E-Scooter - Digital Dashboard

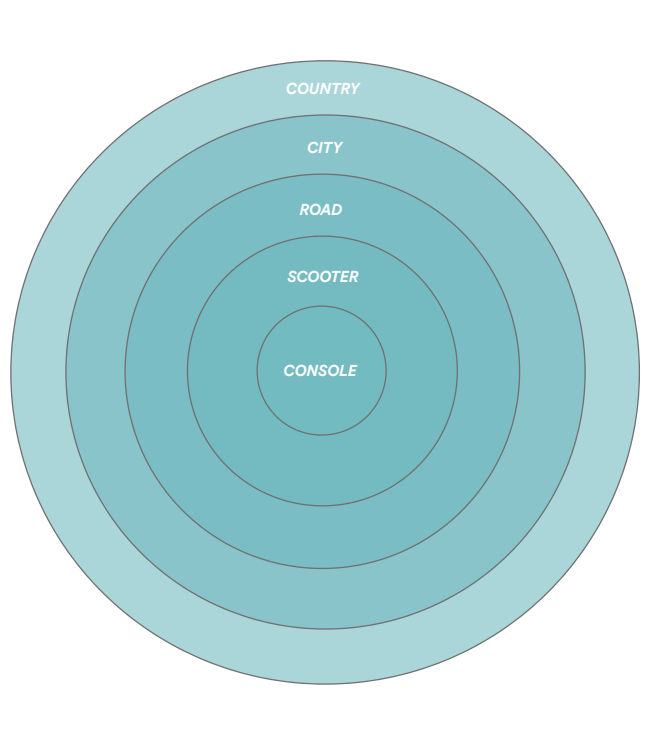
Brief

The Brief was to design a E-Scooter digital dashboard which enables its user to answer calls and listen to music while driving.

Approach Used

"Always design a thing by considering it in its next larger context - a chair in a room, a room in a house, a house in an environment, an environment in a city plan."

- Eliel Saarinen



Objective of Research

- To identify the purpose of use of mobile phones while driving.
- To understand human behaviour and perception when interacting with the phone.
- To understand extent of use of mobile phones while driving.
- To identify the impact on driving performance caused by mobile phone usage.
- Phycological aspect of using mobile when driving.
- Laws in India around using phone while driving.

PRIMARY RESEARCH

Usage Of Mobile During Driving

With this tech era of growing usage of mobile in India, the society desires to stay connected with other human all the time and suffer from the Fear of Missing Out.

RECEIVING AND MAKING CALLS

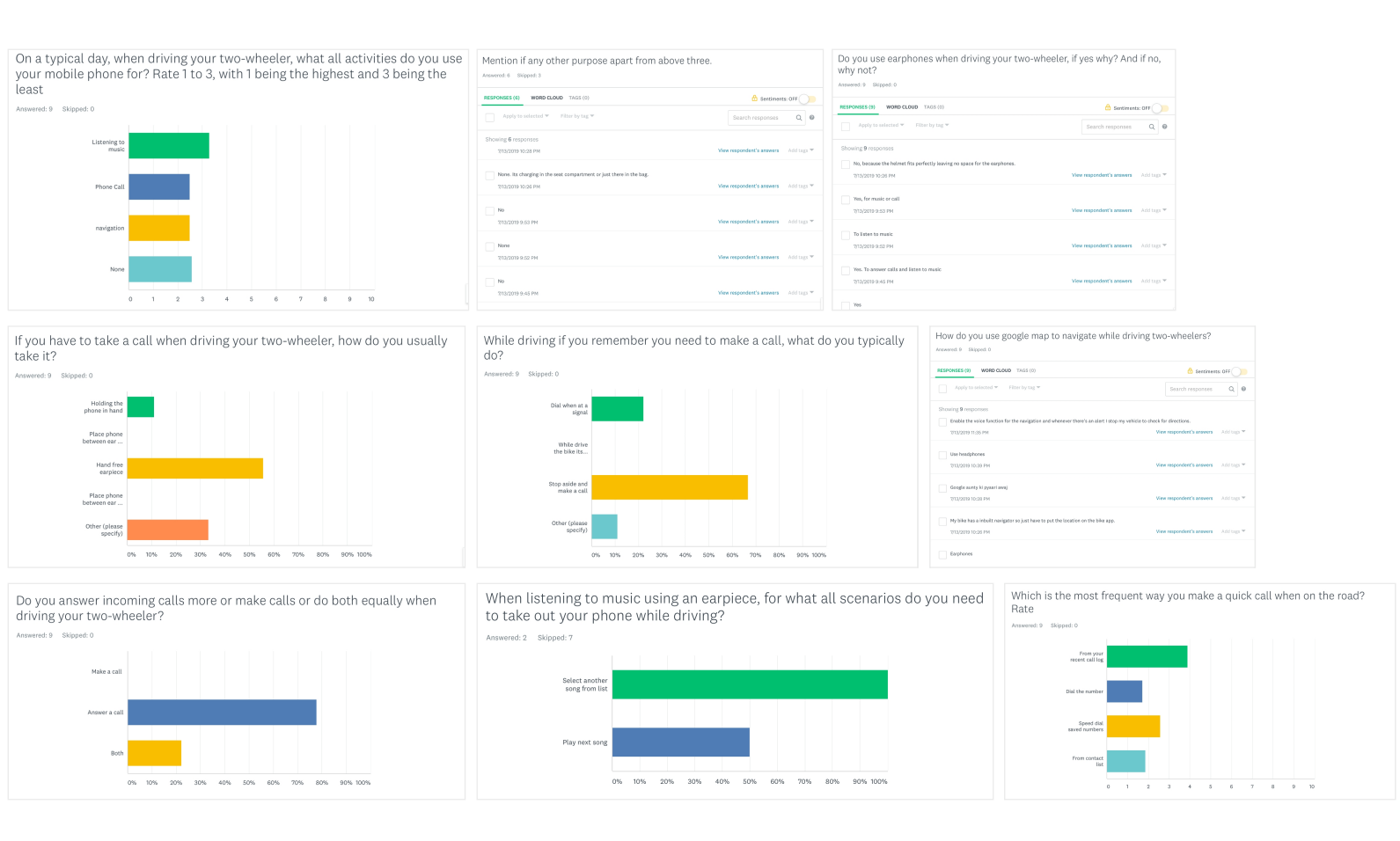
NAVIGATING

LISTENING TO MUSIC

MESSAGING/SOCIAL MEDIA

Survey

To understand the user behaviours and needs of the users, I did a quick survey using Survey Monkey.



