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A Qualitative Survey on Smart Helmet using IOT

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Abstract:- Travelling is a necessity in the urban and rural landscape nowadays, which can be attributed to the fact that populations are increasing and cities are getting bigger. Because of their minimal price and accessibility, motorbikes are more popular in India than cars. In many incidents, the motorcyclist is mostly hurt on the head. A helmet is extremely crucial in preserving the rider's lives. It has been observed for many years that diverse technology advances are affecting the way things work in practice. Since the beginning of time, ever more inventions have been developed to address the current difficulties that humans confront on a daily basis. The transportation business is one of the industries that has been quick to adopt technical advances to decrease mortality and casualties during collisions. Therefore, an effective and useful methodology using Internet of Things platform for a smart helmet has been realized through the analysis of the previous research topics and will be elaborated in the upcoming research article.

Keywords:- *Alcohol Sensor, Internet of Things, Safety Headgear.*

I. INTRODUCTION

In high population density as well as emerging countries like India, a motorcycle is by far the most efficient form of road transportation. However, two-wheelers are amongst the most dangerous modes of transportation on the street. A mishap involving a motorcyclist who is not wearing a helmet might result in deadly consequences. Prominent contributing factors include intoxication and riding, speeding, doing various tricks such as wheelies and stoppie, being oblivious of an oncoming car, releasing hands while maneuvering, attempting to execute feats while standing on the motorcycle, and many others. The motorists' carelessness endangers not just their own lives, but also the lives of everyone else.

Motorbike commuting carries its own set of hazards, particularly whenever the operator fails to obey the regulations and takes the required steps to prevent unpleasant scenarios that can cause a crash that are occasionally lethal. Even though there are regulations governing motorbike safety, almost all of the times the restrictions are not obeyed. The traffic officers who are in charge of overseeing the regulations on motorbike users are finding it difficult owing to the fast surge in the volume of motorcyclists and a lack of personnel to supervise the issue.

An accident is defined as a distinct, unanticipated, uncommon, and unplanned activity that can potentially arise and in any location. The reason of an incident that occurred may be due to the motorist's carelessness, a mechanical flaw in the automobile, or it may be unknown. However, the consequences of an accident might be deadly or inflict significant injury to the motorist or other people on the street. The primary cause of such incidents is the driver's recklessness. The motorcyclists may suffer greatly due to the absence of timely first aid and medical intervention. Some fatalities occur as a result of the paramedic failing to arrive at the targeted destination on time. To save time and alert the appropriate individual in the event of a collision, an approach is suggested that can ensure that the rider receives the necessary treatment in a timely manner.

Even when an accidents is one cause of mortality, while the other is a deficiency of prompt First Aid and Critical Assistance. Even according to the assessment, over 50% of all wounded persons end up dying as a consequence of the lack of timely care, a delayed response of a paramedic, or no one at the scene of the mishap to provide details to the paramedics. This is the predicament in our everyday routines; a thought of discovering a remedy to these problems led to the notion of providing accident details as soon as conceivable as well as on time since, after all, time is of the essence; if just about anything is completed on time, we could save big chunk of the lives lost due to motorcycle crashes.

Collisions are generally avoided by promoting consciousness and using suitable technological breakthroughs. There are several examples of such accidents occurring and enlighten us every day of our lives. Every incident, whether in one's daily experience or on the street, has its origins either within you or even somewhere close. Any type of road disaster, like any other type of crisis in life, is a devastator that may make you understand how precious life is, and how vital it is to have precautionary measures with you when out on a bike. On this premise, modern 21st-century equipment have dramatically decreased traffic fatalities by implementing safety procedures. When it comes to motorbike vehicle collisions, it could be due to breaking the speed limit, drinking alcohol, or some such other justification that distorts the truth within; or it could be due to inadvertent factors that catalyst which are not dependent on individual recklessness but due to misjudgments precipitated by some other origin, such as another vehicle making contact, inclement weather, and so on. This confirms the need for a smart helmet that can perform alcohol detection using Internet of Things platform which has been surveyed extensively in this article.

This literature survey paper segregates the section 2 for the evaluation of the past work in the configuration of a literature survey, and finally, section 3 provides the conclusion and the future work.

