



JK LAKSHMIPAT UNIVERSITY
Institute of Design
NAAC 'A' Grade Accredited

RiderDash

**Vehicle Integrated Smartphone-Based Dashboard
System for Delivery Riders in India**

Arjun Sajan Babu
B.Des, Interaction Design (2021-25)
2021BDESID003

Guided by Devanuj K Balkrishan
Institute of Design, JKLU
2025

THE 
**GRADUATION
PROJECT 2025**

The Evaluation Jury has recommended **ARJUN SAJAN BABU** for graduation from Institute of Design, **JK LAKSHMIPAT UNIVERSITY** with specialization in **INTERACTION DESIGN**.

Herewith, for the project titled, “**RiderDash - Vehicle Integrated Smartphone-based Dashboard System for Delivery Riders in India**” on fulfillment of requirements by

Jury Chairman

Jury Member

Jury Member

Subsequent remarks regarding fulfillment of requirements:

Dean, Institute of Design
JK Lakshmipat University

Statement of Originality

I hereby declare that the work submitted here is entirely my own and does not contain any substantial portions or complete copies of previously published material. It also does not include significant portions of material that have been accepted for the completion of another degree or final graduation from any other educational institution, unless proper acknowledgment has been provided in this Graduation Project. Additionally, I affirm that I have not borrowed or copied any concepts without giving appropriate credit. The intellectual content of this Graduation Project is solely the result of my own efforts, except for any assistance received from others in the project’s design, conception, style, presentation, and linguistic expression, which have been duly acknowledged. Finally, I assert that this Graduation Project, or any part of it, has not been and will not be submitted as assessed work for any other academic course.

Copyright Statement

I hereby authorize the Institute of Design, JK Lakshmipat University to only archive my Graduation Project. It may not be accessed, displayed or distributed for any purpose unless explicit permission is requested and granted upon prior request. I confirm that either no significant portions of copyrighted material have been used in my document, or I have obtained the necessary permissions to utilize such material.

Full Name of Student _____

Signature _____

Date _____

Place _____

Acknowledgements

I extend my sincere gratitude to everyone who contributed to this project, directly or indirectly. Your input and advice were invaluable, helping to shape the project into its current form.

I'm incredibly thankful for the unwavering support and laughter from my parents and my close cousins. They continuously motivated me, especially when the project's sheer challenges felt overwhelming or left me unmotivated.

The delivery partners involved in the research deserve special thanks for their kindness and inclusivity, even amidst their busy schedules. They provided clear perspectives and viewpoints that were essential to this project.

To Yashovardhan, thank you for your continuous encouragement and hands-on involvement. Your help in fabricating necessary components for my prototype was invaluable, and I'm truly grateful for your input in developing this project.

My appreciation also goes to Prof. Devanuj Balkrishan for his expert guidance, input, and advice. He consistently helped steer me in the right direction, reinforcing the designer within me. Finally, Dhruv and Aditi, thank you for being so kind as to entertain my unconventional ideas and for offering your valuable insights and advice

Thank you very much!

Table of Contents

01. Context & Research

- I. A Brief Overview
- II. Research Methodologies
- III. Priming the Context
- IV. Routine & Tools
- V. Key Observations & Challenges
- VI. SINTEF Report on Screens & Distractions while driving
- VII. Infereneces & Key Takeaways
- VIII. Problem Statement
- IX. Intervention Points - HMW
- X. Possible Design Directions

02. Design Development

- I. Design Statement
- II. Early Design Explorations

03. Final Design Outcome

- I. The Interface
- II. User Flows
- III. User Testing

04. Conclusions & Scope

05. Bibliography

1

Context & Research

A Brief Overview

This project explores the design and development of RiderDash, a vehicle-integrated smartphone-based dashboard system aimed at improving the day-to-day work experience of delivery riders in India. With a focus on safety, efficiency, and convenience, the system is designed to address common pain points that emerge during order delivery processes such as distraction from on-screen interactions, lack of transparency regarding delivery locations, and fragmented user flows across multiple apps.

A hands-on approach was taken by becoming a delivery rider, supplemented with interviews and secondary research to better understand the environment, tools, and challenges delivery riders face. These insights helped shape an integrated dashboard interface that minimizes distractions, simplifies access to essential functions, and enhances situational awareness. The project also explores features such as automated accident detection and modular interaction using a physical D-Pad, enabling safer navigation of the interface on the move.