On a typical day, when driving your two-wheeler, what all activities do you use your mobile phone for? Rate 1 to 3, with 1 being the highest and 3 being the least

Mention if any other purpose apart from above three.

Do you use earphones when driving your two-wheeler, if yes why? And if no, why not?

If you have to take a call when driving your two-wheeler, how do you usually take it?

While driving if you remember you need to make a call, what do you typically do?

How do you use google map to navigate while driving two-wheelers?

Do you answer incoming calls more or make calls or do both equally when driving your two-wheeler?

When listening to music using an earpiece, for what all scenarios do you need to take out your phone while driving?

Which is the most frequent way you make a quick call when on the road? Rate

Insights From Survey

1) Usage of phone while driving two wheeler is **majorly for Music followed by Calling and Navigation.**

2) Majority people use **handsfree earpiece to answer calls** when driving.

3) The number of people **Making a call while driving is quite less** compared to Answering a call.

4) While making a call most people **park vehicle aside then make a call.**

5) **60%** people **prefer not to listen to music while driving** as they think it's unsafe.

6) **Recent log is the most** used option to make a call while driving **followed by speed dial numbers**

7) While navigating most people said they **listen to the directions given my google maps** using a **handsfree earpiece.**

SECONDARY RESEARCH

According to a national Survey conducted by Save Life Foundation - Vodafone India

47%
PEOPLE ADMIT TO HAVE **RECEIVED CALLS** WHILE DRIVING

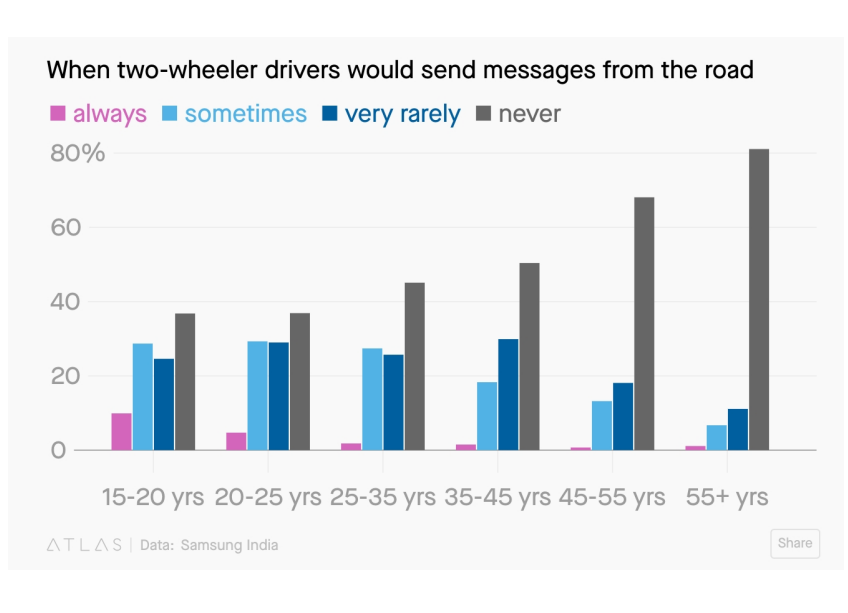
60%
PEOPLE **DO NOT STOP AT A SAFE LOCATION** BEFORE ANSWERING CALLS

41%
PEOPLE **USE PHONES FOR WORK-RELATED PURPOSES** WHILE DRIVING

20%
PEOPLE HAVE HAD A **NEAR-MISS OR A CRASH DUE TO USE OF MOBILE** PHONE WHILE DRIVING

94%
PEOPLE BELIEVE THAT **USE OF MOBILE PHONES WHILE DRIVING IS DANGEROUS**

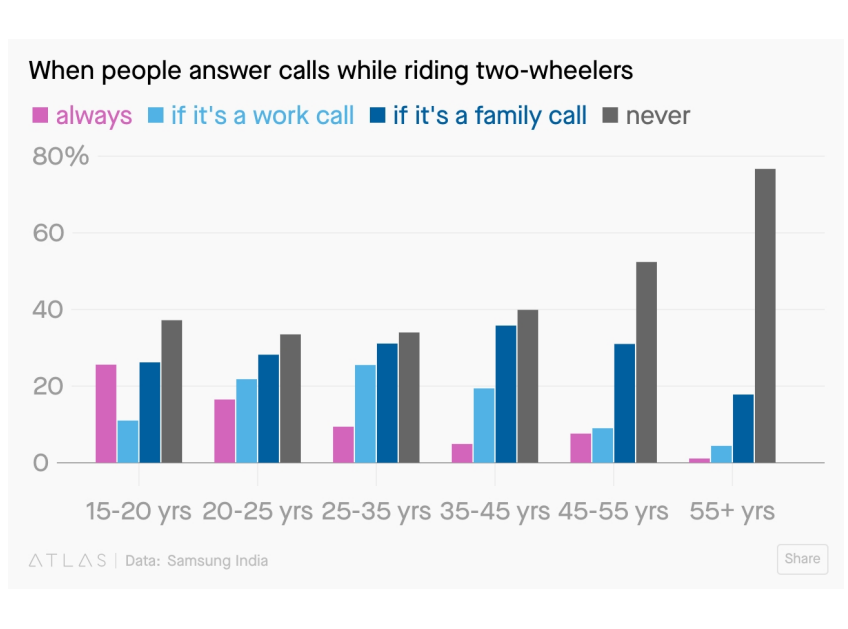
Samsung India conducted interviews with 1,341 respondents aged between 15 and 60 across 12 Indian cities on usage of mobile while driving. Below are their findings



Around 30% of Indians **under the age of 45** said that at **least sometimes while riding** a motorbike they would **send text messages**—via SMS, WhatsApp, Twitter, or Facebook—from their phones.

