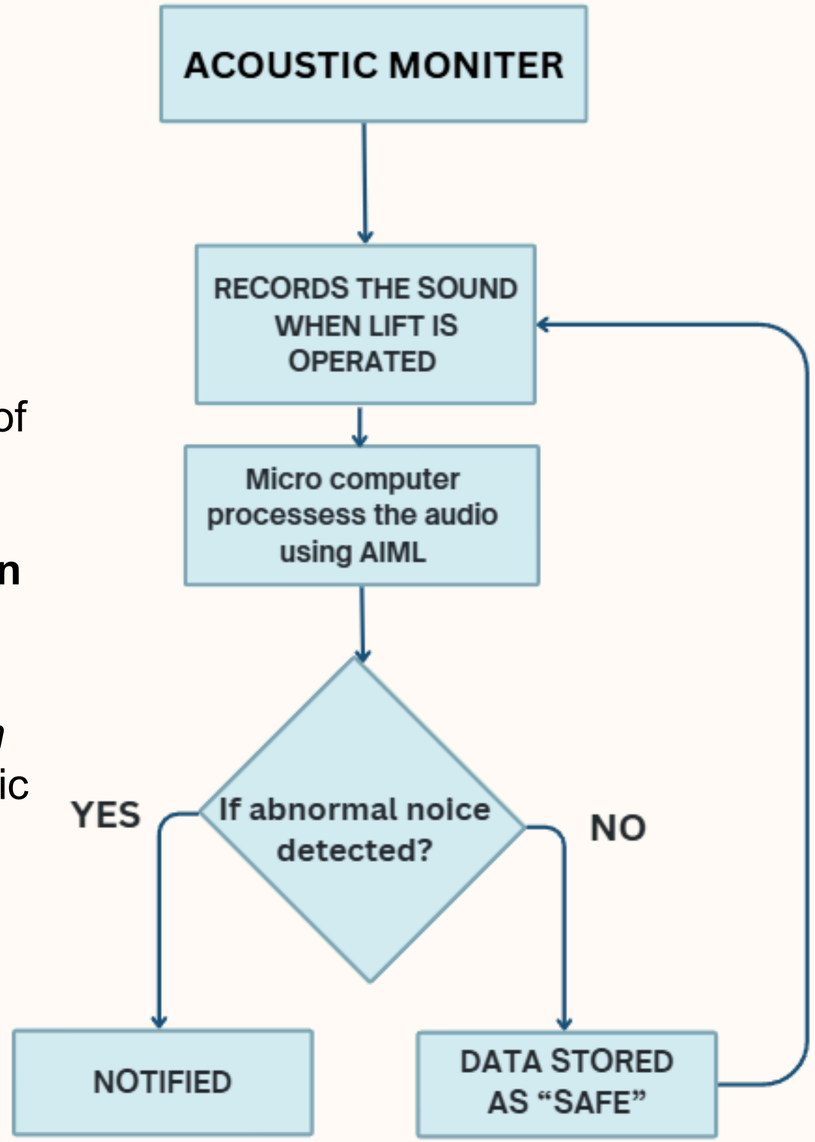
GOAL: To Drive modernization which is one of the strategies Of UNDP

Description of the Idea:

- Intelligent lift maintenance system that utilizes sensors and a small tablet interface for technicians, With a software that is accessible from anywhere.
- Audio of creaking noise**[using ultrasonic audio monitoring]** and temperature of critical components — bearings and joints — monitored and stored.
- Detects and records any unanticipated deviations in vibration, unusual production of noise or temperature readings well in **advance.**
- Alerts the technician crew immediately if any potential issues arise, prior to failure.
- Technicians simply connect to the tablet to see live sensor data **with no disruption of service.**

New innovation:

- It is focused on the most weak Joints and links & bearings *which no existing system tried.* using our own technology called **Acoustic monitoring** employing an ultrasonic sound mic] + temperature monitoring to detect failures and faults in joints and bearings early by analyzing creaky noise and Temperature due to friction .
- It enables immediate contactless monitoring without any disruption of service.
- No delay due to spare parts unavailability as it informs the parts to be replaced in prior



TECHNOLOGIES USED

Hardware

- Microcontroller systems of sensors.
- 2 way wireless communicator.
- External storage.
- sound analysis system.