The outcome is a rider-focused interface that blends smartphone capabilities with ergonomic design interventions, aiming to reduce friction and support safer, more informed deliveries in India's urban environment



Research Methodologies

Throughout the months of the initial stages of project, extensive research has been conducted to fully grasp the perspective of a delivery partner. I leveraged the opportunity to become a delivery rider myself for multiple weeks, which helped me understand observations in their perspective & layer it with analysis from secondary research prior to this. This helped me develop & unlock insights never heard before.

PRIMARY

Hands-On Approach

To better understand ground-realities, have a firm grasp on perspectives

- Being a Zomato Delivery Rider for multiple weeks
- Interacting with Stakeholders in the Delivery System (Riders, Restaurants, Fleet Coaches)
- Individual non-structured interviews consisting of 14 participants from the food delivery sector

SECONDARY

Research & Analysis

Context for pre-hands-on & reason observations from primary research

- Behavioral Research Studies
- Social Context Understanding
- Data Interpretation
- Safety & Ergonomic Cases
- Existing Technology & HMI Design Patterns

SYNTHESIS

Inferences & Insights

Combining primary & secondary to gather insights & inferences.

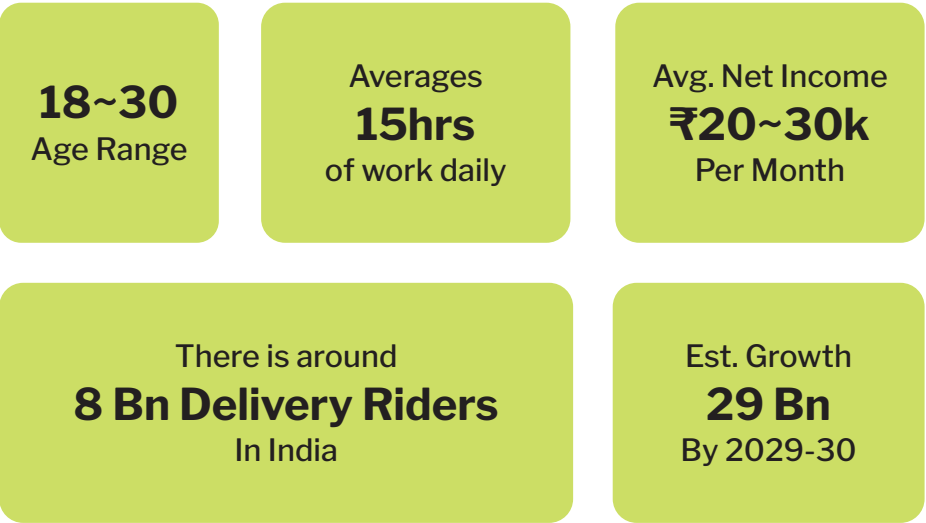
- Information from both forms of research is consolidated & cross analyzed to infer insights
- Re-visiting stakeholders in case of clarification
- Ideation & Explorations
- Developing Solutions

SECONDARY

Priming the Context

- Workers are seen as Independent Contractors, require a sum upfront as joining fees (which also includes cost for Uniform & Cargo Bag)
- They mostly require their own device and a vehicle to sign up for this job. (Although some companies offers EVs on a Loan)
- They are paid on basis of orders completed. Additional equipment required for their work & other consumable expenses are not covered in the compensation.
- Work environment is generally fast-paced, and often dynamic due to the conditions that are either external or internal.
- It is inherently risky due to the dynamic nature of the work. These dynamic conditions and demands can constantly change - Weather, Traffic, Demand, Work Load, Physical & Mental Exertion, Competetion, Deadlines.