The oldest **age group (55+)** was the safest

80% of the respondents saying they'd **focus fully on the road.**



Respondents **aged between 18 and 20 and between 20 and 25,** were the least prudent, saying they'd **instinctively answer incoming calls while riding** two-wheelers.

The Death toll in India due to road crashes is the highest in Delhi and Jaipur, followed by Bengaluru, Kanpur and Chennai.

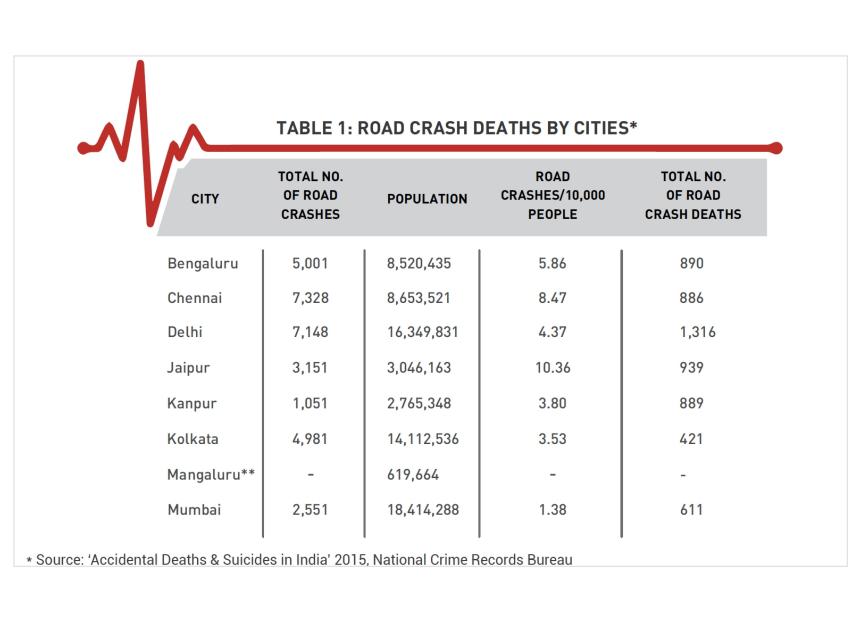


TABLE 1: ROAD CRASH DEATHS BY CITIES*

CITY	TOTAL NO. OF ROAD CRASHES	POPULATION	ROAD CRASHES/10,000 PEOPLE	TOTAL NO. OF ROAD CRASH DEATHS
Bengaluru	5,001	8,520,435	5.86	890
Chennai	7,328	8,653,521	8.47	886
Delhi	7,148	16,349,831	4.37	1,316
Jaipur	3,151	3,046,163	10.36	939
Kanpur	1,051	2,765,348	3.80	889
Kolkata	4,981	14,112,536	3.53	421
Mangaluru**	-	619,664	-	-
Mumbai	2,551	18,414,288	1.38	611

• Source: 'Accidental Deaths & Suicides in India' 2015, National Crime Records Bureau

Psychological Aspect Behind Mobile Usage

People use their smartphones while driving because it **difficult to resist the ping** of an incoming notification like a text message or an incoming call.

The current generation has grown to understand a digital world where relationships rely heavily on social media as well as texting. **An immediate response from the texts is expected always** or they feel obligated to text back right away.

Our society needs constant stimulation, that's why we have music even in elevators. With driving, there is **lack of stimulation, so people use cell phones.** In one of the studies **boredom emerged as the reason for sending texts/ Whatsapp/messages/Emails** while driving

Distracted Driving

According to the report by WHO, Distraction caused by mobile phones can impair driving performance in number of ways:

- **Visual Distraction** cause drivers to look away from the road.
- **Manual Distractions** require the drivers to take their hands of the steering/handlebars.
- **Auditory Distractions** mask those sounds that are crucial for the driver to hear.

> *This distraction caused by the use of electronic devices has been coined as "Inattentional blindness" by the researchers at the University of Maryland Medical Center in Baltimore.*

Laws In India Around Usage Of Phones

In India, **one out of four road accidents is caused** due to distractions caused **by mobile phones.**

The provisions of Section 184 of the Motor Vehicles Act, 1988 specifically **prohibits driving in a manner that is dangerous to public safety.** However, **earphones or Bluetooth devices weren't mentioned in the new rule so there lies a grey area** and the prosecution depends on the circumstances.

According to the Indian Police, talking on the phone while you're driving is a crime, **any form of cell phone use is forbidden.** The police say that although the legal system of India is technologically a little behind, but this practice of punishing those found using mobile phones, in any way, is justified because it is for the welfare of the public only. This practice is to bring the road accidents under control. This practice if followed in many states of India such as Maharashtra.

Are Earphones Safe To Use?

Some earphones have **noise cancelling technology**, meaning drivers are at risk of not hearing sounds vital to driving safely. When wearing earphones or headphones while driving **could intensify your sensory deprivation and cognitive distraction level**, potentially creating additional dangers on our roadways.

Wearing earbuds could also increase your **risk factor on the road if you are wearing them over or in both ears.** In Maharashtra, police have been seen confiscating earphones or fining heavily for using earphones while driving. Some countries allow wearing earphones only in one ear while driving.

Wearing earbuds or headphones and **listening to music while driving could intensify your sensory deprivation and cognitive distraction level**, potentially creating additional dangers on our roadways.

Market Study On Instrumental Clusters

Ather 450

The features on the 450 include
7-inch touchscreen instrument console,
bluetooth connectivity
over-the-air-software updates
reverse mode
USB phone charging.

TVS NTORQ 125

The Ntorq has a dedicated app through which the owner can connect their smartphone to the instrument cluster via Bluetooth. The display shows:
An incoming caller name
Received text messages
An auto-reply feature that can let the caller know when the scooter is on the move.
A navigation assist show turn-by-turn directions are also displayed.