Software

- Python (Data Analysis/AI) C/C++ (Embedded Programming).
- TensorFlow.
- Matplotlib for visualisation.

Platforms & APIs

e patch

- MQTT / Firebase.
- Arduino IDE.
- Acoustic analysers.

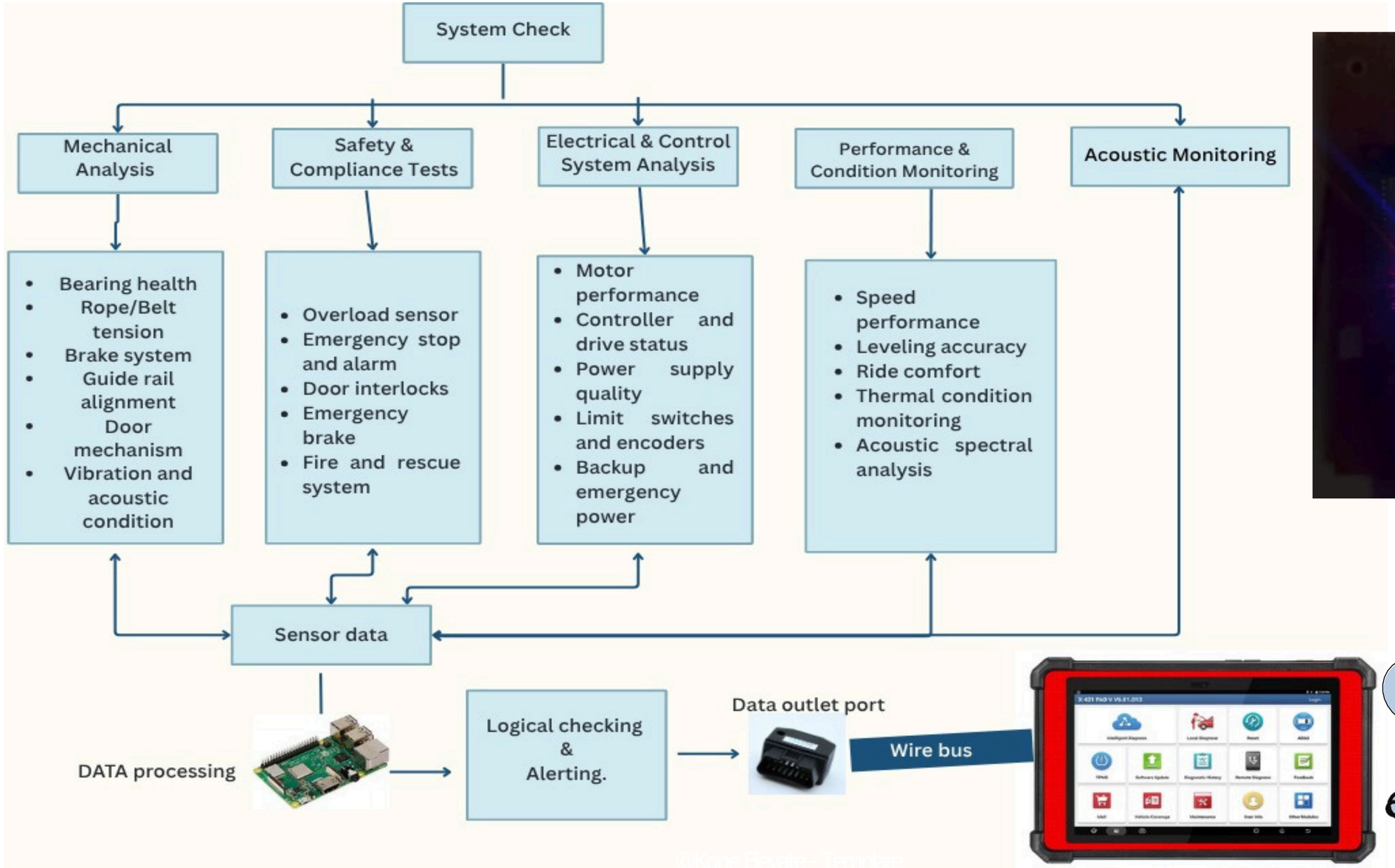
Acoustic Monitoring

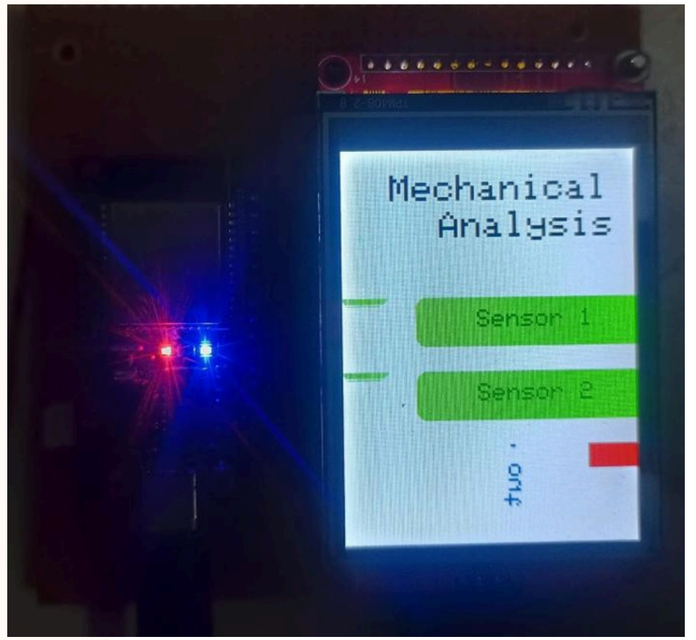
It establishes a "normal" acoustic signature and employs Machine Learning algorithms to instantly detect deviations indicating bearing wear or other mechanical anomalies.