Your Average Delivery Rider

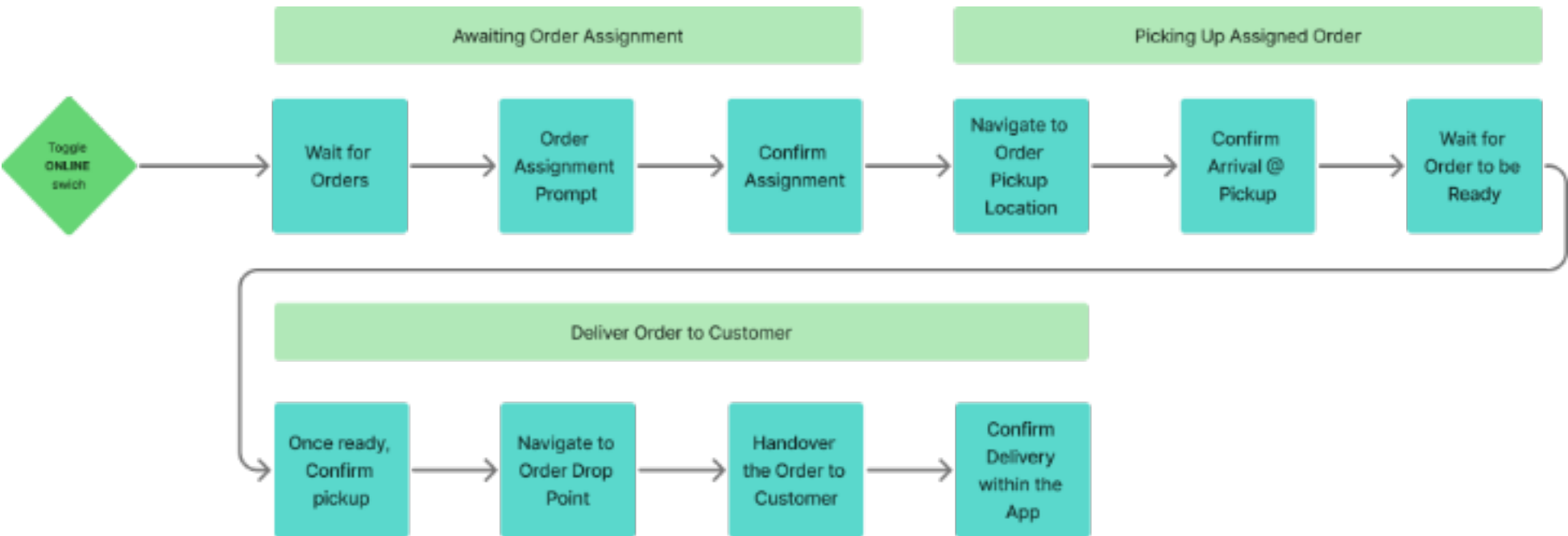


Routine & Tools

We detail out what are the standard in the flow of routine as a delivery rider. To build better context, we also take a look at their core setup of work environment & their tools required to efficiently complete their job

Process Flow

A detailed process flow of an delivery rider's work day is mapped out to understand and analyse core their routine task



A Typical Setup

A frugal two-wheeler, EV or ICE, preferably of commuter class and lower cubic capacity (if combustion based) to be cost effective enough for lower fuel consumption & other related running costs.

A phone that runs the delivery rider app, that is essential to the functioning of this job to assign orders, track income & address anything related to work. — mounted using a phone mount that is attached to the handlebar or the mirror stalk

Phone chargers like Power Banks, or in-built USB ports and cables are attached to keep phone at charge all the time

A reflective, temperature controlled delivery bag that is usually attached to the vehicle using strap ties & velcro stickers. The boxes have unique QR codes for identification and are often in bright colors with reflective material to boost visibility

Although a potential safety risk, some users also wear wireless earphones whilst they ride to attend calls & communciate with customers & company support.



PRIMARY

SECONDARY

Key Observations & Challenges

Tedious Flow of Tasks

During the immersive research, flow of tasks in the application always had a point at certain stages that break the user flow. At first, it wasn't much of a concern until intensity & complexity of the work increased. In the delivery process navigation and communications are one of the most important steps involved. Due to the limitation of the application, the app launches navigation and call management interface separately through external apps. At times, you have switch back and forth between the applications should you wish to make a change or choose a different option.

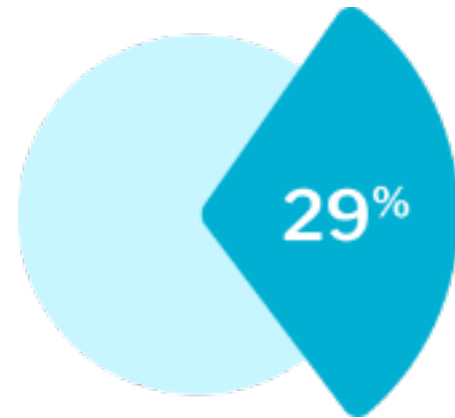
Additionally, there were numerous instances where the phone had mounted and unmounted throughout various parts of the process flow (order pick-up, calling customers, selfie verification). Due to the tightening mechanism of the mount being based screw-based, it added frustration and inefficiency.

These flow breakers happen more often throughout the shift and was found to get tiresome and at times - resulting in user frustration and flow inefficiencies.

Phone is a Core Tool

For a delivery rider, phone is the most important tool for the rider. Majority of their work related responsibilities such as, order management, navigation, communications, and finance are reliant on their smartphone and hence require an active internet connection at all times. Around 86% interviewed in the immersion study revealed they use their primary phone as their device of work, rest 14% of them carry a secondary phone.

While phones are considered as a distraction when driving, this has become a necessary evil in their lives, unfortunately It is something they can't really avoid.



of drivers are confident interacting with app while on the move.

