Employee Efficiency Calculation using RFID

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Abstract – *RFID (Radio Frequency Identification) is a technology used to identify the object on the behalf of the identification resource. RFID has been implemented for the different purpose in many organization including offices and educational institutes, workshops etc. A Manually monitoring, maintaining the record the employee is not efficient and with that calculating their efficiency is very tricky. The objective of this research is to design and developed the system with RFID which will monitor the employee and keep the records of employee. Which will enable to calculate the efficiency of the worker in workshop such as assembly points.*

Key Words: Radio frequency identification, Efficiency, Employee, Organization.

1.INTRODUCTION

The goal of the research is to efficiently calculate the working hours required for a particular job. In this research project we monitor the working hour of the worker using RIFD which will concludetheefficiency of the worker. So in our project we are going to use RFID and a scanner to calculate the efficiency of the worker. As we know that when the RFID comes in range of RFID scanner the RFID gets detected. So the RFID which will be given to the worker will act as the agent to get to know that the worker is actually working or not. When working is working the scanner placed in the machine will know when RFID is in range and the conclude that the worker is working and calculate the working hours. So the time till the RFID is in range of the scanner that time will be treated as the working time of the worker. And this data will be stored in our database. Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. An RFID tagconsists of a tiny radio transponder; a radio receiver and transmitter. When triggered by an electromagnetic interrogation pulse from a nearby RFID readerdevice, the tag transmits digital data, usually an identifying inventory number, back to thereader. This number can be used to track inventory goods.

There are two types of RFID tags:

- *Passive tags* are powered by energy from the RFID reader's interrogating radio waves.
- *Active tags* are powered by a battery and thus can be read at a greater range from the RFID reader; up to hundreds of meters. Unlike a barcode, the tag doesn't need to be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method of automatic identification and data capture (AIDC).

RFID tags are used in many industries. For example, an RFID tag attached to an automobile during production can be used to track its progress through the assembly line; RFID-tagged pharmaceuticals can be tracked through warehouses; and implanting RFID microchips in livestock and pets enables positive identification of animals.

Tags can also be used in shops to expedite checkout, and to prevent theft by customers and employees.

A photoelectric sensor, is an equipment used to discover the distance, absence, or presence of an object by using a light transmitter, often infrared, and a photoelectric receiver. They are largely used in industrial manufacturing. There are three different useful types: opposed (through-beam), retro-reflective, and proximity-sensing (diffused).

2. MOTIVATION

Production is the core factor in industries. If the production increases, then sales also going to increase and Increase in resources for production growth is always not efficient. And it may costly, so digitalization and automation can achieve the notable growth in production. So by calculating efficiency of the employees we can address the how much productive time is getting waste and can recognize the way to utilize it in smart way. Resources in the industry are not 100% productive throughout the working hours it

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May causes less production so it is inadequate. With less resources and low-priced can achieve the smart and considerable production. And tracking employee within the industry environment is little tricky, the research will help for efficiently tracking specific employee in industry working environment.

3. METHODOLOGY

With the help of Radio Frequency (RFID) employee tracking system, you can monitor employees in the real time, analyze their movement and ensure their safety. The system consists of three components:

- UHF RFID readers
- RFID Tags
- Photoelectric sensor
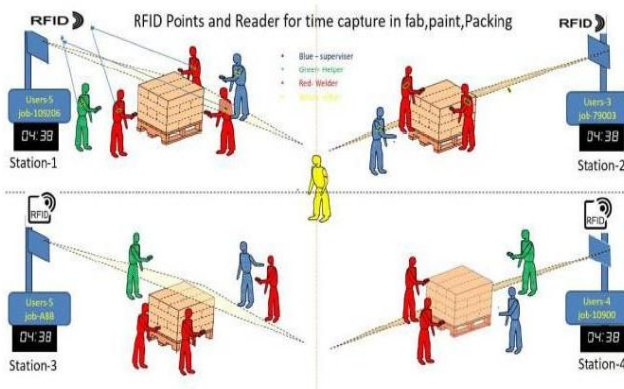
Fig 1 :- RFID Scanner Design

Tracking software known as EEC
Badges given to your employees to wear during working hours, called EEC RFID badges
Reading machines installed at every assembly in organization. We use EEC RFID readers for our tracking system

Step I: The employees get the Radio Frequency (RFID along with HF, passive UHF, NFC and BLE) enabled multi-tag badges which they wear during the working hours.

Step II: Key areas in your business environment like Assembly points, and other working area are fitted with electronic devices called Radio Frequency (RFID) scanners or readers, so that the devices can read the Radio Frequency (RFID) enabled badges, which your employees wear.

