SMART IOT WEIGHT CARRYING AND HELATH TRACKING DEVICE

MANJUNATH BADIGER
Assistant Professor Department
of electronic & communication
Sahyadri College Of Engineering
And Management

SNEHA
Department Of Electronics
&Communication
Sahyadri College Of Engineering
And Management

NAVYA PRABHU
Department Of Electronics&
Communication
Sahyadri College Of Engineering
And Management

MEGHANA NAIK
Department Of Electronics & Communication
Sahyadri College Of Engineering And
Management

SUHAS K S
Department Of Electronics & Communica
Sahyadri College Of Engineering And
Management

Abstract: The smart IOT load carrying and health tracking device is basically a ergonomically designed weight carrying system which is embedded with several sensor maintaining the data of the laborer's such as health and keeps the track of the working conditions which the laborers are exposed . The structure of the devices helps in maintaining the posture of the laborer's preventing various health issues caused by wrong posture while carrying the load along with which the sensors embedded in the carrier helps in maintaining the record of the various factors such as . This also keeps the track of health condition of the laborer's who is working throughout the day making it easy for monitoring the health of the laborer. This also gives an alert message when the laborer faces some serious health fluctuations during their course of work.

Keywords: Health Monitoring Device, Ergonomic Design, Sensors , 12C Communication

I.INTRODUCTION

Construction industry has accomplished extensive growth worldwide particularly. For a construction project to be successful, safety of the laborer is of utmost importance. The safety issues are to be considered right from the design till the completion of the construction.. Construction industry employers are subject to construction site accidents and health risks.

In India, construction industry is the second largest Industry when compared to agriculture and other Field . Throughout the world, the construction industry is one of the most hazardous industry. The number of fatal accidents taking place at the construction sites is high and the major cause For this fatal accidents was found to be fall of persons from height and through openings.

Safety is the basic physical and physiological need of human being but in India numerous laborers and daily wage worker are deprived of this basic necessity of due to working in the extreme conditions in the factory and working sites. Some result in fatal death and the other maybe result to body deformations while others may only be minor fractures and rupture of the ligaments.

The construction site accidents are caused due to falling of raw materials workers, fall of laborer from heights and ladders loading of material , unloading of material , and transportation of the raw construction materials from one place to another.

Proper management of raw materials For construction is essential for the safety of laborers at any construction site. Many activities involved in handling of construction materials put workers at risk of injuries caused by falling Materials on laborers and improper lifting of items manually By the laborer.

The smart IOT weight carrying and tracking device basically intends to provide health regulation and maintain appropriate posture of the labor preventing various health issues caused by wrong posture by carrying heavy loads. The various parameter of the health of the laborer are measured on the continuous basis so that any fluctuation in the parameters such as pulse, temperature and change in position due to accidents is monitored and reported by embedding various sensors.

The smart IOT based carrier and tracking system is hence very useful in this kind of environment where the laborer is carrying heavy weights and helps in maintaining posture by making it easy for the laborer while loading and unloading of the heavy weight easy and also making it time efficient due to the design of the carrier system site.

The tracking of the health status of the laborer is also made possible due to various sensors in imbedded in the carrier like the temperature sensor (DHT11), gyro

sensor (MPU6050), Pulse sensor and a GPS tracker connected to a raspberry pi module. Which also keeps in tracker the login and logout time of the laborer and hence keep a check on the work done by the laborer the time duration the laborer has taken a break and resume the work . Therefore the employer will keep the track on the laborer with being physically present in the site.