GaadiWaadi.com

Hero Xtreme 200S

The Hero Xtreme 200S gets a fully digital LCD instrument cluster with Bluetooth connectivity. It offers
Turn-by-turn navigation system
Call alert once the rider pairs their smartphone with the Instrument cluster.
A gear position indicator
Service reminder tachometer
Speedometer
Two trip meters
Digital clock

KTM Duke 390

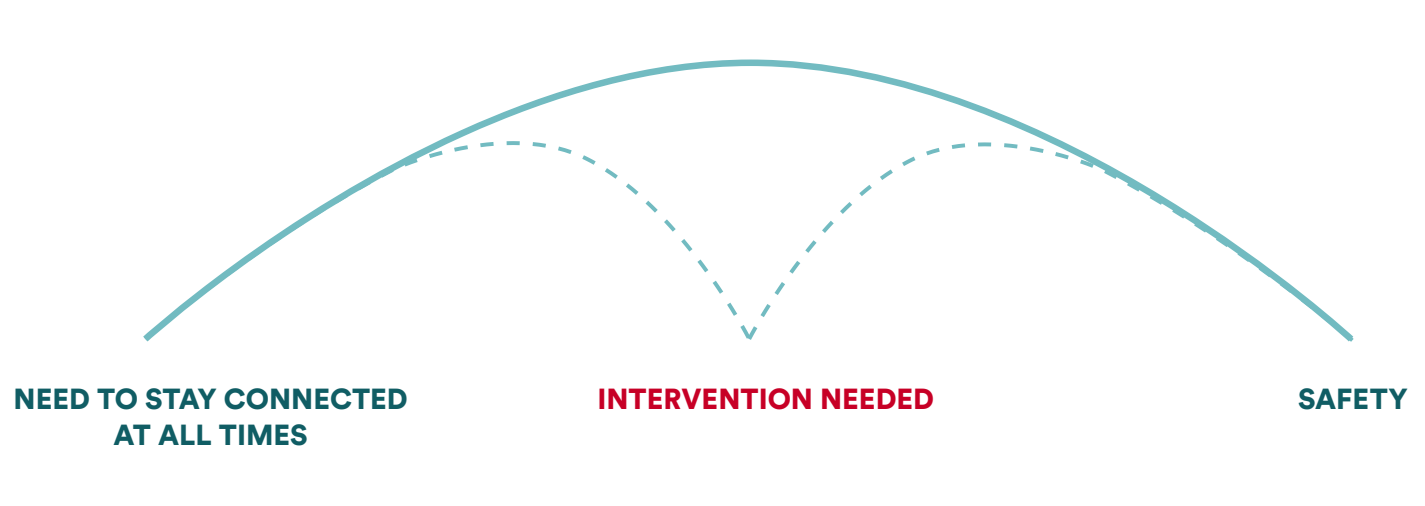
KTM was the first two-wheeler manufacturer who introduced a Smartphone connected instrument cluster in India in 2017. The rider can connect their smartphone via Bluetooth using KTM's My Ride app.
The rider can scroll through their music list and play or pause a track whenever they want.
Showcase the caller's name on the display so that they can actually decide whether they should accept or reject the call
Speedometer ,Tachometer, Odometer, Trip meter
Service reminder
Digital clock.

RESEARCH INSIGHTS

- The age group between 20 to 25 are seen to be more prudent when it comes to using phones while driving.
- People cannot resist impulse of needing to stay connected all the time and have a fear of missing out on things when not using mobiles.
- Just like people know smoking is injurious to health, so do they know that using phones while driving is dangerous, but they do it anyway.
- The main issue with using Headphones or ear plugs is that is cancels out the ambient noise that is important for the driver to hear.
- Mobiles usage cause a Visual and Manual distraction while driving which may lead to accidents.
- Listening to music while driving intensify drivers sensory deprivation and increases cognitive distortion. Also Indian police do not entertain listening to music while driving, as it breaks the law of public safety.

Gap That Needs To Be Bridged

Currently there is a gap where people find it hard resist the need to stay connected with the world outside while using mobile even while driving, compromising their safety.



Vision

To design a Console of an Electronic Scooter that allows user the flexibility to perform important activities calling and navigating while driving, but at the same time eliminating driver distraction.

Principles Used To Design

- Avoidance of harmful behaviour by using Persuasive design.
- Minimal or simple design to Minimise Distraction.

Design Criteria

To create a concept which makes it easier to perform interactions while driving with the least distraction possible or keeping the drivers glance time at the console minimal.

Along with all the basic functionalities the following functionalities to be covered:
1) Call Functionality : Making and receiving a calls
2) Navigation : To be able to start navigation and see/hear the navigation instructions
3) Messages : Listen to unread messages, send a message

Interactions

Divided the interactions into Basic and Complex interactions.

Basic Interactions include interactions:
- Answer and reject calls
- See/hear Navigation instructions

Complex interactions include interactions like
- Make a call from the log list/ speed dials/ contacts / dial number
- Search and start/end navigation