Observing MIC

Processing {ML} and storing

BLOCK DIAGRAMS





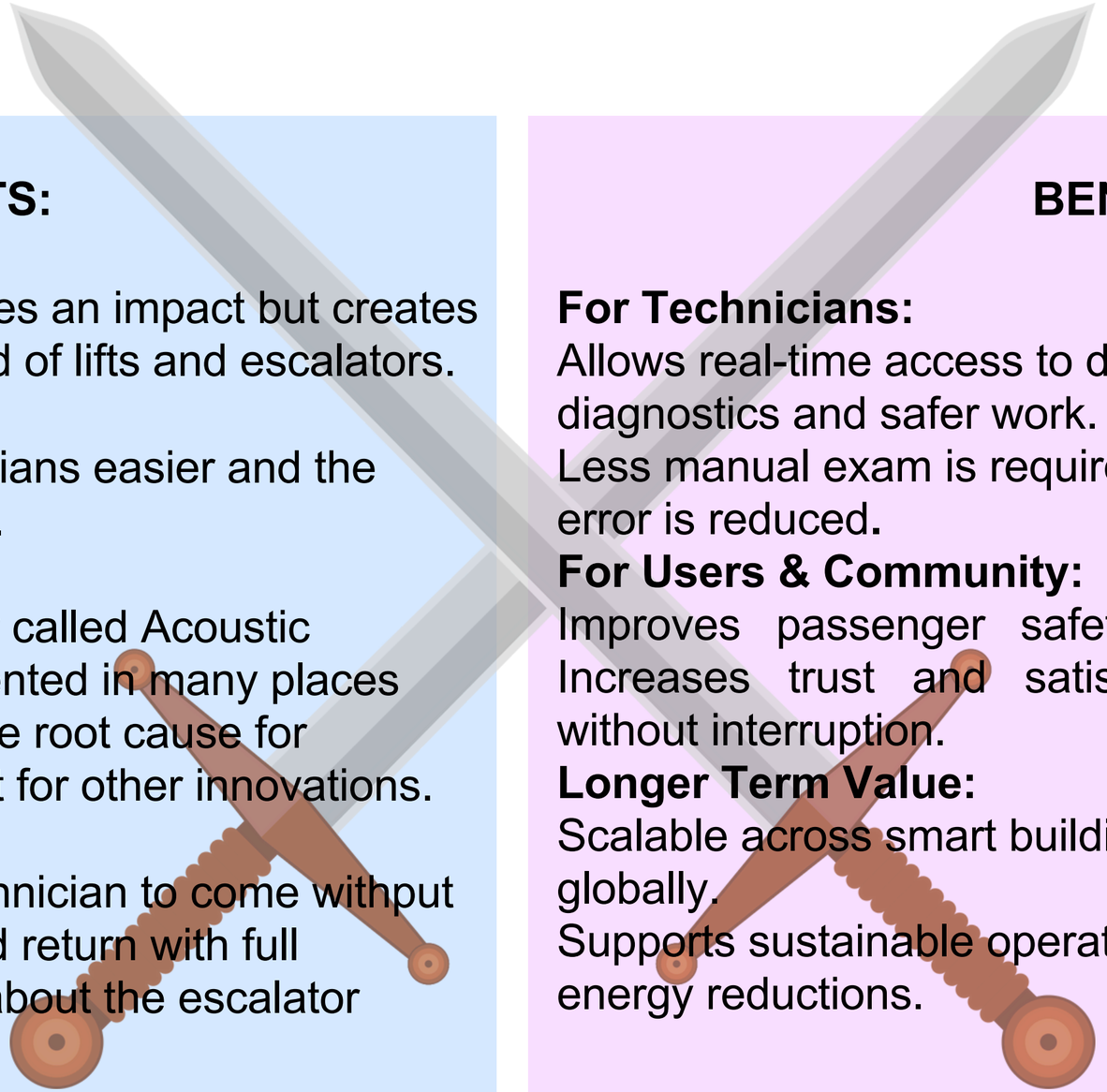
Prototype

External display brought by the technician

IMPACT AND BENEFITS

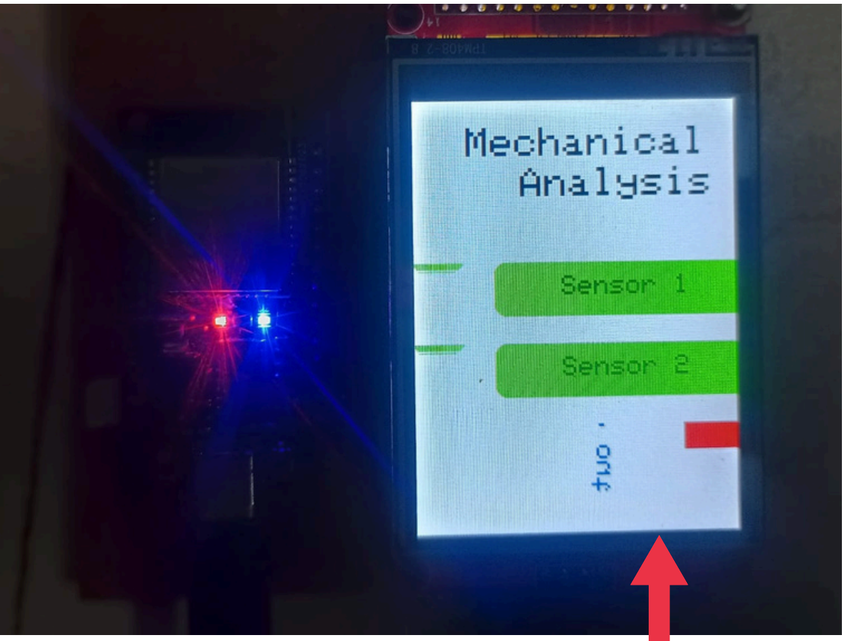
IMAPCTS:

- This product not only creates an impact but creates a **REVOLUTION** in the field of lifts and escalators.
- It makes the job for technicians easier and the admins and people as well.
- The use of new technology called Acoustic monitoring can be implemented in many places and this product hails as the root cause for infrastructural development for other innovations.
- This system allows the technician to come withput any tools for inspection and return with full Information and condition about the escalator which plays a major role.

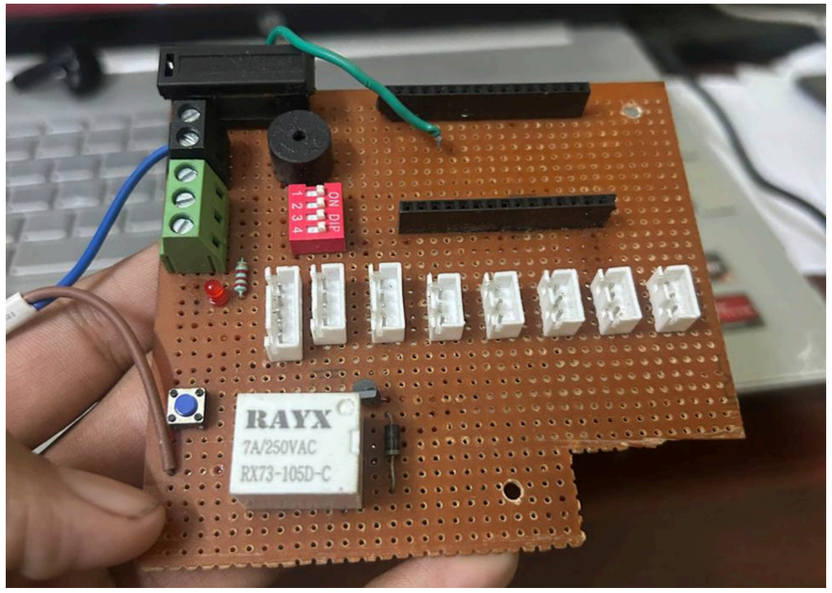


BENEFIT:

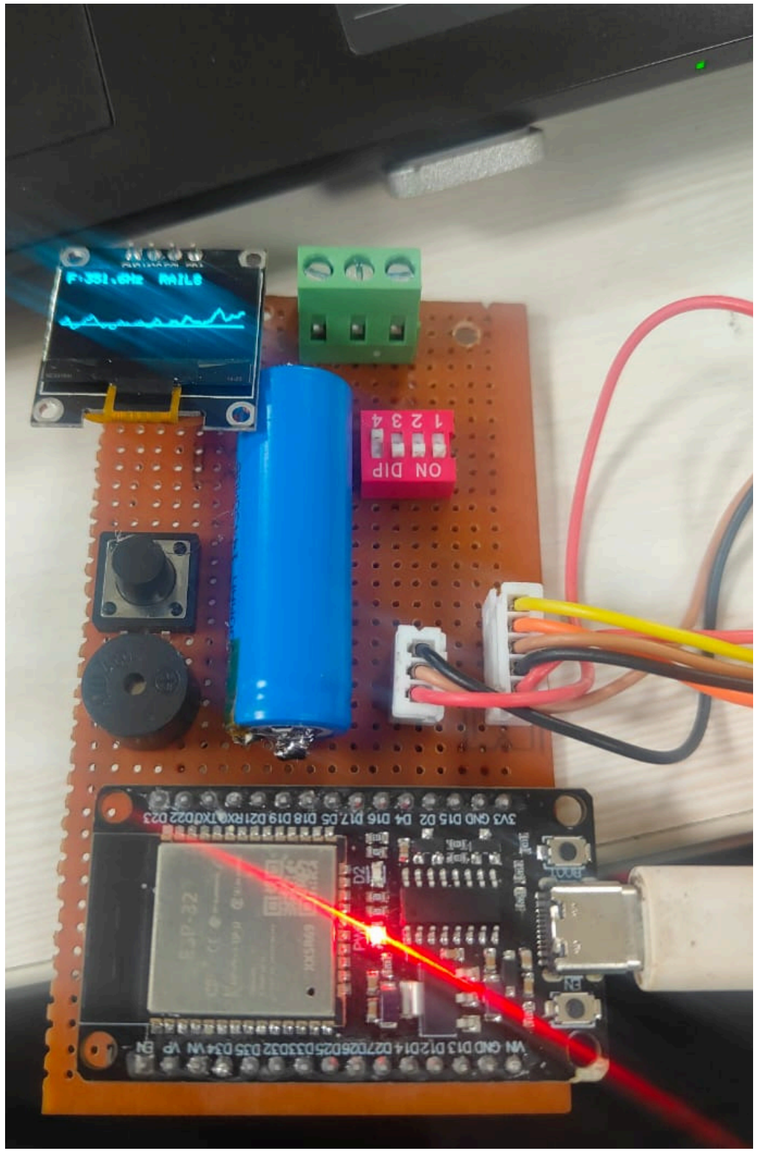
For Technicians:
Allows real-time access to data leading to quicker diagnostics and safer work.
Less manual exam is required for inspections, and human error is reduced**.**
For Users & Community:
Improves passenger safety and reliability of service. Increases trust