International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 10 Issue: 10 | Oct - 2026 SJIF Rating: 8.659 ISSN: 2582-3930

OEE (Overall Equipment Effectiveness) Monitoring System.

Name of Students: **Mohite Snehal Krishnarao, Tingare Sakshi Vishwas, Palange Shraddha Sunil.**

Name of Guide: **Prof. R. R. Dodake**

Name of College: Dr. Daulatrao Aher College of Engineering, Karad.

Name of Department: Electronics & Telecommunication

Relevance:

The IoT Based OEE (Overall Equipment Effectiveness) Monitoring Machine System is a smart solution that enables real-time monitoring of industrial machine performance using IoT technology. The system collects data such as machine running time, production count, and defective products using sensors and transmits it through the internet for analysis.

It calculates availability, performance, and quality to determine the overall efficiency of the machine. The system helps industries identify problems like machine downtime, slow production, and quality issues. By providing real-time data and remote monitoring, it allows quick decision-making, improves productivity, and reduces losses.

The system supports smart manufacturing and Industry 4.0 by integrating IoT and automation. It can be used in industries such as automotive, manufacturing, and production units (e.g., Tata Motors) to improve efficiency and reduce operational cost. It also helps students gain practical knowledge of IoT, sensors, and real-time monitoring systems.

Literature Review:

Several researchers have developed IoT-based systems for monitoring industrial machines and improving productivity. These systems use sensors and microcontrollers to collect real-time data and send it to cloud platforms for storage and analysis.

Some studies focus on machine monitoring and data logging, while others use IoT dashboards for visualization. Recent developments include integration of IoT with data analytics for better performance tracking.

However, many existing systems do not provide complete OEE calculation or lack real-time alerts and efficient decision support. Therefore, this project focuses on developing an IoT-based

OEE monitoring system that provides real-time efficiency calculation, remote monitoring, and better visualization.

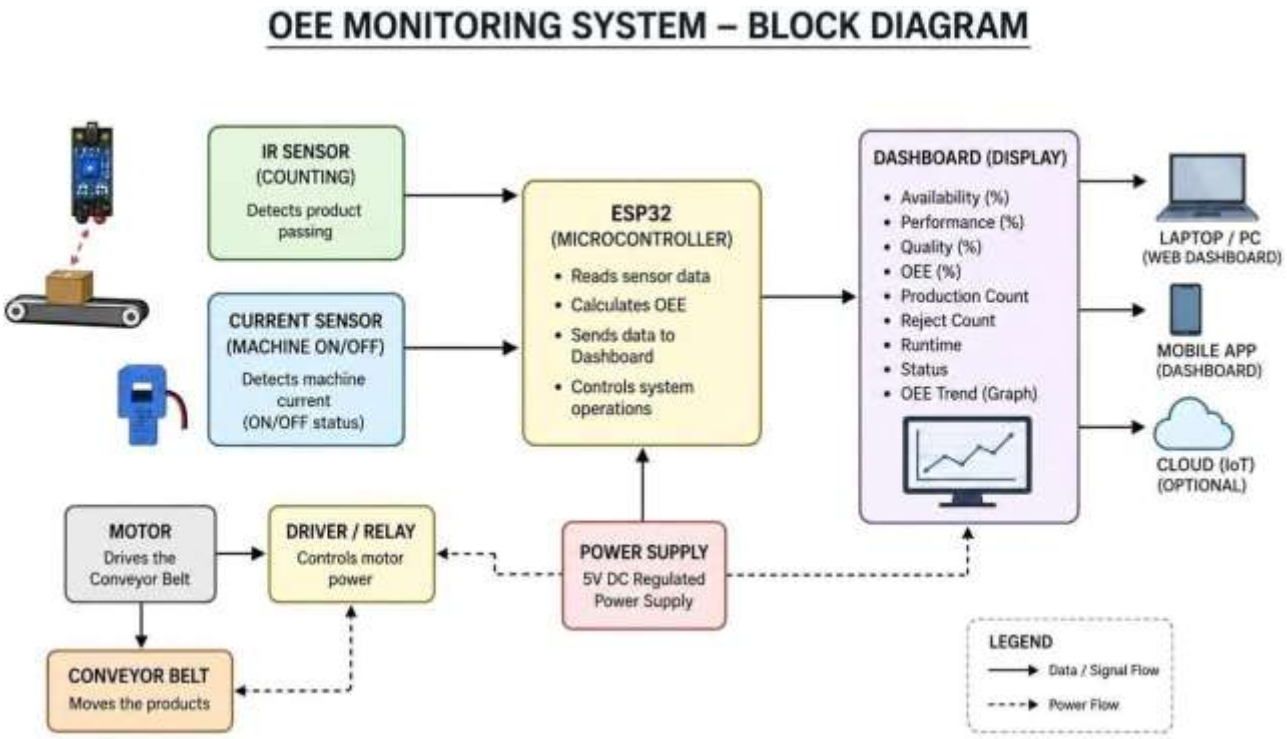
Problem Identification:

In many industries, machines are not used efficiently due to lack of proper monitoring systems. Traditional methods do not provide detailed information about machine performance, downtime, or product quality.

Because of this, industries face problems such as increased machine idle time, low production efficiency, and high maintenance costs. There is no proper system to analyze machine performance in real time.

Hence, there is a need for a system that can monitor machine performance continuously, calculate OEE, and help industries improve productivity and reduce losses.

Block Diagram:



[Fig: OEE Monitoring System Block Diagram]

Experimental Setup:

Hardware: The hardware setup consists of sensors such as proximity sensors for product counting, machine status sensors for detecting ON/OFF condition, ESP32 or Arduino microcontroller, Wi-Fi module (inbuilt in ESP32), LCD display, power supply, and connecting wires. The sensors collect data, and the microcontroller processes and sends it to the cloud.

Software: The software setup includes Arduino IDE for programming, cloud platforms like ThingSpeak or Firebase for data storage, and a web or mobile dashboard for real-time monitoring and visualization of OEE values.

Objective & Scope of Project:

Objectives:

- To monitor machine performance in real time using IoT.
- To calculate OEE (availability, performance, quality)
- To send machine data to cloud for remote monitoring.
- To detect downtime and production loss.
- To improve machine efficiency and productivity.

Scope:

- Real-time monitoring of machines using IoT.
- Cloud-based data storage and analysis.
- Remote access to machine performance data.

- Can be used in industries, factories, and production units.
- Future scope includes AI-based prediction and automation.

Proposed Work:

The proposed system focuses on developing an IoT-based OEE Monitoring Machine using sensors and a microcontroller like ESP32. The system will collect real-time data such as machine running time, production count, and defective products.

This data will be transmitted through Wi-Fi to a cloud platform where it will be stored and analyzed. The system will calculate availability, performance, and quality to determine the OEE value.

A user-friendly dashboard will display real-time and historical data, allowing users to monitor machine performance from anywhere. The system will also generate alerts when machine efficiency decreases or downtime increases.

Motivation for Work:

Industries are moving towards smart manufacturing and automation, where real-time monitoring is very important. Traditional systems do not provide accurate and timely information about machine performance.

The motivation behind this project is to develop an IoT-based system that can monitor machines efficiently and provide real-time data for better decision-making. This will help industries reduce losses, improve productivity, and adopt modern technologies.

Expected Outcome:

- Real-time monitoring of machine performance using IoT.
- Accurate calculation of OEE.
- Cloud-based data storage and access.
- Detection of downtime and production losses.
- Improved productivity and efficiency.
- Easy visualization through dashboard.

Project Timelines & Cost Details:

Expected Date of Completion: April 2027 **Approximate Expenditure:** 9000-10000 Rs.

References:

- Nakajima, S., “Introduction to TPM (Total Productive Maintenance),” Productivity Press, 1988.
- Hansen, R. C., “Overall Equipment Effectiveness (OEE): A Powerful Production/Maintenance Tool,” Industrial Press Inc., 2001.
- Everything You Need to Know About OEE (Free eBook PDF).
- Complete Guide to OEE (Online Book PDF).
- OEE Free Training Guide and Tools (Online Resource).
- Lee, J., Bagheri, B., and Kao, H. A., “A Cyber-Physical Systems Architecture for Industry 4.0-Based Manufacturing Systems,” Manufacturing Letters, 2015.
- Zanella, A. et al., “Internet of Things for Smart Cities,” IEEE Internet of Things Journal, 2014.