Concept

A Smart , Safe and driver friendly E-Scooter

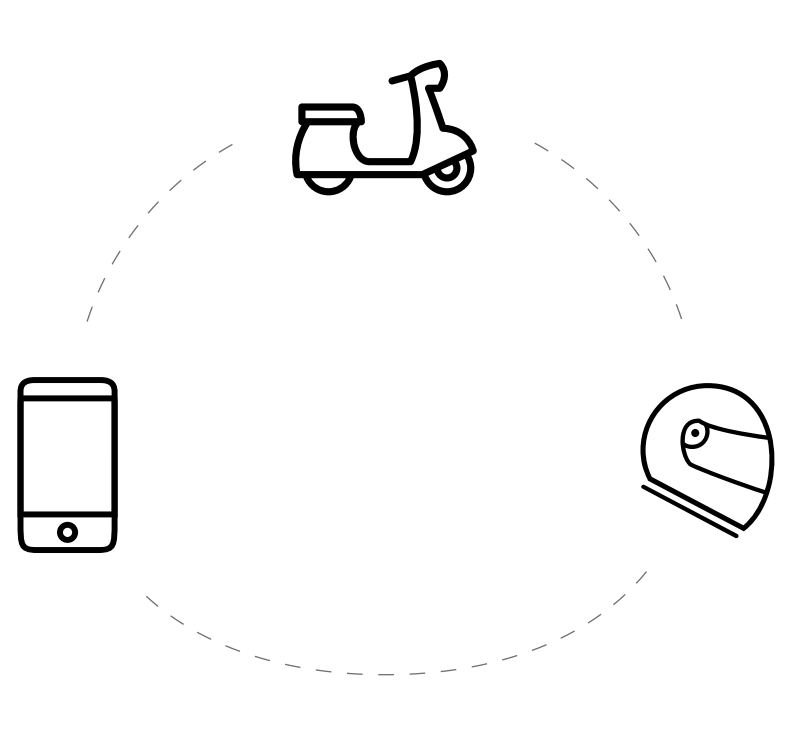
Connects to phone using Bluetooth

6.5" touch screen Display

Easy Controls at the handle bar

Helmet with Inbuilt Speakers & Microphone

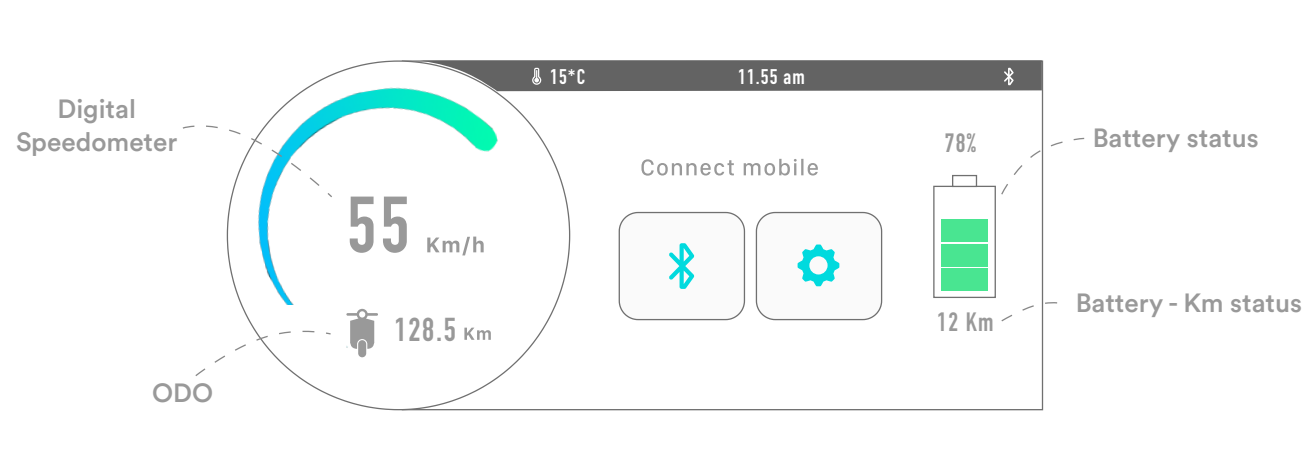
So the phone connects to the scooter using bluetooth which is connected to the helmet.



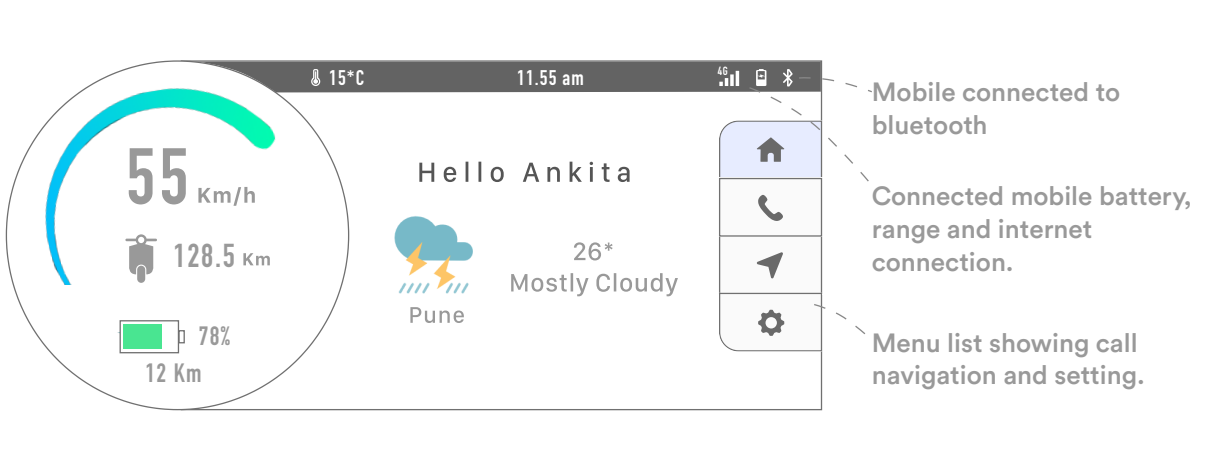
SCREENS

Before the bike starts moving

On the start of the switches on of scooter, user is asked to connect mobile using

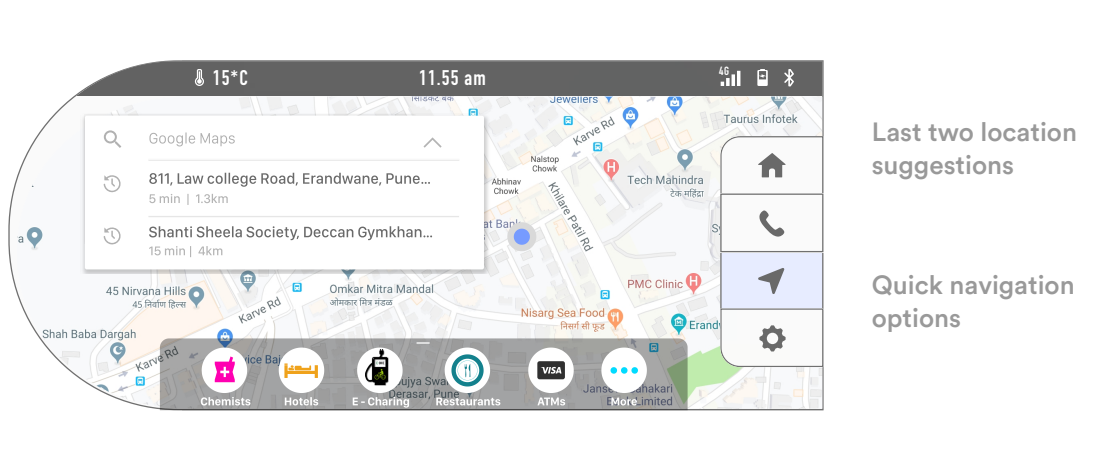


Once the mobile is connected using bluetooth, user gets a welcome message with the users bluetooth name and can see the weather updates based on the mobile detected city


15°C
11.55 am
55 Km/h
128.5 Km
78%
12 Km
Hello Ankita
Pune
26°
Mostly Cloudy
Mobile connected to bluetooth
Connected mobile battery, range and internet connection.
Menu list showing call navigation and setting.