and satisfaction with lifts performing without interruption.
Longer Term Value:
Scalable across smart buildings and elevator networks globally.
Supports sustainable operations through waste and energy reductions.



External display

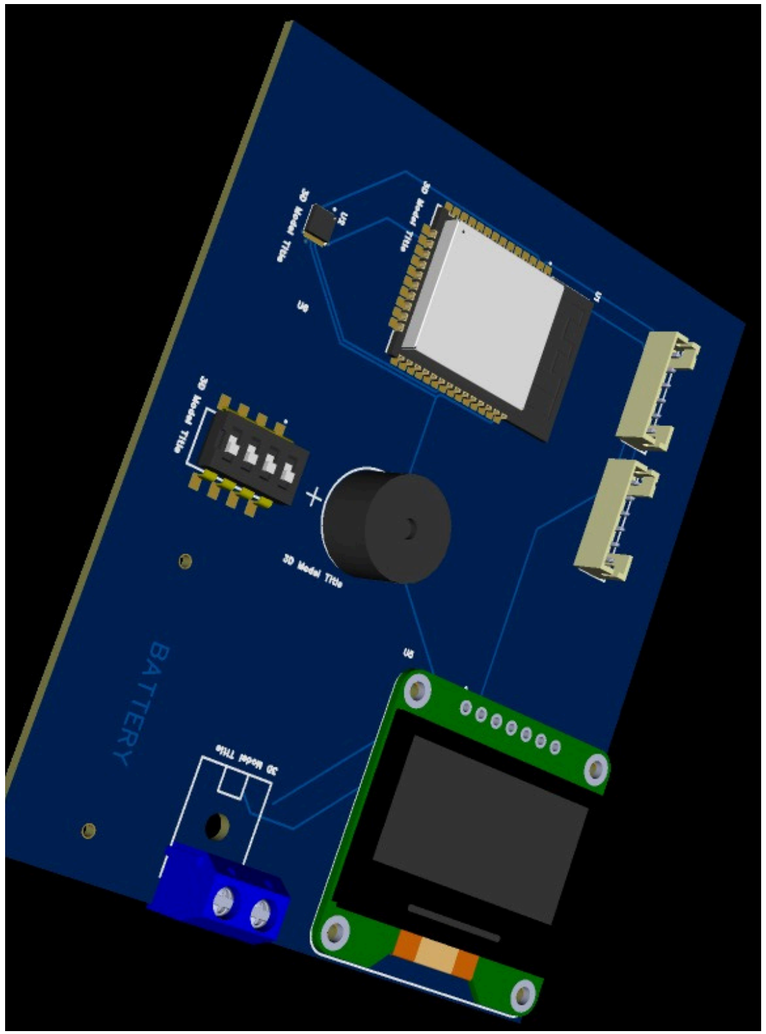


Main Board(System of sensors)



