International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 05 | May - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

SMART AR HELMET WITH LIVE MAP NAVIGATION SYSTEM

Authors: [1] Dr. N.Kannan, Principal The Oxford College of Engineering

[2] M Nandashri, [3] Kushal Kumar S, [4] Meghana J, [5] Dilip Kumar B
Students, , ISE Dept, The Oxford College of Engineering, Bengaluru

---

Abstract - AR smart helmet with map display is a unique concept that makes motorcyclists safer than ever. The main purpose of this AR smart helmet is to provide safety to the user. This is achieved using basic components such as TFT display, main electronic board (ESP8266), sensor (DHT Module), phone and battery. The consequences of a motorcycle rider without a helmet being involved in a high-speed accident can result in injury or death. In this article, a detailed and comparative study is conducted on the AR smart helmet and map navigation system.

***Key Words*: Navigation, TFT display, main electronic board (ESP8266), sensor (DHT Module), Great visibility, AR-Technology.**

1. INTRODUCTION

On the busy roads of India, a helmet is not just a safety feature but also a welcome companion at every wheel. This instruction is supported by Section 129 of the Motor Vehicles Act of 1988, which requires the use of standard safety covers prescribed by the Bureau of Indian Affairs (BIS). Driving under the influence of alcohol is a serious offense under the Motor Vehicles Act 1939, which ensures that offenders face serious consequences.

The strength of our Project stems from many powerful factors. First, find the right tools. Traditional maps require frequent stops, and traditional guides can distract the driver, compromising safety during transportation. Like all passengers, drivers need access to their travel cards. However, if there is no barrier between the rider and the environment, relying on on-screen GPS devices, cell phones, or not using paper maps compromises safety. The helmet that serves as a motorcycle shield also serves as a navigation aid. The Live Map helmet increases safety and comfort by integrating landmarks into the player's field of view.

Secondly, our goal is to make GPS more useful for drivers through innovative design. Using the GPS screen while driving is not safe or practical as it distracts the driver from the road. Live Map uses a "head-up" display that displays important information on pilots' helmets. Live Map plans to make a motorcycle helmet that displays navigation information in the area it's looking at. These helmets will use the power of the Android operating system, voice control and NAVTEQ map mapping to deliver the best experience.

OBJECTIVE OF PROJECT

- Augmented Reality (AR) for simple and user-friendly navigation:
  The main purpose of this project is to develop the motorcycle using augmented reality. By hiding digital information in the field of view, the helmet provides real-time guidance without the driver having to take their eyes off the road. An intuitive navigation system ensures safety and convenience.

- Motion Sensors (G sensor, gyroscope, digital compass):
  These tools check the titles and change the displayed image. As the driver looks around, AR data adjusts according to direction, providing an immersive experience.

- Minimalistic Interface:
  Instead of the standard Android interface, the helmet gets a smaller interface. A simple design prioritizes important information, minimizes distractions and provides a clear view.

- Volume control with microphone:
  The helmet has a built-in microphone for hands-free navigation. Drivers can provide voice for navigation, change settings or make free calls.

- Integrated Earphones:
  The helmet also features a built-in headset that allows users to receive audio, navigation and notifications from their helmet. This reduces the amplification of external noise and improves the overall experience.

- Light Sensor for Adaptive Brightness: The's LED flash automatically adjusts AR brightness according to outdoor conditions. Whether day or night, a helmet keeps you looking good without the rider having to worry.

Fig 1: Smart helmet Design

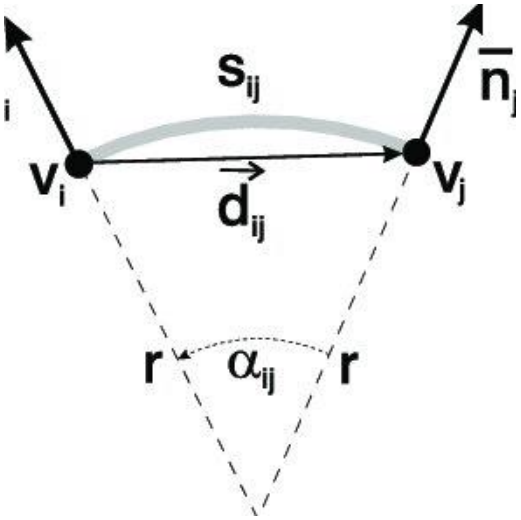

Fig 2.1.2: Visor working image

2. SYSTEM DEVELOPMENT

2.1 MOUNTED DISPLAY (TFT-DISPLAY)

The mounted display, often referred to as the TFT display, serves as the primary interface between the rider and the AR smart helmet system. This component plays a crucial role in presenting navigation information, environmental data, and other relevant details to the rider in a clear and accessible manner.