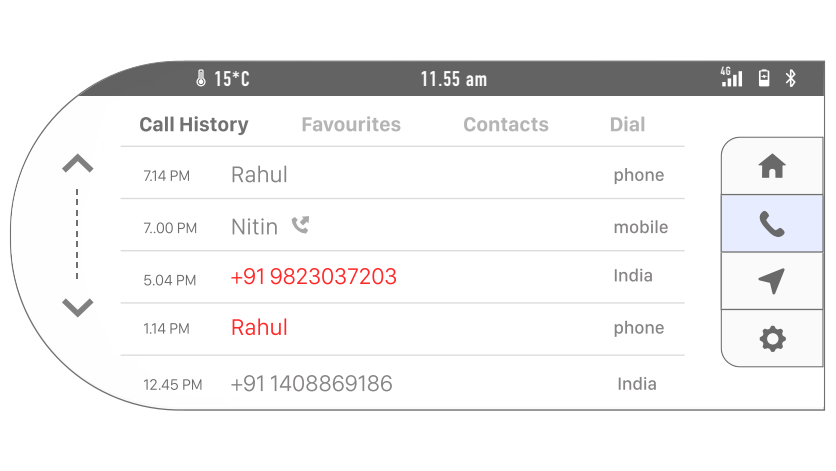
Navigation

User can search preferred location. A keypad will appear on the click of search


15°C
11.55 am
Google Maps
811, Law college Road, Erandwane, Pune...
Shanti Sheela Society, Deccan Gymkhan...
Chemists
Hotels
E - Charging
Restaurants
ATMs
More
Last two location suggestions
Quick navigation options

Calling

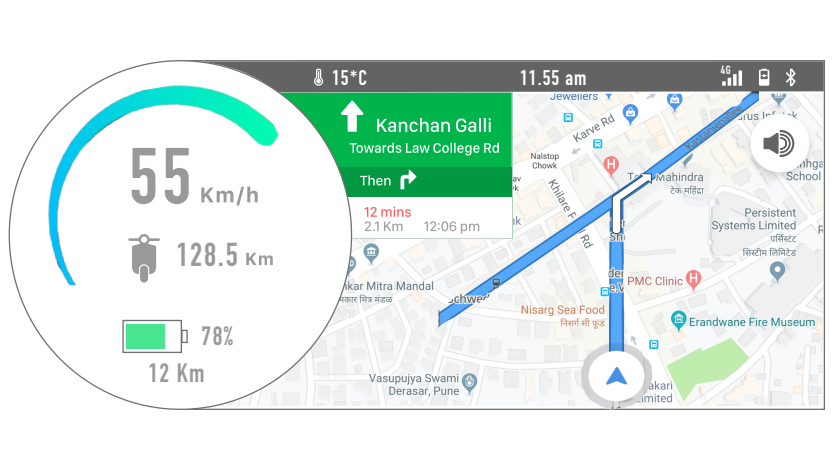
All the list of user call history, speed dial and contacts list will appear on this screen. User can also choose to dial a number



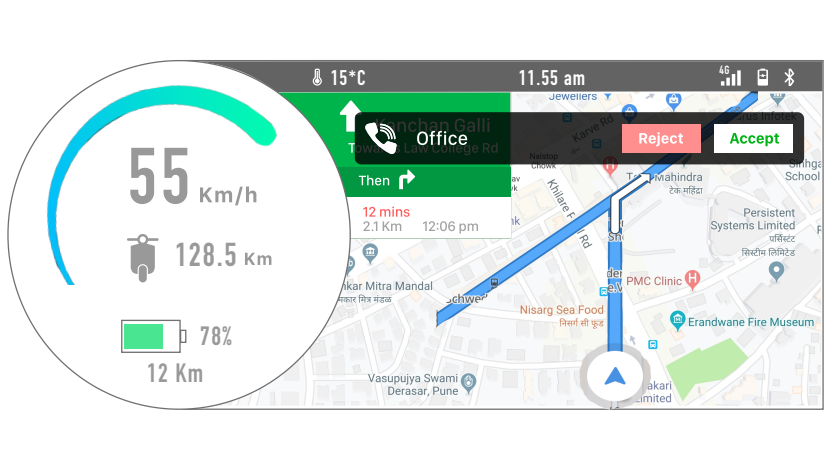
Call History	Favourites	Contacts	Dial
7.14 PM	Rahul		phone
7.00 PM	Nitin		mobile
5.04 PM	+91 9823037203		India
1.14 PM	Rahul		phone
12.45 PM	+91 1408869186		India

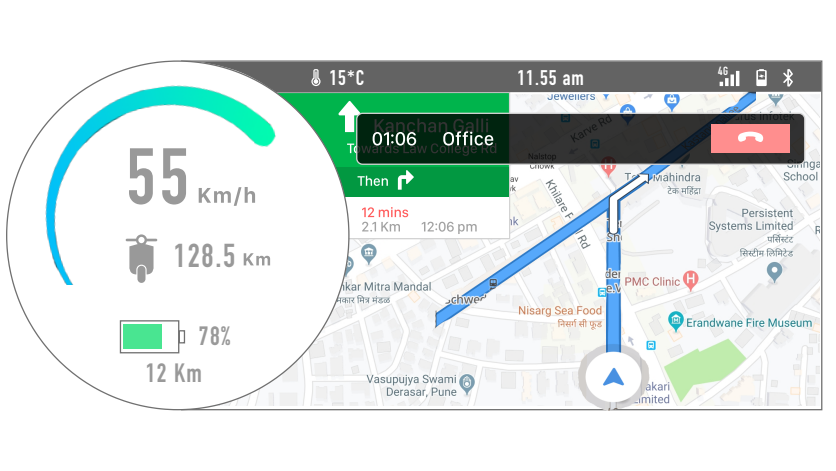
When bike starts moving

As soon as the Scooter user starts driving the screen view changes.
Here the user can only View the navigation or call made before the vehicle started moving. In this view the left menu disappears and the screen becomes a view only screen.



