



IoT-Enabled Smart Helmet for Smooth and Safe Journey

Client Background

Our client is a global industry leader based in Florida, with branch offices in China, Israel, and India. They specialize in component design and the manufacturing of LED lighting, ceiling fans, and electrical goods. In their remarkable journey of three-decades, they have evolved from being a component manufacturer focused on the lighting industry into a global network that customizes products and logistics solutions for OEM customers worldwide. Today, they stand as the preferred supplier to four of the world's five largest lighting manufacturers, prominent OEMs, big-box retailers, as well as online B2B and B2C platforms.

Business Requirements

Our client envisioned a Smart Helmet to provide a connected and secure riding experience for bikers. However, creating a smart helmet is a multidisciplinary effort that involves skills in electronics, software development, design, safety, and manufacturing. Therefore, the client wanted to have a Proof of Concept first to determine whether the product development is viable on a large scale or not.

For the PoC development, the client had initial requirements as follows:

- Hardware development
- Product design
- A Head-up-Display unit featuring an OLED screen for information display
- The integration of rechargeable battery-operated electronics

Additionally, the client sought to complement the Smart Helmet hardware with a mobile application for controlling the helmet's features.

Solution

Softude was selected as a preferred development partner for the project due to our extensive experience in IoT product development. We initiated with concept understanding and the specific requirements for the Smart Helmet's Internet of Things (IoT) functionality. Our IoT experts conducted a thorough research to ensure all the hardware, software, and connectivity requirements are met. Then, we developed a PoC that has three major parts- Hardware, Software, and Mobile Application.

Product Overview

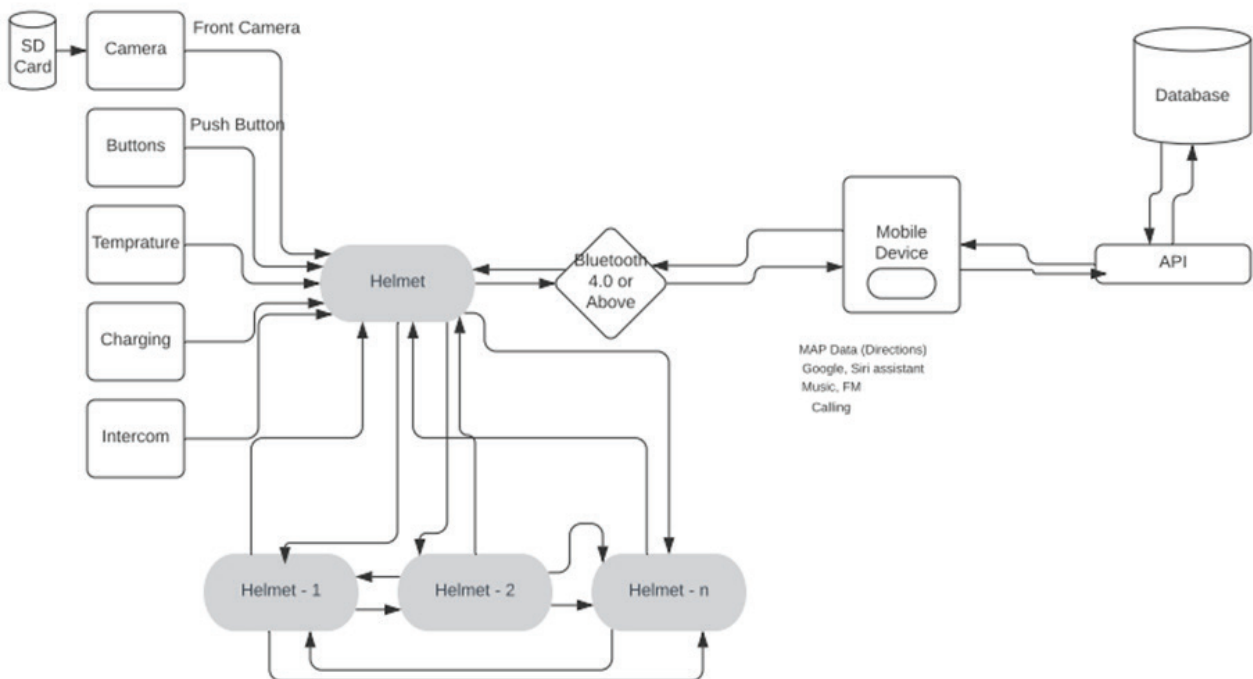
The smart helmet is a protective head-gear for bikers with advanced features such as hands-free calling, a heads-up display for navigation and critical information, and built-in sensors for monitoring the speed, and stability of the riders. It also captures photos and videos of the surrounding and has SOS and emergency response capabilities to ensure the safety of bikers.



Product Development

From hardware development to the mobile application, Softude's IoT team covered all the aspects of Smart Helmet PoC.

1. Hardware Integration



An Esp32 Controller

The main hardware component with a microcontroller and Wi-Fi/Bluetooth module. ESP32 Controller is commonly employed in a variety of IoT (Internet of Things) and embedded systems applications. To establish the device communication with mobile applications and other devices like speedometers, we used the Esp32 I2C communication protocol .

A Built-In HUD Display

An OLED screen with a high-quality vision to display critical information directly in the rider's line of sight including navigation directions, speed, fuel level, and more without disturbing the rider's field of view.

Built-in Cameras

Front and rear micro cameras for recording photos and videos during the rides. It is useful in case of accidents and emergencies.

Headphone and MIC

A built-in headphone and mic with Bluetooth v5.0 to make hands-free calls, listen to music, and communicate with other riders in a group.