All the data collect by the sensors imbedded in the carrier is then stored in the cloud and can be accessed by the company and various labor organization that ensure the safety of the labore and well-being of the laborers and t companies as they can track the amount of work done by the laborer along with the safety and security of its employees.
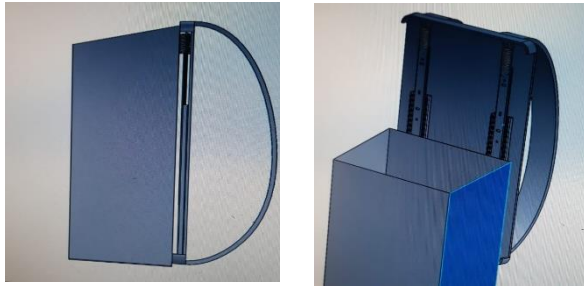
Fig(1) Top View And The Side View Of The Carrier

II. BACKGROUND

M. Bures [1] A new rising me was published in the paper. A new approach to industrial workplace ergonomic design methodology has been developed, which combines the current traditional approach to workplace design and evaluation with modern methodologies for workplace design using ergonomic analysis and software tools. The algorithm, the knowledge rule base, and the methodology are the three primary areas.

M. K. Sain ,M. L. Meena [2] Intervention in Occupational Health and Ergonomics According to the Indian Small Scale Industries, small scale industries (SSIs) play a critical role in the Indian economy. SSIs contribute to the country's industrial production, export, employment, and the development of an entrepreneurial foundation. Traditionally designed tools or manual labour are used in the majority of SSIs in India Ergonomics and Occupational Health Intervention Small scale industries (SSIs), according to the Indian Small Scale Industries Association, play a significant role in the Indian economy. SSIs help the country's industrial production, export, employment, and entrepreneurial development. The majority of SSIs in India use traditional designed tools or manual labour.

V Tamilselvi [3] With the emergence of the new corona virus, each country now places a high priority on healthcare, according to IOT Based Health Monitoring System and her team. As a result, an IoT-based health monitoring system is the greatest answer for such an epidemic in this regard. The Internet of Things (IoT) is a new internet revolution that is a rapidly increasing study topic, particularly in health care. Remote health care monitoring has evolved at such a rapid rate, thanks to the increased usage of wearable sensors and smart phones. IoT health monitoring aids in the prevention of sickness as well as the accurate diagnosis of one's current state of health, even if the doctor is a long distance away. The purpose of this study is to present a portable physiological monitoring framework that may be used to continuously monitor a person's health. the patient's heartbeat, temperature, and other room fundamentals Using Wi-Fi Module based remote correspondence, we presented a nonstop checking and control instrument to screen the patient condition and save the patient information in the server. A system for remote health monitoring using IoT is proposed, in which authorised individuals can access these data saved on any IoT platform, and ailments are diagnosed by doctors at a distance based on the values obtained.

R. Kumar and M. Pallikonda Rajasekaran said in their paper [4] A Raspberry Pi-based IoT-based patient monitoring system The Internet of Things (IOT) is a recent development that connects all objects and has been dubbed the next technological revolution. Smart parking, smart homes, smart cities, smart environments, industrial settings, agriculture fields, and health monitoring are just a few examples of Internet of Things applications. One such application is in healthcare, where it is used to keep track of a patient's health. The Internet of Things improves the efficiency of medical equipment by providing real-time monitoring of patient health, in which sensors collect patient data and reduce human error. Patient parameters are transmitted through medical equipment via a gateway, where they are stored and evaluated in the Internet of Things. The monitoring of all patients from multiple locations is one of the major obstacles in the introduction of Internet of Things for healthcare applications. Thus, in the medical industry, the Internet of Things provides a solution for effective patient monitoring at a lower cost, as well as a reduction in the trade-off between patient outcome and disease management. This document discusses how to keep track of a patient's body temperature

J. Castillo-G, A. Aguilar-R and D. Chacón, "Electronic System for the Control and Monitoring of Weight Lifting," 2018 IEEE World Engineering Education Conference (EDUNINE) [15] The procedure of developing an electronic system for the control and prevention of diseases in people who lift too much weight is detailed in this article. The electronic system comprises of an FSR resistive pressure sensor inserted within an ergonomic glove, which will monitor the pressure using an Arduino Nano installed in a handle. Weight data that is raised by the individual, working with weight ranges of up to 20 kg. The study is based on the importance of first understanding the types of diseases that can be caused by lifting weights greater than 10 kg in middle and senior citizens during specific periods of time during their work routines, and an Android app was created to assist users in avoiding possible injuries.

