WINTER INTERNSHIP
IOT BASED STRUCTURE MONITORING

Abhishek Sawardekar(ahsawardekar_b22@ee.vjti.ac.in)
Amol Chaugule(avchaugule_b22@et.vjti.ac.in)
Asawari Rawatale(avrawatale_b22@el.vjti.ac.in)
Nishad Nanaware(nrnanaware_b22@et.vjti.ac.in)
Sakshi Rokade(sjrokade_b22@el.vjti.ac.in)

VJTI

EED, VJTI

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Abstract:

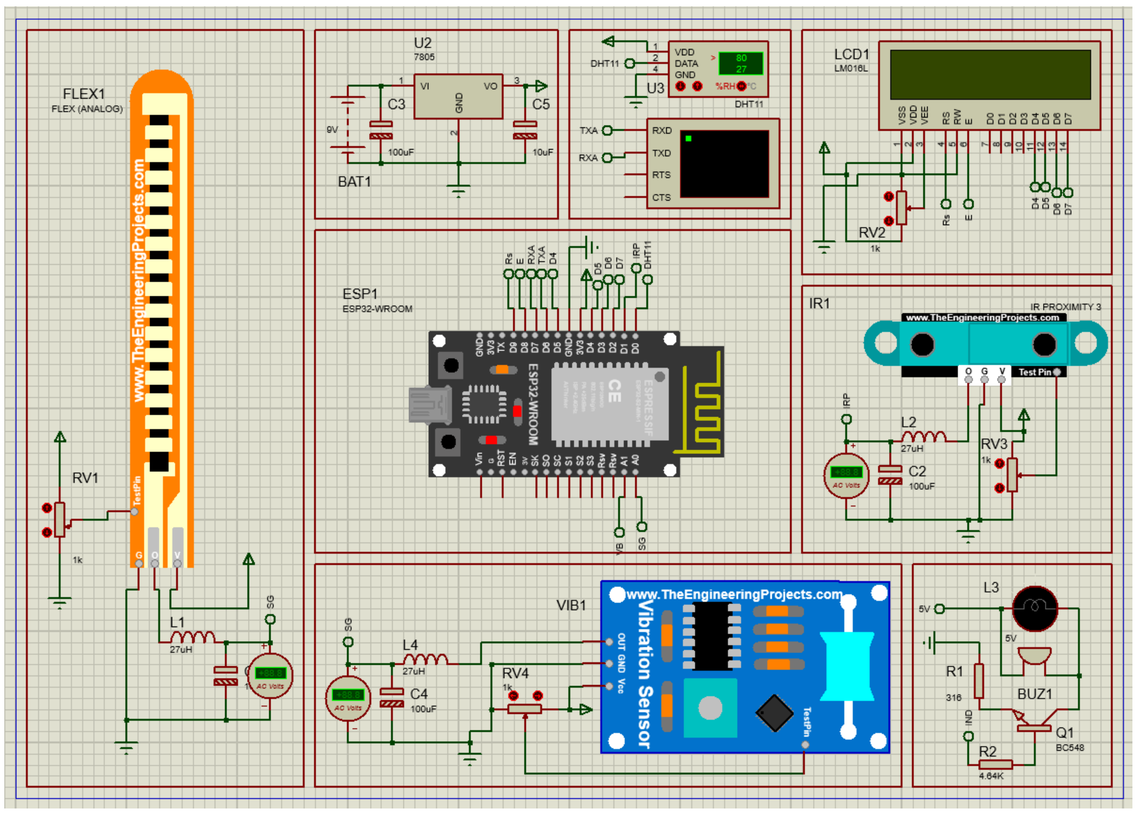
An integrated structural health monitoring(SHM) system for bridges is presented. The system is based on a customized wireless sensor network platform with a flexible design that provides a variety of sensors typical in SHM. These sensors include accelerometers, strain gauges, and temperature sensors, with ultra-low power consumption. An acceleration sensor board, and a strain sensor board are developed to satisfy the requirements of bridge structural monitoring. Communication software components are integrated within ThingSpeak/Blynk software to provide a flexible software platform whereas the data processing software performs analysis of acceleration, dynamic displacement, and dynamic strain data.