Incoming call while navigating

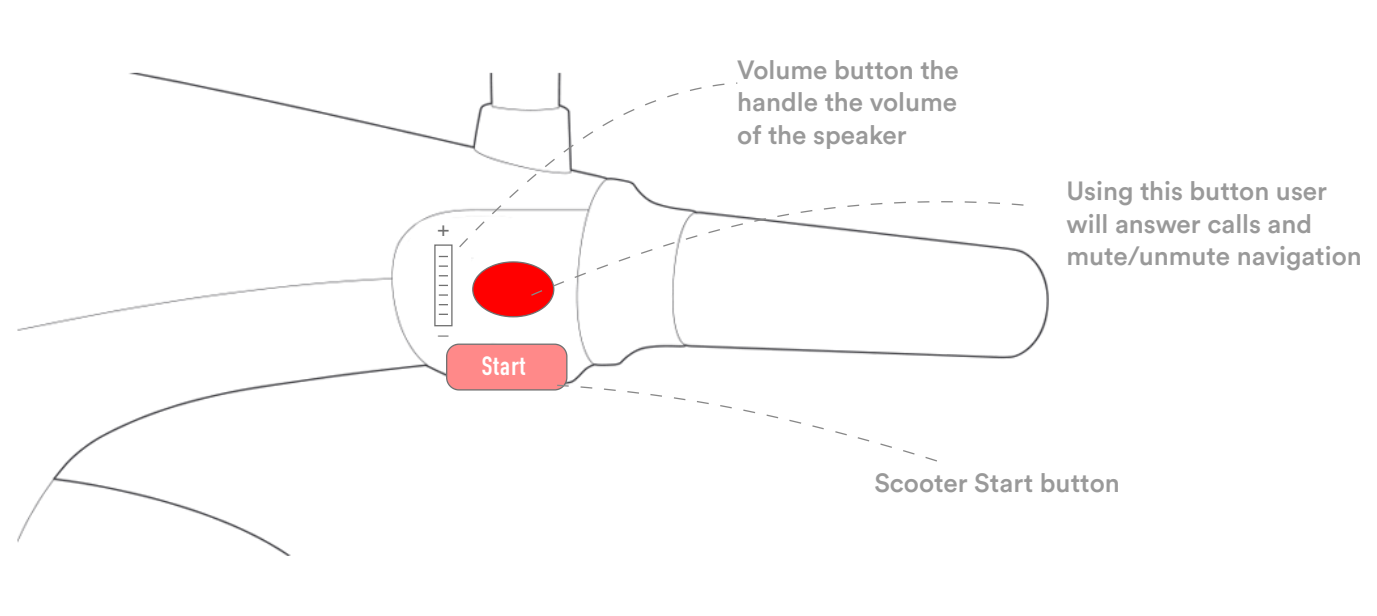




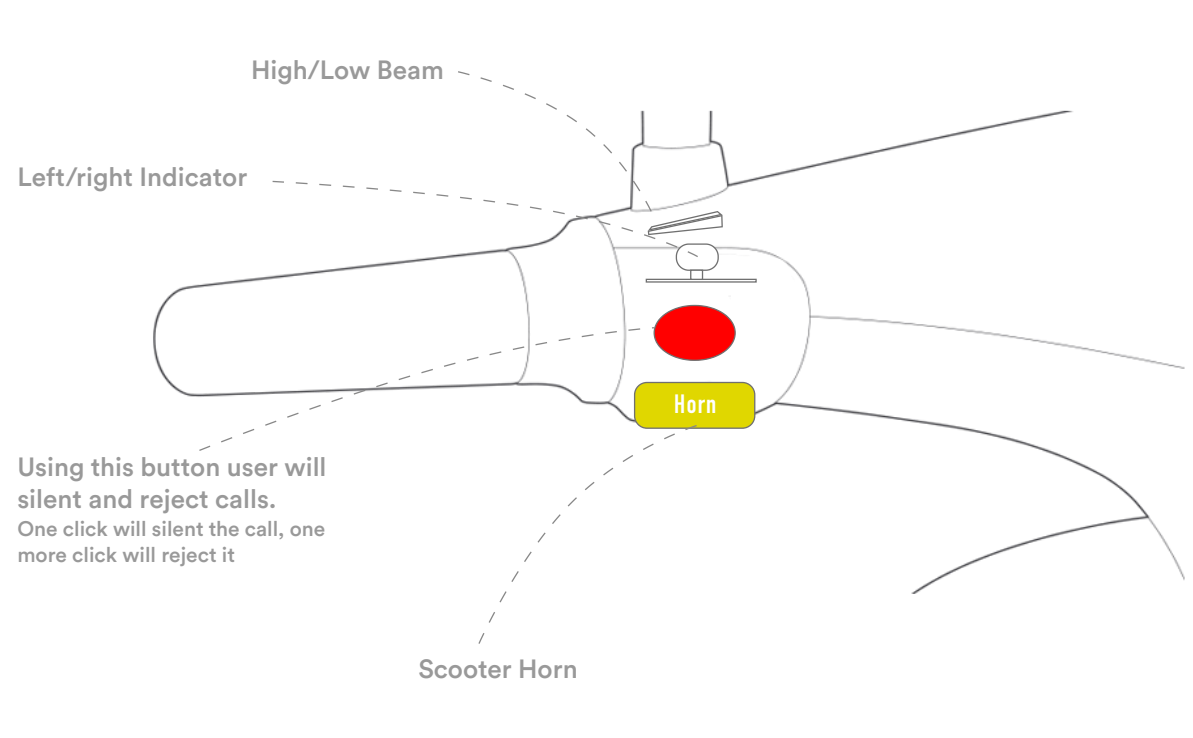
HANDLE BAR DESIGN

To answer or reject this call or mute the Navigations the user need not to take his hands off the scooter handle bar. The scooter comes with two buttons on each side which will help user perform required interactions while driving.

