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IoT based Smart helmet for construction workers

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Abstract: *Industrial protection is one of the major elements of industry . Working surroundings risks consist of suffocation, fueloline poisoning and fueloline explosion. Hence air pleasant and dangerous occasion detection may be very essential thing in industry. In order to gain the ones protection measures, the proposed machine affords a wi-fi sensor community for tracking actual time state of affairs of running surroundings from tracking station. It affords actual time tracking of dangerous gases like CO, CH4 and LPG and additionally temperature and humidity. To conquer the ones dangerous state of affairs, this machine affords emergency alert to the tracking station . Some employees aren't aware about protection and that they did now no longer put on helmet nicely. For this purpose, a restriction transfer became used to correctly decide whether or not the employees had worn their helmet nicely or now no longer. The machine makes use of Wi-Fi era for transmission of facts from running surroundings to the tracking station. There is an alert transfer at running surroundings for emergency purpose.*
Key Word*: Safety, NODEMCU, Sensors, IOT, Cloud Computing*

INTRODUCTION

The Internet of Things (IOT) is a machine of interrelated computing devices, mechanical and virtual machines, items, animals or human beings which might be furnished with precise identifier and the cap potential to switch statistics over a community with out requiring human-to-human or human-to-laptop interaction. The IOT lets in items to be sensed or managed remotely throughout current community infrastructure, developing possibilities for greater direct integration of the bodily global into laptop-primarily based totally systems, and ensuing in advanced efficiency, accuracy and financial gain similarly to decreased human intervention. IOT has advanced from the convergence of Wi-Fi technologies, microelectromechanical systems(MEMS), MICROSERVICES and the internet. The convergence has helped tear down the silo partitions among operational era and records era, permitting unstructured machine-generated statistics to be analyzed for insights with a purpose to force improvements.

IOT primarily based totally clever production helmet lessen production website accidence which may be minor or foremost reasons effect at the entire web website online in addition to paintings of production. Also, as in step with a record primarily based totally on "survey of India", there may be a listing of the variety of an coincidence on production web sites which incorporates majorly a massive part of injuries occurred to the labour , because of different factors inclusive of machineries, equipment's or a few different associated factors. There are many benefits of helmets . For the protection of employees on the web website online, for the paintings to be finished on time, there may be a want for such technological innovations. For the verbal exchange among the manager and the labour in case of any emergency, GPS sensors and Emergency Buttons had been to be had to set up with inside the helmet Construction commercial enterprise is developing each day as all want infrastructures to stay and to paintings. For this, an increasing number of initiatives want to be finished on time with the protection of all of the labourers running on web website online. (10)

II. METHODOLOGY

A clever helmet is a mixture of the everyday helmet with the contemporary era as in step with the requirement of the development web website online (Safety, Time Management, and Risk). At the Construction web website online, Helmet is the simple want for labour. For this investigation, an everyday helmet is taken into attention and changed it with the contemporary development to fulfil the diverse necessities at the development web website online like dealing with the time, the protection of labour, supervising the employee's activity, how tons paintings is to be finished, approximately the sports which might be going parallel, detection of diverse gases, etc. To satisfy this whole requirement of the development industry, the Internet of Things (IoT) is brought in diverse initiatives which play an critical role. Various additives are mounted with inside the everyday helmet and join these kind of with a unmarried laptop so that each one the sports are to be supervised in a unmarried laptop.

III. ARRANGEMENTS OF ADDITIVES IN HELMET:

In a clever helmet, a GPS sensor to find the precise vicinity of the employee and engineer, and Arduino Uno forums are used on which codes are uploaded for the functioning of the helmet then distinctive buttons are used one for protection in addition to a smoke alert machine.