Acoustic sensor System
(Part of main board)

3d model



FUTURE SCOPE

Mobile and Web Applications:
Development of mobile apps or web interfaces for technicians to access lift health data remotely.

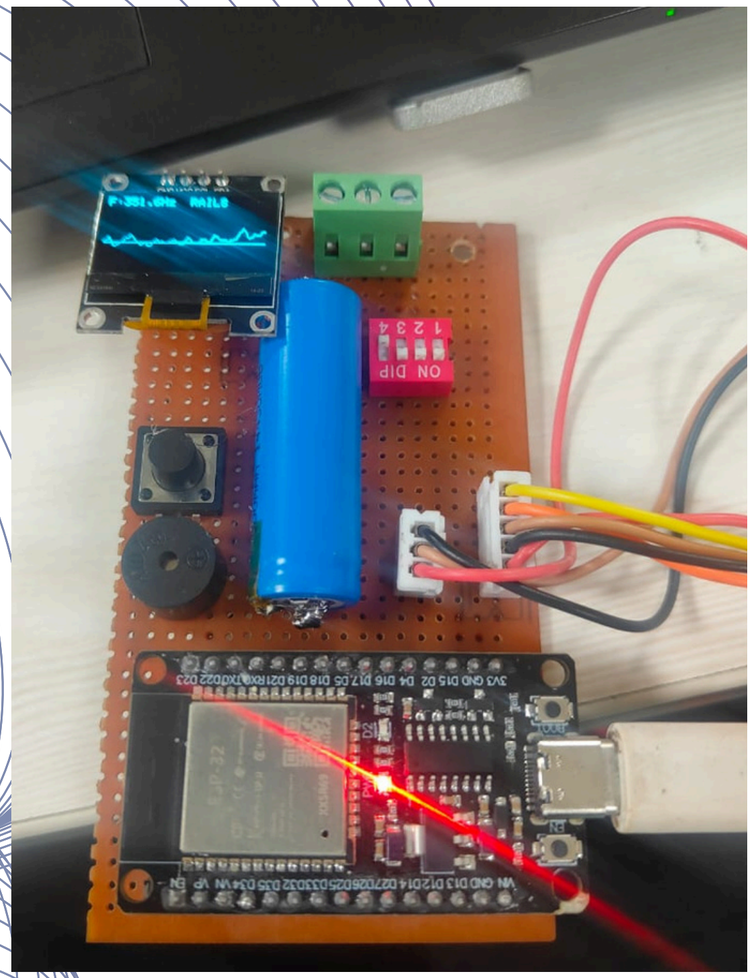
Automated Maintenance Alerts:
The system can automatically notify the maintenance team when any parameter crosses a danger limit.

Integration with Building Management Systems (BMS):
Can be linked with smart building systems for centralized monitoring of all facilities.

Self-Diagnosing Mechanism:
The system can classify faults (bearing failure, pulley wear, imbalance) and suggest corrective actions automatically.

Commercial Implementation:
The system can be scaled and deployed across commercial complexes, hospitals, and high-rise buildings for large-scale predictive maintenance.

Standardization and Certification:
Future versions can comply with elevator safety and maintenance standards **(like ISO 8100-41)** to make it industry-ready.



Multi-sensor system Where all the sensor data gets collected and processed

3D Generated Video model and Acoustic monitoring Prototype link : [3D DEMO-KONE Elevates]