Introduction:

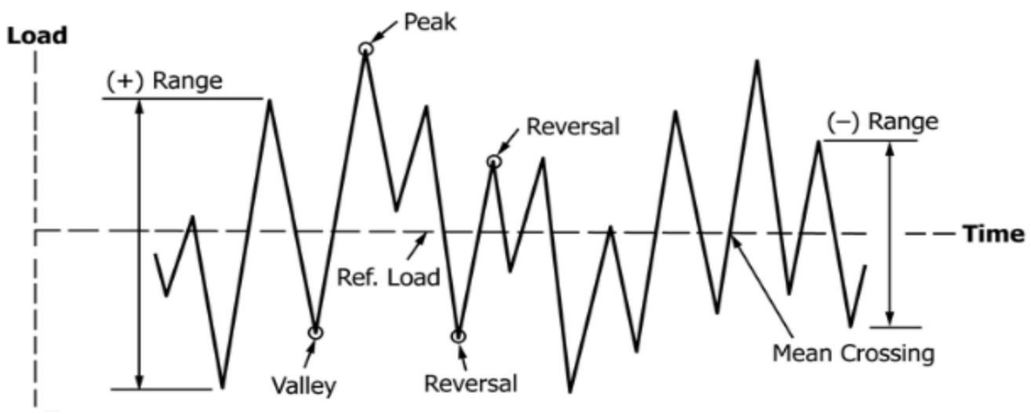
Wireless sensor network (WSN) based structural health monitoring (SHM) system attracts increasing interest in recent years. However, the restricted bandwidth, memory and energy pose great challenges to the application of SHM in large scale building. Supported by a real engineering project, a WSN based prototype of SHM system is designed in this paper. Acceleration data, synchronously sampled in each sensor node, are transported to a data processing computer through a base station.

Results:

SIMULATION ON PROTEUS AND THINGSPEAK

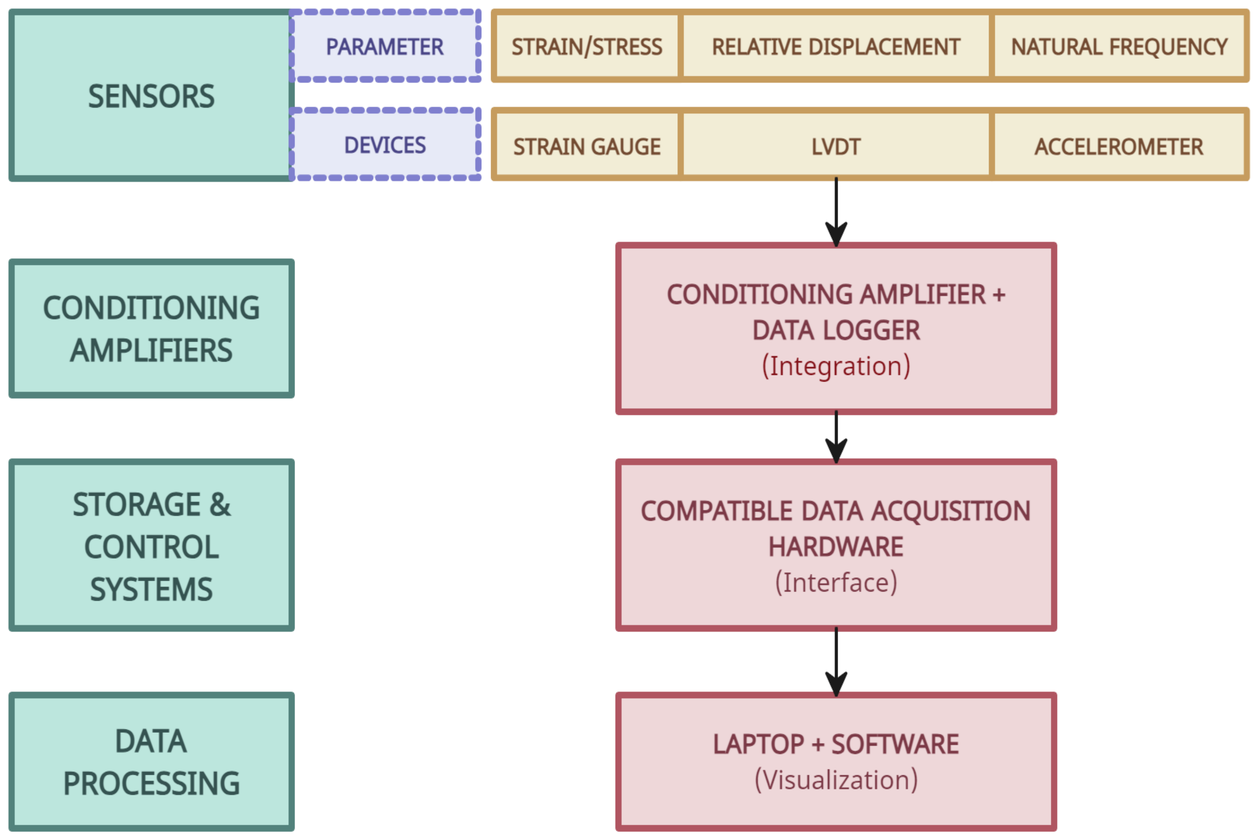


Conclusions:

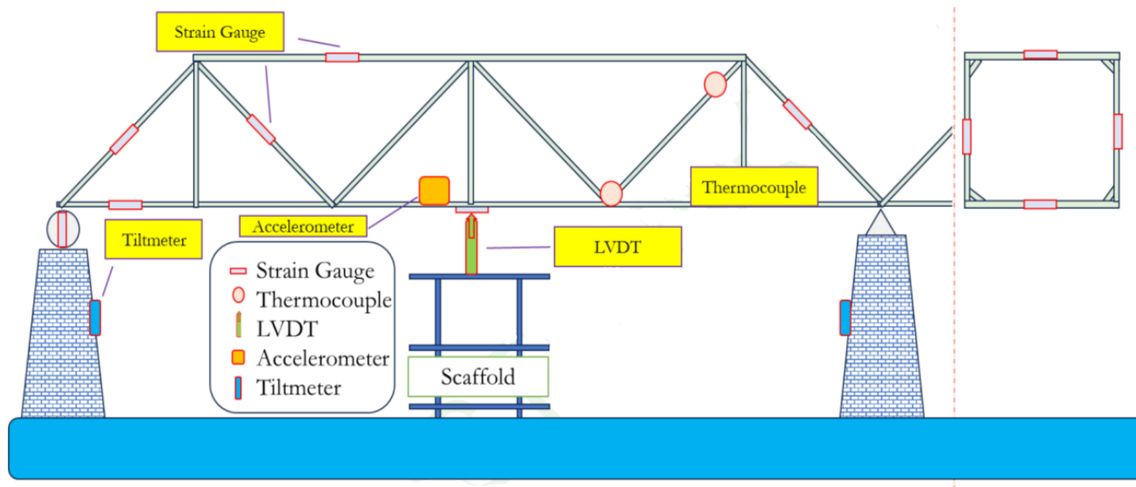


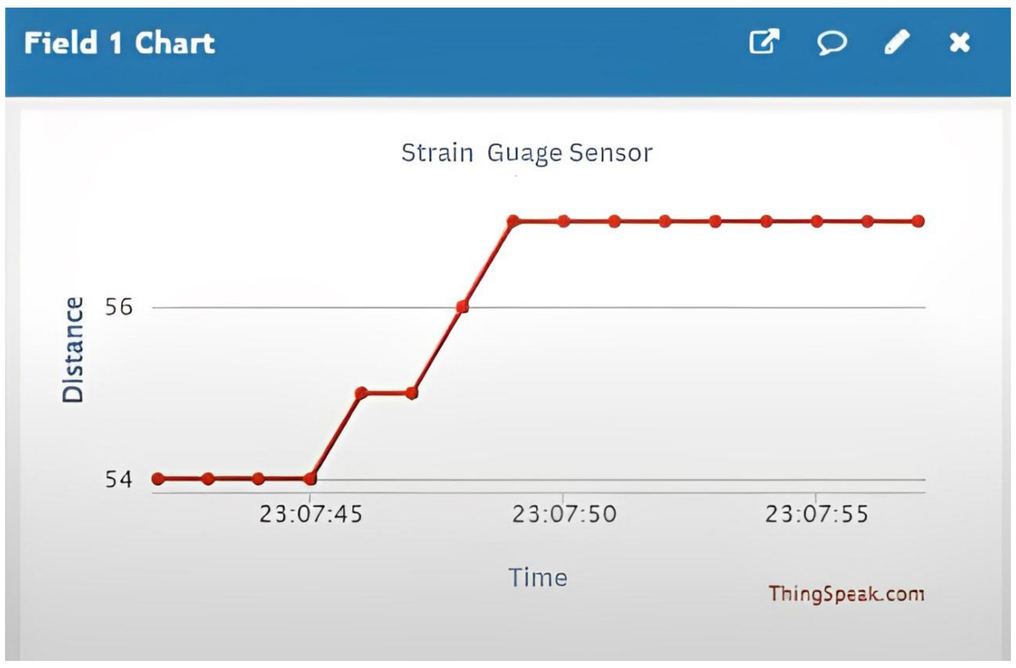
The concept of structural health monitoring is truly based on identifying a damage with reference of ideal conditions and Load Threshold Fatigue and subsequent monitoring on IOT Fields. It has become important to monitor the damage in Real-time environment for its existence, location and extent and retrofit the same to enhance its performance features.

Methodology:



Sensors Positions:





References:

Literature Survey: Assessment of Existing Bridges using Instrumentation of one span of each Bridge for 14 Bridges in Central Railway.

Future Scope:

This project lays the groundwork for advancing SHM capabilities in large-scale buildings through wireless sensor technology. Moving forward, further research could explore enhancements to the prototype, such as refining wireless sensors approach for even greater efficiency and scalability. Additionally, the integration of advanced sensors and data analytics techniques holds promise for enhancing the accuracy and predictive capabilities of the SHM system.