The TFT display is strategically positioned within the helmet's visor or integrated into the helmet itself, ensuring optimal visibility without obstructing the rider's view of the road. Its high-resolution screen provides crisp, vibrant visuals, allowing riders to easily interpret navigation instructions and other information at a glance.

Fig 2.1.1: Mounted Display

One of the key features of the TFT display is its versatility and adaptability. It can dynamically adjust its brightness and contrast levels based on ambient lighting conditions, ensuring optimal visibility both during daytime and nighttime riding. Additionally, the display is designed to minimize glare and reflections, further enhancing readability in various lighting environments.

The TFT display interfaces seamlessly with other components of the helmet system, such as the GPS module and motion sensors, to provide real-time navigation guidance and environmental data. Through intuitive touch controls or voice commands, riders can interact with the display to access navigation menus, adjust settings, and perform other tasks without distracting from their primary focus on the road.

Overall, the mounted TFT display represents a crucial element of the AR smart helmet system, offering riders a convenient and user-friendly interface for accessing vital information and enhancing their overall riding experience.

2.2 DHT Module Sensor

The DHT module sensor serves as the environmental monitoring component of the AR smart helmet system, providing real-time data on temperature and humidity levels to the rider. This information is essential for ensuring rider comfort, safety, and awareness of changing weather conditions during their journey.

Mounted discreetly within the helmet, the DHT module sensor continuously monitors ambient temperature and

Fig 2.2.1: Sun days Display

Fig 2.2.2: Dark Night Display

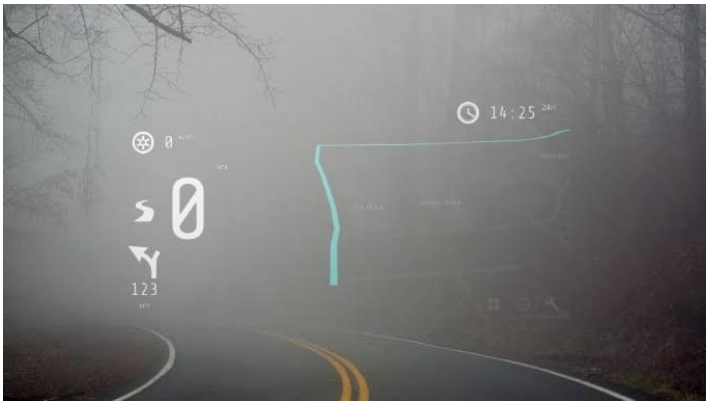

Fig 2.2.3: Bad Weather Display

humidity levels in the rider's vicinity. By accurately capturing this data, the sensor enables the helmet system to provide relevant alerts and recommendations to the rider, such as advising on the need for additional protective gear in extreme weather conditions or suggesting rest stops to prevent overheating.

In summary, the DHT module sensor plays a vital role in enhancing rider safety and comfort by providing real-time environmental data and actionable insights within the AR smart helmet system.

USER INTERFACE

The user interface (UI) of the AR smart helmet system serves as the gateway through which riders interact with the various features and functionalities of the helmet. Designed with simplicity, intuitiveness, and safety in mind, the UI provides riders with easy access to navigation tools, environmental data, communication options, and other essential functions.

Fig 2.3.1: User View

Fig 2.3.2: Map View Display 1

The UI is presented on the mounted TFT display, offering riders a visually engaging and user-friendly interface that is easily navigable even while in motion. The layout and design of the UI prioritize clarity and readability, ensuring that riders can quickly access the information they need without distraction or confusion.

Fig 2.3.3: Map View Display 2

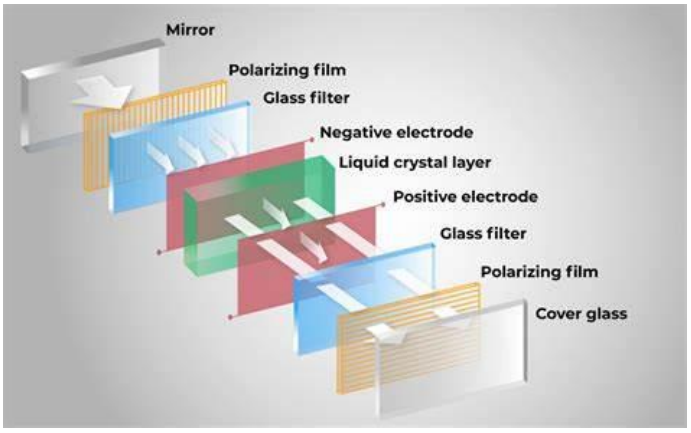

Fig 2: Image-generation for augmented reality display.