Right Side of Handle Bar

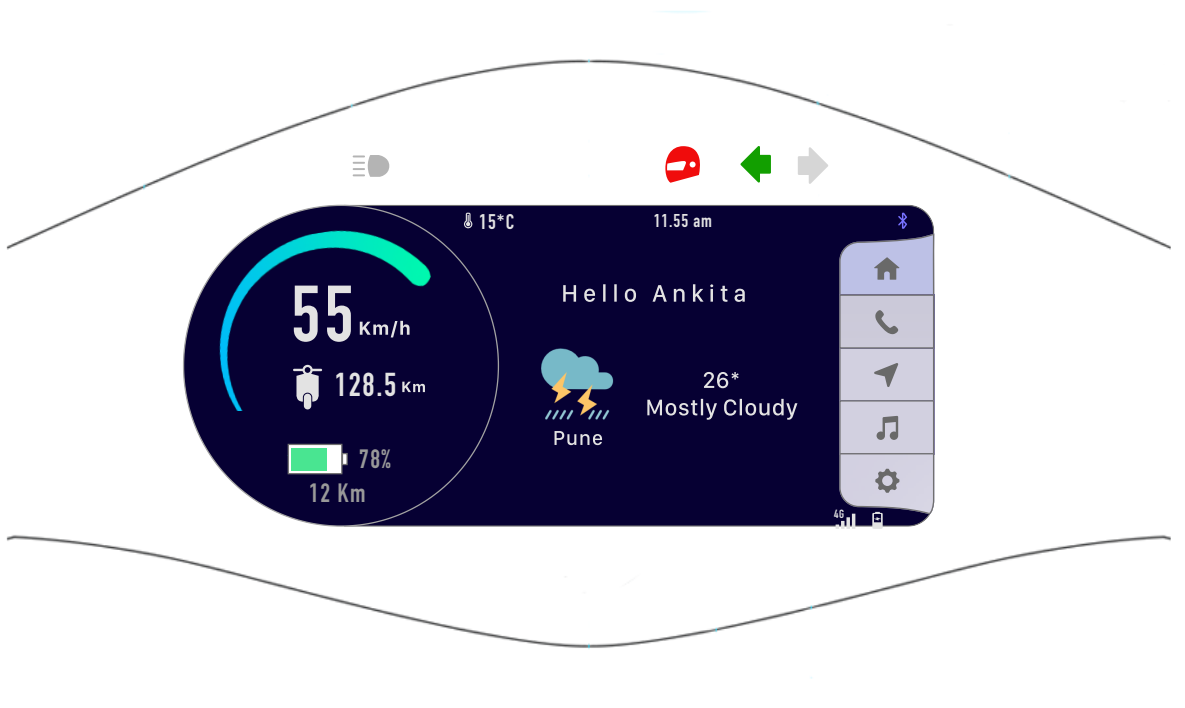

Volume button the handle the volume of the speaker
Using this button user will answer calls and mute/unmute navigation
Start
Scooter Start button

Left Side of Handle Bar


High/Low Beam
Left/right Indicator
Horn
Using this button user will silent and reject calls.
One click will silent the call, one more click will reject it
Scooter Horn

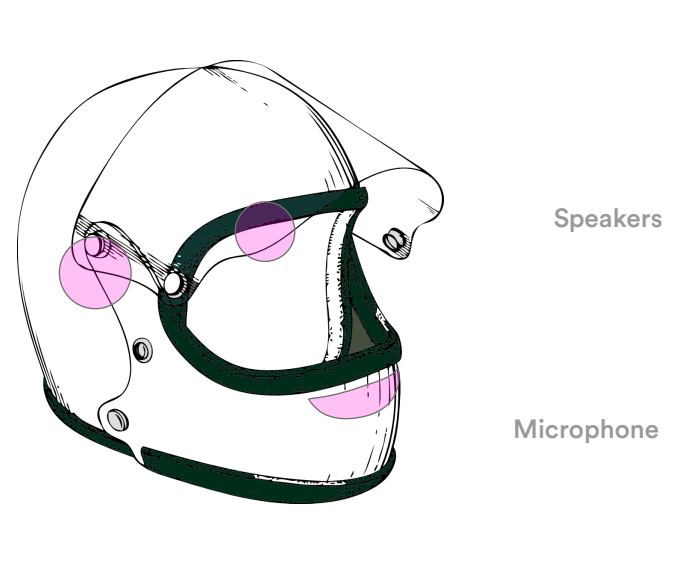
Scooter Console

The scooter console will also have a helmet indicator which will keep on blinking till the driver wears the helmet



Helmet Design

The helmet which is connected to the scooter console and mobile, has inbuilt speaker and microphone. This ensure handsfree calls and navigation directions while driving.



Helmet Features:
1) Volume : The maximum volume of these inbuilt speakers is set upto permissible levels which ensure user can hear the calls/ directions but at the same does not miss out on the ambient required sounds. Basically, speakers in the helmet do not a have noise cancellation feature, so the rider is aware of the sounds on the road.

2) Voice commands : This helmet microphone can also take voice command like "Hi Riya, call Rahul" or can take voice command for navigating to saved pins like, "Hi Riya, navigate home".

3) Messages : Reads out unread messages and also takes voice command to send a message.

Positive Changes This Solution Will Bring

1) As the driver is restricted by design to perform any complex tasks like making a call and starting a navigation when the vehicle is in motion.

2) Important data that the user consumes while driving is placed in the drivers line sight. Also the data being minimal the glance time of the driver to this screen will be very less.

3) With all the important interactions need by the driver once the vehicle is in motion are at the thumb, driver does not have to take hands off the handle bar. Within very less time the driver will get trained to use muscle memory to interact with the buttons

4) Unlike personal earpieces used by people while driving, the helmet speakers restrict volume level above a certain limit ensuring driver safety.

5) The additional feature of voice command enables the user to perform complex tasks like calling easily and without taking eyes off the road.

6) The red helmet indicator on the console will keep on blinking if the user is not wearing a helmet, reminding the driver to wear the helmet at all times.

Thank-You