Dynamic Height Measurement

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Overview

The overhead wire above the train which carries 25000 volts power supply can lag due to continual usage. If the lag increases power supply will immediately trip due to short circuit. Monitoring this becomes very important as entire rail traffic can get disrupted. Currently measurement of overhead equipment is done manually.

This involves blocking the line and measuring the cable lag at every point at a distance of 10 m. This process is very time consuming.

Purpose

One of the solutions is to automate the process of measuring height of Overhead equipment.

The proposed equipment measures the height of OHE dynamically and suggests the places where changes are required Then the maintenance department workers can go to that place and make the required adjustments.

Why to use

1.Technology:

- Will utilize existing technology which lowers project risk.
- Once in place this technology is simple to operate and maintain for a relatively low cost

2.Marketing:

- Railways is the largest Public Sector Undertaking.
- Technology used is personalized according to customer.

3.Organizational:

- Minimum changes to train include installation of equipment with no increase in staffing.
- No new facilities or capital investments are required

Features

- **Interactive**: GUI is user-friendly and allows employees to operate with ease.

- **Reliability**: Latitude and Longitude position give the exact location where changes can be made. This reduces the time required.

- **Dynamic**: Real time environment can be analysed.

- **Cost effective**: Sensors used are reusable and can be attached to any train.

- **Security**: A secure login is provided which uses employeeId and designation to access sensitive information.

Financial Projections

These figures account for sensors, additional staffing requirements, and insurance costs, contract support for IT and training needs, and web server and hosting costs. Equipment has low power consumption.

Sensors	5000 INR
Additional Staffing requirements	10000 INR
Insurance Costs	4500 INR
Hosting Costs	10000 INR

Program Evaluation and Review Technique(PERT)

PERT weighted Score=($optimistic\ time$+4*$most\ likely\ time$+$pessimistictime$)/6

Where, optimistic time=minimum possible time to complete an activity

Most likely time=the normal time required to complete an activity

Pessimistic time= maximum possible time required to complete an activity

Pws = (7+4*9+15)/6

Pws = 10 weeks

where, optimistic time=7 weeks,

most likely time=9 weeks,

pessimistic time= 15 weeks

Thus,system testing is expected to be completed in 10 weeks

Comparative Study

	Existing System	Alternative System
Metrics		
Productivity	55%	85%
Quality	40%	80%
Sensitivity Analysis		
a)Ease of Use	Measurement is to be done manually	It has an interactive GUI.
b)Response Time	It's a very time consuming process.	Faster response time and better accuracy
c)Cost Efficiency	Less cost efficient as lot of money is to be paid as labor charges	As everything is digitalized, it is more cost effective.
Risks	Human error as a possibility of failure	Failure of network or hardware failure.
Assumptions	-	Every employee has an ID card which has barcode, which is the basis of the sign up. No employee has admin rights without permission.

Testing

- Frequent trial runs were done to test the accuracy of the readings

- Values were tested several times throughout the day

- Stakeholders and customers met at least once in a month to discuss the progress.

- The changes made during development is reversible and can be enhanced according to further demand.

- Cost factor was always checked before the installation f hardware equipments.

Conclusion after testing

- Cost effective

- Reliable

- Interoperable

- Agile in nature

- After detailed testing, the entire process is reviewed with microscopic details before making it live for the end users.

THANK YOU