Vikram sarabhai [2] wrote an article on it. Laborer's Load Carrier: Removes the load from the laborer's back. The main goal of the invention is to make it easier for workers to lift and shift loads using three different methods: above the head, behind the back, and with a push or pull action. The major structures of the new device are constructed of cane, plastic, and metal components. It is feasible to make the whole thing yourself. It is possible to make the entire structure in plastic or metal.

Load S. M. Riazul Islam [8] Multipurpose Load Design and Development Carrier is a revolutionary product that allows workers to work comfortably and without the risk of injury or health problems. It can be utilized at construction sites, industries, ports, and other locations where big goods must be lifted and carried by hand or on shoulders and heads. This is an ergonomically constructed carrier to improve laborer's working conditions and lessen the danger of head, shoulder, hand, and waist injuries, among other things. The major goal is to give workers the ability to carry loads in three simple ways: over the head, at the back, and with a push or pull action It is simple to prepare and inexpensive, as well as readily available. It also does not necessitate a lot of expert labor. The many gadgets and load carriers

presented here are new and improved inventions for carrying burdens effortlessly and safely without injuring any part of the body such as the head, neck, shoulder, legs, hands, and so on. These new load carriers have been developed to be light in weight, simple to use, and work without putting any strain on the muscles or body parts. Different devices are used for different purposes, but the basic goal is the same for all of them: to lower the level of injury and strain on the body in any manner feasible. Some are utilized for industrial purposes, while others are used for residential purposes. Some are used for industrial purposes, while others are utilized for domestic uses such as gardening. A few of these are based on the method of taking and carrying the load by various body parts in various ways in order to avoid injury and strains. Each of the devices discussed below has its own application and way of operation, as well as distinct advantages over earlier versions and the present apparatus.

D. D. Pham, H. T. Duong and Y. S. Suh "Walking Monitoring for Standard and Front-Wheel Walker Users," says the study. A walker movement monitoring system for a regular walker and a front-wheeled walker is proposed in this research. To give a statistical analysis of rehabilitation evaluation, the walking parameters (step length, step duration, step speed, and total walking distance) are precisely measured from the walker's movement. To begin, a movement classification method to identify walking styles is proposed (continuous rolling, step-by-step rolling, two back tips lifting, and complete lifting). The movement of a walker can be measured using two encoders (only for front-wheeled walker) or an inertial measurement unit based on this classification. Five subject is used to verify the accuracy of walking parameter estimation. The root mean square error in 20-meter straight walking varies from 0.1 to 0.3 meter depending on walking technique

S. M. M. Rahman, R. Ikeura, M. Nobe and H. Sawai, "Design guidelines for industrial power aid robots for lifting large objects based on human weight perception for better HRI," [14] postulated that for lifting an object with a power assist robot, weight perception (WP) due to inertia might be different than WP due to gravity (PAR). Objects were raised individually with a PAR using three distinct lifting schemes: unimanual, bimanual, as well as a cooperative lift Then, for each scheme independently, psychophysical connections between actual and power assisted weights (PAWs) as well as excess in load forces (LFs) were found. To eliminate the excess in LFs for each scheme, a novel control approach was implemented. Finally, we proposed that the findings be used as design guidelines for PARs for lifting big things in industries that would benefit from them.