II. RELATED WORKS

Divyasudha N [1] explains that the safety and security aspect of our lives is one of the most essential and highly necessary area that needs attention. There have been a large

number of deaths and injuries in humans that are happening on the roads due to accidents. A large number of fatalities are being recorded in individuals with the lack of a helmet or with individuals that are drunk. This increases the probability of an accident or a collision to become increasingly fatal for everyone involved. Therefore there is a need for an effective mechanism that has the ability to make sure the rider is wearing a helmet and is not riding drunk which has been proposed by the researchers in this research article.

V. Jayasree [2] elaborates on the concept of the increasing death rate that has been noticed in the construction workers. The hazardous environment of a construction site has been one of the most deadly environments for the workers. There are various safety precautions that are being undertaken to ensure the safety of the workers on the construction site. But there have been incidences due to the workers being forgetful about the safety equipment that has led to accidents. Therefore, a smart helmet has been envisioned which utilizes the Internet of Things platform to achieve the goals of monitoring the condition of the worker physically such as fall detection and distraction.

Jesudoss A. [3] discusses the large scale loss of life that occurs every day across the world. This has been one of the most problematic occurrences that have been happening due to negligence of the users and distraction due to tedious work which can be highly dangerous. The increasing accidents, especially the ones that ride a bike are extremely common and have also been extremely fatal. The authors therefore proposed an internet of things approach which utilizes an infrared sensor, load sensor, gas sensor and MEMS. These sensors are dedicated for a smart and safe riding experience that is necessary for the survival of the rider in case of an accident or any mishap. It also as the ability to perform alcohol level detection which will reduce the instance of driving in the inebriated condition.

Nataraja N [4] introduces the reader to the safety hazards that are experienced by a two wheeler rider on the streets. It is a fun activity to ride a bike but it is generally overlooked as it is extremely dangerous and carry a lot of risk. The reason why people are still using bikes is due to the fact that they are quite useful in traffic while being easy to park along with being cheap and easier in operation than a car. Therefore, a program was developed utilizing structured modelling and is capable of delivering the intended outcomes. With few adjustments, it can be incorporated as a Real life solution. Furthermore, the majority of the components, together with the microcontroller, may be built on a single chip, making the system streamlined and more economical.

Mahesh S Gour [5] narrates that annually, India experiences a large incidence of traffic fatalities. Accidents can occur for a variety of causes, including breaking the speed restriction, driving recklessly, driving while intoxicated, and so on. On the helmet, the planned system is established. Using the suggested technique, two-wheeler commuting will become more practical in any climate. The breath analyzer towards the base of the helmet detects the presence of alcohol. If the motorbike component fails to react, the bike will not ignite; in this situation, an override procedure using the passcode can be used to enable ignition to the bike. For the future research the authors have proposed to make the device and the sensors smaller and much less intrusive for implementation.

P. Pathak [6] asserts that a heart - rate monitor is much more competent in determining regardless of whether or not the cyclist is wearing a headgear. A heart - rate scanner, unlike a microswitch or an infrared photodetector, can be initiated by a fake signal. The solution is inexpensive yet efficient. A rider must wear personal protective equipment as a result of this. As a result, the number of people killed in automobile collisions decreases. Because the approach does not necessitate the user to link to a smartphone, it is simple to operate. OLED seems to be more portable and allows for larger texts to be shown. Accidents can be avoided by making the operator conscious of oncoming cars.

Shikha Gupta [7] explains that According to our nation's crash data, two-wheeler riders have a higher mortality rate. Because smart helmets are so effective at preventing fatalities, they have established a necessity. A smart helmet could indeed give necessary assistance, but it should also prevent the catastrophe from arising in the first instance. The suggested system's functionality can be expanded to include making contacts immediately to paramedics or healthcare facilities with professional support. The smart helmet can indeed be rendered cheap for lot of people with the right support from the state. Given the critical nature of the smart helmet, the government may be able to assist in establishing this sort of helmet obligatory.

Prashant Ahuja [8] narrates that this suggested system has the following characteristics: exceptional precision, economic efficiency, providing location of the incident within minutes, and the ability to summon a paramedic immediately at the moment of the collision with more reliability. This recommended approach is useful for accidents that happens in remote areas when there are no emergency services such as authorities, paramedics, or emergency responders. "Perceived threat confronts us with a greater countenance if we do not take correct course of action at the appropriate moment." When a victim is harmed, we should act quickly. We ought to realize how valuable people’s lives can be and how important first-aid is in preserving these valuable lives.