Overall, the user interface of the AR smart helmet system serves as a central hub for accessing essential information and features, empowering riders with the tools they need to navigate safely and comfortably on the road.

ARGUMENTED REALITY INTERFACE

The augmented reality (AR) interface of the smart helmet system represents the pinnacle of innovation, combining advanced technology with real-world navigation to enhance the rider's situational awareness and safety.

3. AR-TECHNOLOGY

- TFT Display
- head-mounted display
- hand-held display
- spatial optical see-through display

Expanding on these concepts, the subsequent phase involves discussing virtual reality, which can display actual and augmented realities either locally or at a distance, enhancing the experience of augmented reality for individuals and organizations.

Proximity dimension*:*

- **Proximal**: Devices that enhance the visual field, such as those that combine retina and head-mounted displays, can be categorized as augmented visual field devices (AVFDs).
- **Hand-held**: This category includes portable devices like smartphones or tablets.
- **Distal**: This refers to independent display units, such as monitors or projection screens.
-

Viewpoint:

- **first degree (first person?)**: This pertains to a first-person perspective.
- **second degree (bystander?)**: This involves being in the same location as the viewer and having the ability to display them within the visual scene.
- **Third degree (third party? remote?)**: This is about depicting a visual scene that is situated remotely.

4. CONCLUSION

The article explores the concept of the Live-map navigation helmet, a "smart helmet" that serves as an efficient navigational aid, rendering the traditional practice of manual map navigation obsolete. The frequent need to halt and verify one's current path can be both time-consuming and frustrating. The dedicated team behind the Live-map helmets has developed intelligent helmets that incorporate navigation systems. These systems project images onto the helmet's visor and employ headphones and voice commands to enable hands-free operation, along with a host of additional features.

ACKNOWLEDGEMENT

The acknowledgment serves as a modest expression of my appreciation to everyone who has supported us throughout the process of preparing this paper. I am profoundly grateful and wish to convey my deep satisfaction and appreciation to my guide and mentor, Dr. N Kannan and Prof. Bairavi, for her unwavering support and invaluable motivation.

REFERENCES

[1] National Crime Records Bureau. Accidental deaths and suicides in India. New Delhi: Ministry of Home Affairs, Government of India; 2005

[2] Bertel King, Jr.(Jun 19, 2013)LiveMap Is An Android-Powered Motorcycle Helmet With HUD, 4G LTE, GPS, And An Indiegogo Campaign

[3] Hardware Battlefield Jan(7-10,2014)| Las Vegas Convention Center Livemap Demonstrates A Motorcycle Helmet Concept With Built-In Navigation Posted Jan 7, 2014 by Anthony Ha (@anthonyha)

[4] By Kevin Cameron July 11, 2013 LiveMap Motorcycle Helmet: Focus On The Road (Video)

[5] Mr. A.A Cameron Visor projected helmet mounted displays technology and applications https://doi.org/10.1016/S0141-9331(98)00105-7

[6] Mr.David Krevor,Gregg McNelly, John Skubon, Robert Speirs Kaiser Electronics, a Rockwell Collins Co.; 2701 Orchard Prkwy, San Jose CA 95134;MXL Industries; 1764 Rohrerstown Road, Lancaster, PA 17602;Plastics & Rubber Department; Ferris State University, Big Rapids, MI 49307 Development and Manufacture of Visor for Helmet Mounted Display

[7] Dylan MCGrath Ambient light sensors adjust LCD brightness to save battery power EE Times 12/26/2006

[8] Andrew Artishchev Moscow, Russian Federation LiveMap: Motorbike helmet with navigation Unique hi-tech motorbike helmet with built-in navigation system and voice controlled interface.

[9] Peter L. Marasco Development and manufacture of visor for helmet-mounted display Proceedings of SPIE - The International Society for Optical Engineering 5180 · January 2004 DOI: 10.1117/12.506435

[10] The BAD ASS Helmets Store Posted on 01/30/2015 by Karl

[11] Augmented reality interface is brought to your helmet Autoblog Staff Feb 21st 2018 at 9:22PM

[12] Bimber, Oliver, and Ramesh Raskar, "Modern approaches to augmented reality", *ACM SIGGRAPH 2006 Courses*, p. 1. ACM, 2006

[13] Van Krevelen, D. W. F., & Poelman, R. (2010). A survey of augmented reality technologies, applications and limitations. *International Journal of Virtual Reality*, *9*(2), 1,

[14] Tony Hirst, 16th March, 2009.Digital Worlds – Distorted Reality Published March 26, 2010