S. Guo-Hong, [10] The Android Platform is being used to conduct research on application development. Android is a Linux-based open-source operating system that is mostly used on mobile devices such as smartphones and panel computers. It is being developed by the Open Handset Alliance, which is made up of over 30 technology and mobile phone firms Android aims to provide the highest service quality to users while also providing developers with a more open platform for more convenient program development. As a result, Android may be used to create mobile applications with more useful features. The architecture of the Android platform, including the classes and methods used in development, is initially presented in this paper. Then, using audio/video file acquisition as an example, we'll go over Android program

design and development, which includes classes such as application, program design, development, and analysis.

III. EXSITING METHODOLOGY

There were no technology to load, unload, or move construction materials on construction sites a few decades ago. There were only a few ways for loading and unloading construction materials by workers, such as above the head, at the rear, and push or pull action, and there were only a few methods for lifting and shifting heavy loads by workers, such as above the head, at the back, and push or pull action. The disadvantage of these approaches is that lifting high weight on various parts of the laborer's body might result in serious injuries such as bone fractures and back pain.

The process of evolution occurs. Evolution happened in every industry, and it happened in the building industry as well. Heavy building materials are now carried by new carriers. The carrier is a new invention that allows workers to work more comfortably and without the risk of injury or illness. Wherever big goods must be lifted and carried by hand or on foot, carriers can be replaced, shoulders and head. Cane material was not durable. Plastic material is a hazard to the environment even though recyclables used most of them required an arduous process to recycle. Metal carrier was not user friendly and it had its own weight The cane was not a long-lasting material. Plastics are a threat to the environment, despite the fact that most of them are recyclable. The metal container was inconvenient to use and carried its own weight. Workers had to carry a heavy metal bag that was exceedingly tough to handle.

In the future, There is an ergonomically built carrier to enhance laborer's working conditions and minimize the danger of head, shoulder, hand, and waist injuries, among other things. The major goal is to provide employees the ability to carry loads in three simple ways: over the head, at the back, and with a push or pull movement. It is simple to prepare and inexpensive, as well as readily available. It also does not need a lot of expert work
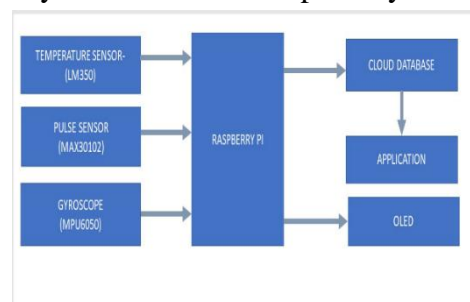
IV. PROPOSED METHODOLOGY

Smart IOT weight carrying and health tracking device-The main intension of this project is to reduce the on field accidents while carrying material from one place to another and monitor the health of the labors by continuously tracking the health parameters such as temperature, pulse etc. and the environment in which the labor is working such that the accidents can be minimized and the heath of the workers are monitored.

The carrier is designed in such a way that is light in weight and user friendly and it supports the workers to carry heavy loads preventing major accidents minors fracture and ligament tears which take place while loading and unloading the heavy loads at the construction

The smart IOT weight carrying and tracking device basically intends to provide health regulation and maintain appropriate posture of the

labor preventing various health issues caused by wrong posture by carrying heavy loads . The various parameter of the health of the laborer are measured on the continuous basis so that any fluctuation in the parameters such as pulse, temperature and change in position due to accidents is monitored and reported by embedding various sensors .

The smart IOT based carrier and tracking system is hence very useful in this kind of environment where the laborer is carrying heavy weights and helps in maintaining posture by making it easy for the laborer while loading and unloading of the heavy weight easy and also making it time efficient due to the design of the carrier system .

The tracking of the health status of the laborer is also made possible due to various sensors in imbedded in the carrier like the temperature sensor (LM350), gyro sensor (MPU6050), Pulse sensor (MAX30102)connected to a raspberry pi module . which also keeps in tracker the login and logout time of the laborer and hence keep a check on the work done by the laborer the time duration the laborer has taken a break and resume the work .

Fig (2) Block diagram of the health monitoring system

Therefore the employer will keep the track on the laborer with being physically present in the site.

