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
University mentor: prof. Ing. Alena Pietriková, CSc.


PROBLEM DESCRIPTION


Dynamometer testing involves extreme conditions. Standard monitoring is often dependent on local infrastructure. Our system provides an independent redundant layer to notify operators in real-time via GSM, preventing costly damage.

SOLUTION ARCHITECTURE

An autonomous unit based on the Arduino Mega 2560.

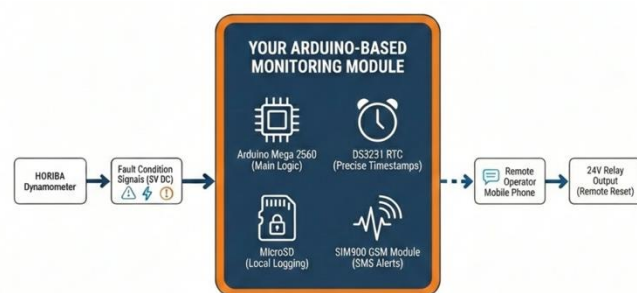
 Galvanically isolated 5V DC inputs (PC817).

 SIM900 GSM module for SMS alerts.

 DS3231 RTC for precise timestamps.

 MicroSD for local data logging.

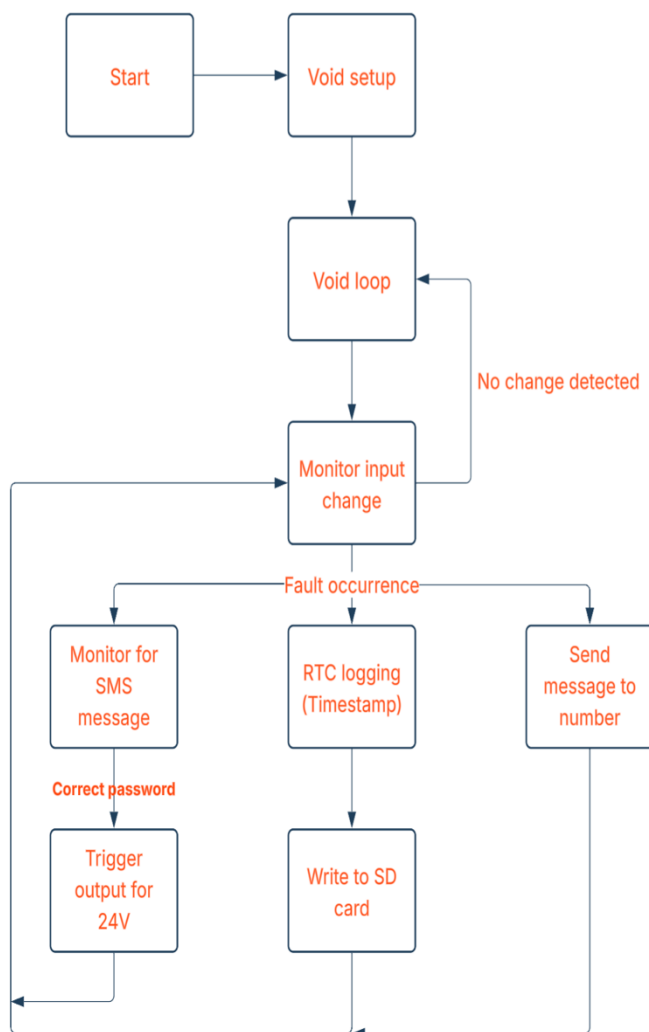
SYSTEM ARCHITECTURE



COMPARISON OF SOLUTIONS

Criteria	Arduino	Raspberr y Pi	PLC
Reliability	High (Dedicated)	Medium (OS)	Extreme
Power Use	Very Low	Medium	High
Boot Time	< 1 Second	30-60 s	5~10 s
Unit Cost	Lowest (~50€)	Medium	Very High

PROGRAM LOGIC



STATUS & SYSTEM HMI


The system is currently in the **Functional prototype stage**, verified for reliability.




System HMI: Local LCD Alert & Real-time SMS Notification

EVALUATION

 **Response Time:** Notifications delivered in < 5 seconds.

 **Zero Interference:** Galvanic isolation protects the main system.

 **Cost-Effective:** Professional results at a fraction of PLC costs.

 **Portable:** Compact design for easy deployment.