Step III: The Radio Frequency(RFID) badges worn by employees transmits data, which Radio Frequency(RFID) readers pull and send it to our

Software EEC after particular minute which powers the RFID employee working time in key areas. Now you can calculate employee efficiency as well as track your employees anywhere using our software
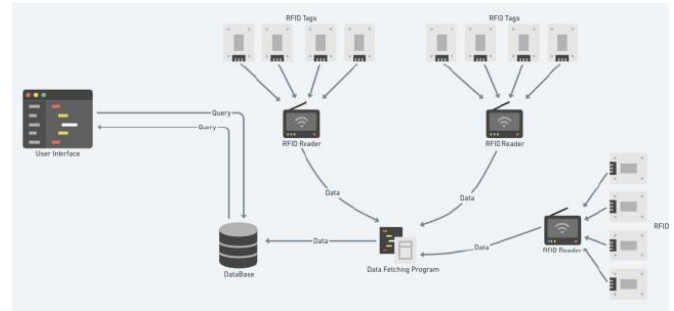

Fig 2:- System Infrastructure

4. LITERATURE REVIEW

Nowadays RFID has moved from obscurity into mainstream applications that help speed of handling of manufactured goods and materials. RFID enables identification from a distance, and unlike earlier bar- code technology, it's done without requiring a line of sight, RFID tags support a larger set of unique IDs than bar codes and can incorporate additional data such as manufacturer, product type, and even measure environmental factors such as temperature. RFID can be classified in two classes active and passive. [5]Active tags usually require a power source they are stored in two ways, one is connected to powered infrastructure and other use energy stored in integrated battery, whereas passive tags doesn't have internal power instead are powered by the electromagnetic energy transmitted from an RFID reader. [6] RFID provides the function of individual goods identification and online changeable data storage. We should make a better utility to these additional functions. Intelligent RFID applications could bring in new research and commercial opportunities. Moreover, it helps to further reduce costs, enhance customer services and could provide insight for updating business models. [7] In every project security is always the main aspect therefore appropriate data collection it is possible to detect cloned tags. Information, RFID signals can be encrypted using suitable algorithms. But then, most of the commercial RFID tags do not include security as it is very expensive. This leaves most RFIDs vulnerable to cloning and data tampering. The RFID tag can contain tracking information or just a unique identification code. When you tap a credit card to pay for something, the machine reads an RFID chip embedded in the card.

5.CHALLENGES

There are no possible successful projects without challenges. When we are trying to calculate the employees working hours we seem that there is no any physical boundaries between the Assembly points.

5.1 Virtual Boundaries

For solving this problem, we are implementing boundaries for each assembly area with photoelectric sensor. A Photoelectric Sensor consists primarily of an Emitter for emitting light and a Receiver for receiving light. When emitted light is interrupted or reflected by the sensing object, it changes the amount of light that arrives at the Receiver. The Receiver detects this change and converts it to an electrical output. For Creating the virtual boundaries for every assembly area in work shop so if the worker will move from one assembly area to another RFID reader from that specific area will pause the time for that particular area and when that tag enters in another assembly area RFID reader of that area will start timer for that reader. One more major advantages of creating boundaries is that we can recognize if worker will leave the working area without RFID tag
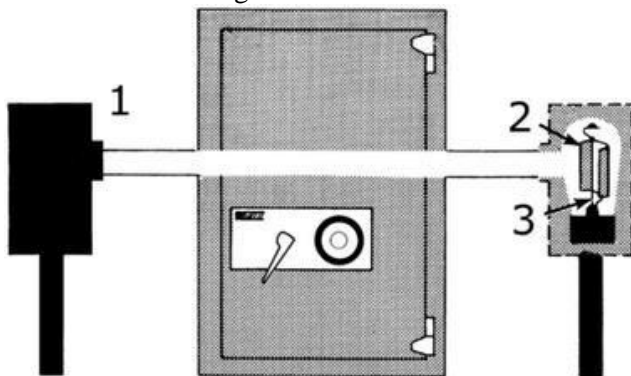

Fig 3:- Photoelectric Sensor

6.CONCLUSIONS

This system is design to automate the employee tracking and calculating employee efficiency and job time in different division in an organization. With the help of RFID, the system will monitor every worker in organization and will send the status of workers after every specific period of time. System will keep the track record of every employee and calculate their work efficiency; System will also help to track the employee in

Organization, administrator can see the worker position. With this framework it is considerable simpler to discover the situation of each worker inside the organization premises; It sees the workers points of interest and their exercise. Overall research is the automation and digitalization in organization. Smart way for the effective production and industrial growth.

7. ACKNOWLDGEMENTS

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