All the data collect by the sensors imbedded in the carrier is then stored in the cloud and can be accessed by the company and various labor organization that ensure the safety of the laborer and well-being of the laborers and the companies as they can track the amount of work done by the laborer along with the safety and security of its employees .

This consist of four sensors which is activated when the code is (password) enter.

Weight sensor: For measuring the weight of the carried by the laborer.

Temperature sensor: It is used to measure the body temperature of the laborer Pulse sensor: this is measure the pulse of the laborer to ensure the well-being and to keep the record office help. All the output of the sensor are given to the microprocessor or a node From here the data it sends to the gateway or wireless connectivity in our case we are using(Wi-Fi) .from here the data stored in cloud which can be viewed using an application(App).LCD provided in the device also display the output of the sensor
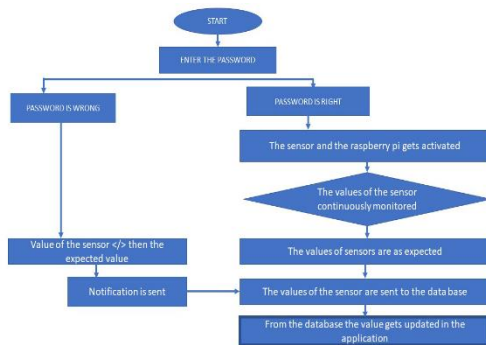
V. WORKING PROCESS

Fig (3) Flowchart

The idea is divided into two phases: The first one is the interfacing the sensor with the raspberry pi and getting output and getting the output on the LCD. Next is sending the data to the cloud for the storage and retrieving it back correctly firm the cloud storage then comes to build and application which can store and get the data from the cloud and display it in an android phone. These three combined to an IOT enabled health monitoring system of the laborer

The IOT health monitoring system is then combined into the weight carrying device which has three modes of transporting facilities and is able to effectively carry the heavy load maintaining the\posture of the body along with which the health is monitored in continuously , All the data is stored in the cloud and can be viewed using the application that run in an android application.

Combining the two process the "Smart IOT Weight Carrying and Tracking System is made which can continuously monitor the health of the laborer and also and monitor the environment in which the laborer is working. This data can be collect both by the employer and the various organizations which is looking after the well-being of the laborer. And laborer himself will be aware of his rights and the health conditions. Therefore making it profitable both for the laborer and the employer where the employee gets information of the work done. And the health condition which the laborer is working which can be helpful for preventing accidents also the employer will get to know about the working environment of the labors

Fig (4) Outputs of the sensing device

VI. CONCLUSION

Designed a new carrier that assists the labourer in keeping good posture, which lowers injuries, monitors health parameters such as temperature and pulse of labor, and sends text messages to the construction site manager, and is user pleasant. The information on the workers' health and working conditions may be beneficial to various labor organizations concerned with their wellbeing. labors This will ensure that the laborer's are not exploited and that they are paid fairly for their work. Apart from laborer's, these can be used by a wide range of people, including train stations, local sellers, and internet delivery systems.

REFERENCES

[1] *New approach to ergonomic design of an industrial workplaces published in 2009 and presented in IEEE International Conference on Industrial Engineering and Engineering Management by M. Bures Department of Industrial Engineering and Management, University of West Bohemia, Pilsen, Czech Republic*

[2] *Occupational Health And Ergonomic Intervention In Indian Small Scale Industries: A Review M. K. Sain ,M. L. Meena Research scholar, Department of Mechanical Engineering Malaviya National Institute of Technology Jaipur, Jaipur, India ,Assistant Professor Department of Mechanical Engineering, Malaviya National Institute of Technology Jaipur, Jaipur, India*