2. Embedded Software Development

Softude's IoT team was responsible for developing the embedded software to control the IoT components within the Smart Helmet. They designed and implemented the firmware to ensure that accurate data is captured and stored on a cloud-based platform.

3. Smart Helmet Application Development

Apart from hardware development, we also developed a mobile application for enhancing the overall functionality and user experience of the Smart helmet. It connects the riders with a smart helmet allowing them to control all the components from a single device. They can also access and manage various features and settings of the helmet such as navigation and communication. To use the application, users have to initially pair the helmet.

Application Features

- Face and touch ID for login and security
- Helmet control and customization
- Helmet purchasing option for new users
- Google Map integration for step-by-step navigation and route planning with the option to save the best route
- Helmet pairing with other riders for intercommunication
- Push button for calls, notifications, music, and other audio files
- Group creation with other riders for ride planning and communication
- GPS for location and journey tracking
- Notification for rides-in-progress
- The detailed history of the journey including distance traveled, time and date, etc
- Emergency settings with the option to add up to 3 emergency contacts and set the duration to send notifications before the incident
- Gallery of photos and videos recorded during the journey
- How-to videos for helmet pairing and FAQs to learn about the application

Smart Helmet Admin Panel

The admin panel ensures the smooth operation, security, and management of the application and the associated smart helmet ecosystem. Here are a few activities that the admin can perform from the backend:

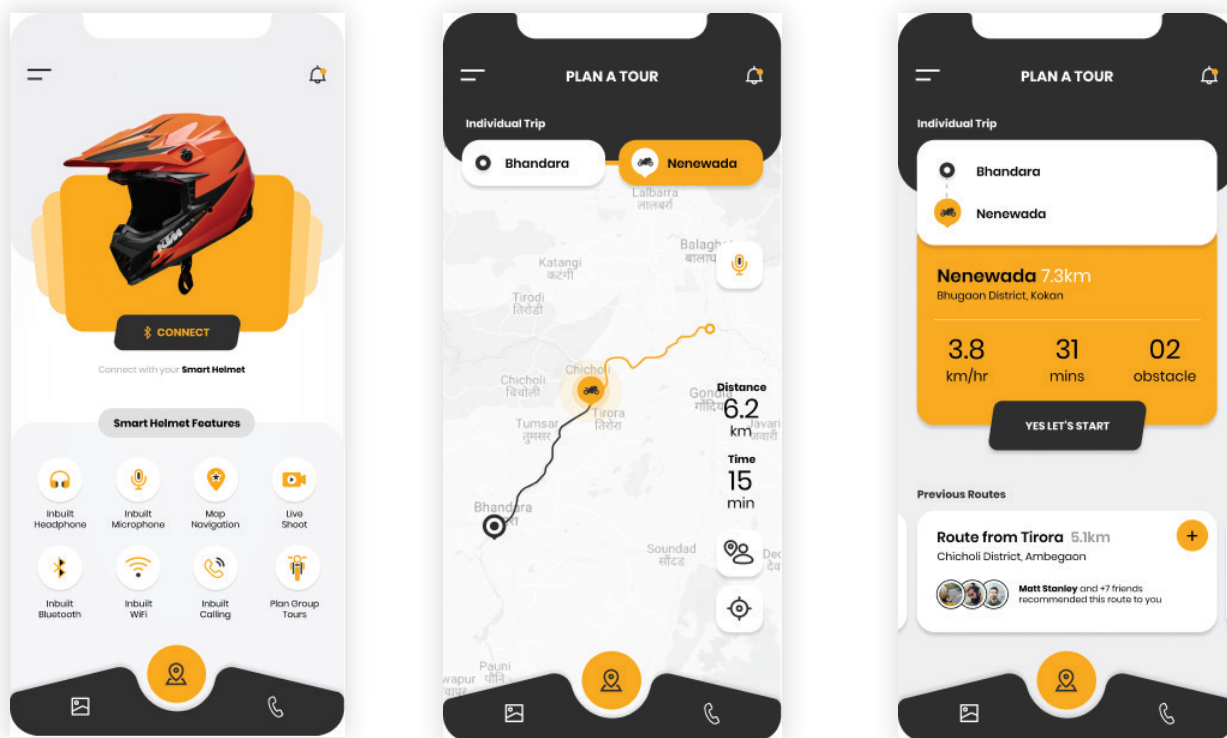
- Manage users and has the authority to approve or reject their access to certain features based on a subscription model
- View insights on the number of active helmets, riders, the total number of revenues generated, etc.
- Manage billing and subscription
- Manage groups and calls for billing
- Initiate or schedule firmware updates for optimal performance and security of the riders
- Coordinate with pre-set emergency contacts to ensure timely assistance in case of accidents
- Access riders' details such as ID, name, email address, phone numbers, emergency contacts
- Manage route navigations and app content such as screen text, terms, and conditions, etc.

Solution Impact

The successful development of PoC helped our client gauge the market interest and demand for their smart helmet product resulting in the following benefits:

- Established a presence in the market of smart helmets ahead of potential competitors
- Attracted potential partners and collaboration in related industries

Application Screenshots



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About Us

Incorporated in 2005, Softude is a global IT consulting and services company with expertise in architecting digital transformation solutions and providing software product engineering services. We are dedicated to creating innovative and interactive digital experiences that connect people to the brand. These software solutions that are used across 32+ countries are engaging audiences in-venue, on the web, and personal mobile devices. Our highly competent and trusted team delivers digital brilliance that accelerates our client's digital-first journey.

Softude is a CMMI Level 5 appraised, ISO 27001:2013, ISO 9000:2015, and a Great Place to Work For certified company.

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