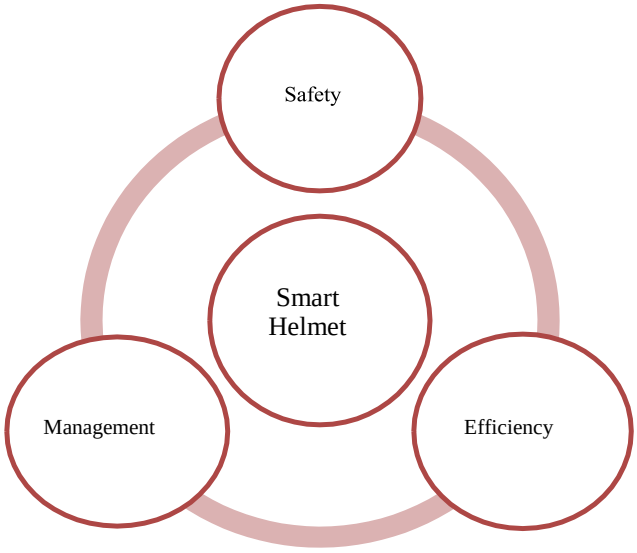
The hc12 module is used for the conversation of the helmet with the machine having any other hc12 module. A smoke detector sensor is used for the fitness protection of the employees and engineers because the smoke detector can locate the dangerous gases gift with inside the surroundings and LED of 3 distinctive shades is used all of them displaying or notifying that the helmet is in an inactive state (blue), the helmet is in alert condition (red), the undertaking finished through the employee (green).

The helmet is designed to be with three buttons installed in it and various components also like GPS, Smoke Detection, and Gas Detection, etc. in it. One button is installed on to and the rests two are on both sides. The button on top will reflect the safety and emergency symbol whenever a little force will act on the top of the helmet, it will give the

information or emergency alert with the location to the supervisor so that the team will reach the labour easily and take necessary actions. The Second button installed on the right side of the helmet is used to give information to the supervisor for the completion of the specified task.

IV. PRINCIPLES OF SMART HELMET:

The system provides real time monitoring of industries From the monitoring station. The transmitter unit is placed On helmet of worker and receiver unit placed on the Monitoring station. The Wi-Fi wireless technology is used For data transmission from the working environment to the Base station. The Wi- Fi communication network provide Way to monitor the working environment through Thing speak application from the monitoring station. The main aim for developing the concept of the smart helmet was not only focused upon the safety of the workers and labours at the construction site, but also includes many aspects of the ongoing project at the construction site. The basic principles of developing IOT – based helmet is a three – fold dimension, focusing on Safety, Management and Efficiency.



Safety was the prime factor which was considered behind the idea of developing the smart helmet. It is designed for all the working – labor class at the construction site. These helmets will be having the different color code which are being employed at the construction site presently, just with the addition of the concept of making it “smart”, attached with different equipment’s such as sensors. These helmets are designed in such a way that if the worker is facing any kind of emergency, whether ne health related or work related, a different signal (in the form of LED) will be displayed on the screen, making it understand that one or many of the labors are facing problems. Due to which, if some accidents happened at the construction site, the person – in – charge can easily get notified and take the necessary remedial action to the earliest for the safety of the particular victimized labor. The second principle is management. Smart helmet plays an important role in managing different activities such as Time Management, Work Management and Labor Management at the construction site. All these three types of management are inter- related to each other.

S. No.	Colour Lights	Specification
1	White	Wearing of Helmet
2	Green	Problematic situation
3	Red	Task Completion
4	Yellow	While using machineries

V. PROBLEM STATEMENT

To design and implement the system using Internet of Things to provide the safety is a major problem in construction works. This project aims to develop smart wearable devices such as helmet using various sensors that will help in monitoring the health and safety of workers. Hybrid approach to integrate fixed and mobile IOT sensors to measure and monitoring the environment in which the workers are working. Collect the air quality around people, by combining fixed and mobile sensors and alert the managers if any crisis occurred.

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VII. CONCLUSION

Through this study, we developed a smart helmet which was designed to help workers to get rid of hazardous events in industries. The paper has been successfully presented and tested with integrated features of each hardware component for its development. Significance of each block has been resonated out and placed carefully, thus contributing to the best working of the unit. Hence the system is reliable with simple and easily available components, making it light weight and portable. This product can be enhanced by adding additional features in the near future

LED of four different colours is used, all of them showing or notifying different roles and Specifications. The main objective is to focus on overall performance of the workers at construction Site including safety and work management. In accompanying with the four lights, smoke sensor or gas sensor is also installed for Detection of leakage of gas or smoke in the nearby area. Thus, with the help of this “smart” helmet, One can not only ensure the maximum safety for the labours working at the construction site. This type of helmet is economical and also Doesn’t require much time in its production. The future scope of the smart helmet may include the Installation of other sensors or modifying the shape so that it may perform more functions towards the Overall effectiveness and efficiency of the construction project.

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