[3] *IoT Based Health Monitoring System Publisher: IEEE. Published in: 2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS) authors V Tamilselvi SNS College of Technology, Coimbatore, India S Sribalaji SNS College of Technology, Coimbatore, India P Vigneshwaran SNS College of Technology, Coimbatore, India P Vinu SNS College of Technology, Coimbatore, India J. GeethaRamani SNS College of Technology, Coimbatore, India*

[4] *An IoT based patient monitoring system using raspberry Pi Publisher: IEEE R. Kumar Department of Electronics and Communication Engineering, Kalasalingam University, Tamilnadu, India M. Pallikonda Rajasekaran Department of Electronics and Communication Engineering, Kalasalingam University, Tamilnadu, India*

[5] *Progressed IOT Based Remote Health Monitoring System January 2020 Project: Health Authors: Dahlia Sam Dr. M.G.R. University S Srinidhi*

[6] *Niveditha V.R Dr.MGR Educational and Research Institute s. Amudha Dr. M.G.R. University*

[7] *New secure healthcare system using cloud of things Ebrahim Al Alkeem, D. Shehada, Published 2017 Computer Science Cluster Computing*

[8] *Enabling Technologies for the Internet of Health Things Joel J. P. C Rodrigues; Dante Borges De Rezende Segundo; Heres Arantes Junqueira; Murilo Henrique Sabino*

[9] *The Internet of Things for Health Care: A Comprehensive Survey Publisher: IEEE S. M. Riazul Islam UWB Wireless Communications Research Center, Inha University, Incheon, Korea Daehan Kwak Networked Systems and Security Laboratory, Rutgers University, Newark, NJ, USA UWB Wireless Communications Research Center, Inha University, Incheon, Korea*

[10]   *Ghandi, C. Silva, D. Martinez and T. Gualotuña, "Mobile application development process: A practical experience," 2017 12th Iberian Conference on Information Systems and Technologies (CISTI), Lisbon, 2017, pp. 1-6, doi: 10.23919/CISTI.2017.79758*

[11]   *S.Guo-Hong, "Application Development Research Based on Android Platform," 2014 7th International Conference on Intelligent Computation Technology and Automation, Changsha, 2014, pp. 579-582, doi: 10.1109/ICICTA.2014.145.*

[12]   *A Literature Survey on Health Care Service October 2015Authors Minutha .V University of Mysore Dr.Subash.S.Sannasiddanannavar*

[13]   *A Review on IOT Based Health Care Monitoring System January 2020 DOI:10.1007/978-981-13-8715-9_12 In book: ICCCE 2019 (pp.95-100) Project Pravin Kshirsagar Avn Insitute of Engineering and Technology Akshay Pote Raisoni Group of Institutions Krishan K Paliwal H Raisoni College of Engineering and management, Pune*

[14]   *S. M. M. Rahman, R. Ikeura, M. Nobe and H. Sawai, "Design guidelines for industrial power assist robots for lifting heavy objects based on human's weight perception for better HRI," 2010 5th ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2010, pp. 121-122, doi: 10.1109/HRI.2010.5453234.*

[15]   J. Castillo-G, A. Aguilar-R and D. Chacón, "Electronic System for the Control and Monitoring of Weight Lifting," 2018 IEEE World Engineering Education Conference (EDUNINE), 2018, pp. 1-5, doi: 10.1109/EDUNINE.2018.8450988.

[16]   S. M. A. Salehizadeh, Y. Noh and K. H. Chon, "Heart Rate Monitoring During Intense Physical Activities Using a Motion Artifact Corrupted Signal Reconstruction Algorithm in Wearable Electrocardiogram Sensor," 2016 IEEE First International Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE), 2016, pp. 157-162, doi: 10.1109/CHASE.2016.8.

[17]   D. D. Pham, H. T. Duong and Y. S. Suh, "Walking Monitoring for Users of Standard and Front-Wheel Walkers," in IEEE Transactions on Instrumentation and Measurement, vol. 66, no. 12, pp. 3289-3298, Dec. 2017, doi: 10.1109/TIM.2017.2745058.