Syed Umaid Ahmed [9] discusses that depending on the requirements, the remedy might be a fantastic piece of technology. By going through numerous development phases, the structure may be enhanced even more and the reaction can be rendered appropriate. Motorcyclists and mining employees can be distributed to multiple duties that benefit both the employee and the supervising agency. The usage of such designs might aid in the reduction of significant risk factors. These apps might also be useful for management and security purposes. Depending on the requirement, the prototype and varied outcomes may be enhanced by adding alternative controllers and detectors.

Muneshwara M S [10] elaborates that to make this apparatus strong, researchers used sophisticated sensors,

methods, and electromagnetic radiation wireless networking. This essential smart technology is concerned with the effective inspection of helmet use and riding while intoxicated of alcoholic. By adopting this smart technology, researchers can protect a rider's existence by requiring them to wear protective gear and prevent the chance of a driver drunk driving of alcohol, making the voyage extremely safe. This system is composed of both software and hardware. The outputs of the sensors will be evaluated on the android smartphone.

Manish Uniyal [11] introduces this technology that would aid in the implementation of the government's helmet-wearing policy and will reduce the number of accidents. As well as legal custodians who are concerned regarding their kid's or wives driving velocity, they can observe the speed of the vehicle it's about whether or not their kid is wearing a helmet. In the upcoming years, this application might be implemented at a controlling traffic department or any other organization that can monitor all of the motorist's data, as well as if any incident happens with anybody, the emergency services or medical assistance could be provided at the appropriate moment. This allows a victim's identity to be preserved and necessary care to be provided.

Rajesh Kumar Sharma [12] expresses that the suggested helmet concept provides a low-cost option for intoxication identification and mishap prevention. This low-cost effort can be exhibited in conjunction with ignition and other protective measures. Furthermore, all of the units may be manufactured on a single Integrated circuit, rendering the suggested system extremely condensed in form. Once this is completed, it may be converted into a portable production level. This experimental component can be used in real world scenarios such as automobiles and bikes.

Arif Rahman [13] states that depending on the outcomes of the assessment of fuel early warning sign evaluation with the fuzzy logic technique using a micro - controller, notably fuel buffers attached to the micro - controller, fuel channels linked to the micro - controller seem to be possible to forecast the current that passes in the buoy to measure the quantity. Furthermore, the effectiveness of the fuzzy inference system method may be used to identify the present limitations. The gadget on the helmet can emit an alert message based on the level of fuel in the tank. Instruments on the engine can transmit orders to the helmet that cause it to emit noise. The objective for the next task is to make the gadget located on the helmet relatively lightweight. Because the present method does not take aerodynamics and visual appeal into account.

Lokeshwaran M [14] explains that the goal of this initiative is to require a two-wheel motorist to wear a helmet and call an assistance hotline in the event of a disaster. The headgear is built with the rider's comfort and safety in consideration. The technology is housed in a small space inside the helmet. The system is proposed in order to save costs and make it accessible to a larger population. The headgear makes use of contemporary technologies such as IoT and smartphones to minimize overall costs while boosting effectiveness of the construction.

Sayan Tapadar [15] present an analytical approach for optimizing collision identification using SVM While evaluating the collision recognition, researchers discovered that the alert was frequently activated often, which could be difficult for motorcyclists to react to it while operating the motorcycle. As demonstrated repeatedly, if the alert sounds and the motorcyclist presses the button, the gadget disregards the observation and does nothing. If the trigger is not pressed, the gadget thinks it is a genuine mishap and respond appropriately.

III. CONCLUSION AND FUTURESCOPE

This survey article has been utilized to effectively evaluate the previous researches for the realization of smart helmet for riders to determine the current scenarios in this field. Bike riding is less expensive to operate, more versatile in congestion, and simpler to park. Meanwhile, data show that the number of individuals traveling on two wheels is increasing at an accelerated pace. Every year, there are a massive proportion of traffic fatalities in India. Collisions can occur for a variety of causes, including driving while intoxicated, driving recklessly, breaking the speed limit, and so on. Quite often the individual who is harmed is not at fault for the mishap. It could be the fault of another vehicle's operator. However, both riders will be impacted. Therefore, an effective mechanism has been formulated through this survey for a smart helmet using Internet of Things platform which will be discussed in detail in the upcoming research editions.

REFERENCES

[1.] D. N., A. P. and R. E.R., "Analysis of Smart helmets and Designing an IoT based smart helmet: A cost effective solution for Riders," 2019 1st International Conference on Innovations in Information and Communication Technology (ICIICT), 2019, pp. 1-4, doi: 10.1109/ICIICT1.2019.8741415.

[2.] V. Jayasree and M. N. Kumari, "IOT Based Smart Helmet for Construction Workers," 2020 7th International Conference on Smart Structures and Systems (ICSSS), 2020, pp. 1-5, doi: 10.1109/ICSSS49621.2020.9202138.

[3.] A. Jesudoss, R. Vybhavi and B. Anusha, "Design of Smart Helmet for Accident Avoidance," 2019 International Conference on Communication and Signal Processing (ICCSP), 2019, pp. 0774-0778, doi: 10.1109/ICCSP.2019.8698000.

[4.] N. Nataraja, K. S. Mamatha, Keshavamurthy and Shivashankar, "SMART HELMET," 2018 3rd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT), 2018, pp. 2338-2341, doi: 10.1109/RTEICT42901.2018.9012338.

[5.] M. S. Gour, D. K. S, P. Kumara, M. S, S. K. K and C. H, "Arduino based smart and intelligent helmet system for two-wheelers," 2020 IEEE International Conference on Distributed Computing, VLSI, Electrical Circuits and Robotics (DISCOVER), 2020, pp. 236-240, doi: 10.1109/DISCOVER50404.2020.9278032.

[6.] P. Pathak, "Smart Helmet with Motorbike unit for Accident and Rash Driving Detection," 2020 IEEE International Conference on Advances and Developments in Electrical and Electronics Engineering (ICADEE), 2020, pp. 1-6, doi: 10.1109/ICADEE51157.2020.9368914.
[7.] S. Gupta, K. Sharma, N. Salvekar and A. Gajra, "Implementation of Alcohol and Collision Sensors in a Smart Helmet," 2019 International Conference on Nascent Technologies in Engineering (ICNTE), 2019, pp. 1-5, doi: 10.1109/ICNTE44896.2019.8945979.
[8.] P. Ahuja and K. Bhavsar, "Microcontroller Based Smart Helmet Using GSM & GPRS," 2018 2nd International Conference on Trends in Electronics and Informatics (ICOEI), 2018, pp. 1-9, doi: 10.1109/ICOEI.2018.8553802.
[9.] S. U. Ahmed, R. Uddin and M. Affan, "Intelligent Gadget for Accident Prevention: Smart Helmet," 2020 International Conference on Computing and Information Technology (ICCIT-1441), 2020, pp. 1-4, doi: 10.1109/ICCIT-144147971.2020.9213742.
[10.] M. M S, A. R, S. T, S. M S and C. A. S, "Advanced Wireless techniques to avoid accidents on roads through wearing Smart helmet," 2021 5th International Conference on Intelligent Computing and Control Systems (ICICCS), 2021, pp. 258-264, doi: 10.1109/ICICCS51141.2021.9432193.
[11.] M. Uniyal, H. Rawat, M. Srivastava and V. K. Srivastava, "IOT based Smart Helmet System with Data Log System," 2018 International Conference on Advances in Computing, Communication Control and Networking (ICACCCN), 2018, pp. 28-31, doi: 10.1109/ICACCCN.2018.8748790.
[12.] R. K. Sharma, G. Kumar and B. J. S, "Smart Helmet Prototype For Safety Riding And Alcohol Detection," 2020 IEEE Bangalore Humanitarian Technology Conference (B-HTC), 2020, pp. 1-5, doi: 10.1109/B-HTC50970.2020.9297983.
[13.] A. Rahman, M. Abdurohman and A. G. Putrada, "Indicator Warning Refined Fuel Oil in A Motorcycle With Fuzzy Logic and Sound Navigaiotn Through Smart Helmet," 2019 International Symposium on Electronics and Smart Devices (ISESD), 2019, pp. 1-5, doi: 10.1109/ISESD.2019.8909616.
[14.] M. Lokeshwaran, S. P. Nikhit Mathew and A. Joshuva, "Raphael—The Smart Helmet," 2020 International Conference on Wireless Communications Signal Processing and Networking (WiSPNET), 2020, pp. 48-51, doi: 10.1109/WiSPNET48689.2020.9198463.
[15.] S. Tapadar, S. Ray, H. N. Saha, A. K. Saha and R. Karlose, "Accident and alcohol detection in bluetooth enabled smart helmets for motorbikes," 2018 IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC), 2018, pp. 584-590, doi: 10.1109/CCWC.2018.8301639.