In the immersion study, around 71% of riders reported that their experience with smartphone based interactions can prove to be distracting when driving. Some reported dangerous close-

calls and mishaps that happened while they were interacting with their device on the move. Safe practices like pulling over to use the phone isn't always performed due to limited time constraints they run on.

Delivery Locations & Ambiguity

For the customer privacy & safety reasons, delivery locations are not revealed in the earlier stages of delivery process. It is only revealed late into the process. Due to its ambiguous nature, safety can be a gamble for delivery riders as they never know what kind of location are they getting into. One of the delivery riders recalled a delivery assignment taking them to a brothel without knowing where they are heading to.

Accident Emergencies & Care

Some of the current delivery partner applications offer insurance and emergency hospitalization care when a rider meets with an accident when on the clock. While insurance helps you settle hospital bills, food delivery companies doesn't compensate them for the hours lost not working while being hospitalized, however major burden of bearing loss due to accident comes on to delivery riders themselves. For some, it is their sole source of income and can get easily affected.

By the nature of this job, it leaves them more vulnerable to serious injuries/complications in an event of accident. Timely care and treatment can greatly reduce the chances of severe injuries or long term complications. Adding to location ambiguity, it can lead to delayed responses in first aid, and if the

case is severe, it is difficult to initiate a call to emergency services. themselves



A snapshot during hands-on research.
Prior consent was obtained, faces are blurred for privacy of participants.

Long Waits & Lackluster Cancellation Process

During immersion study, it has been observed that item pick up or delivery drop off can act as a bottleneck for their job process. Some delivery riders reported their wait times being stretched more than 25 minutes. As per Zomato, riders have to wait upto 25 minutes until they can cancel the order without any repurcussions from the system, however, riders complain that having to wait until the minimum window does cost them their time and wages because, once an order is cancelled due to excess waiting, they aren't compensated for the fuel they spent travelling or time they spent waiting.

Delivery partners are also hesitant to cancel their assignment prematurely as well because of the repurcussions that come along with it. A prematurely cancelled order leads to hours of offline time, which basically means no pay for the hours they are offline. They may also be barred from earning bonuses and incentives for the day. Circling back to location safety, if a driver wishes to cancel them, they are faced with a dilemma of safety & repurcussions.

Unoptimized User Interface for Riders

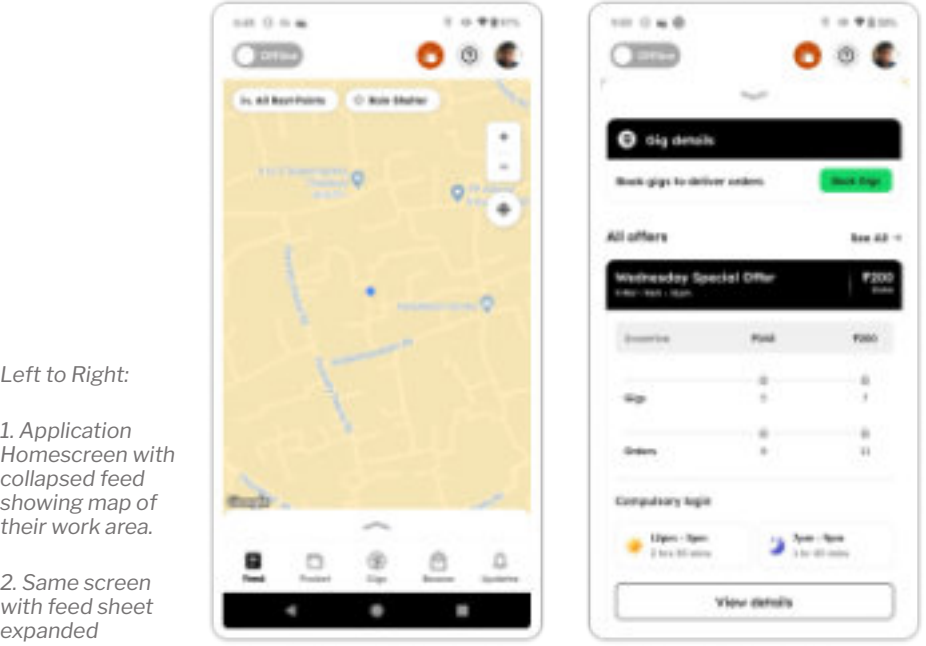
The current state of the interface of delivery partner applications doesn't offer a user interface that makes it easy for riders to glance info while they are on the move.

In the immersion study, it was observed that due to smaller visual elements in the interface and smaller touch targets, it

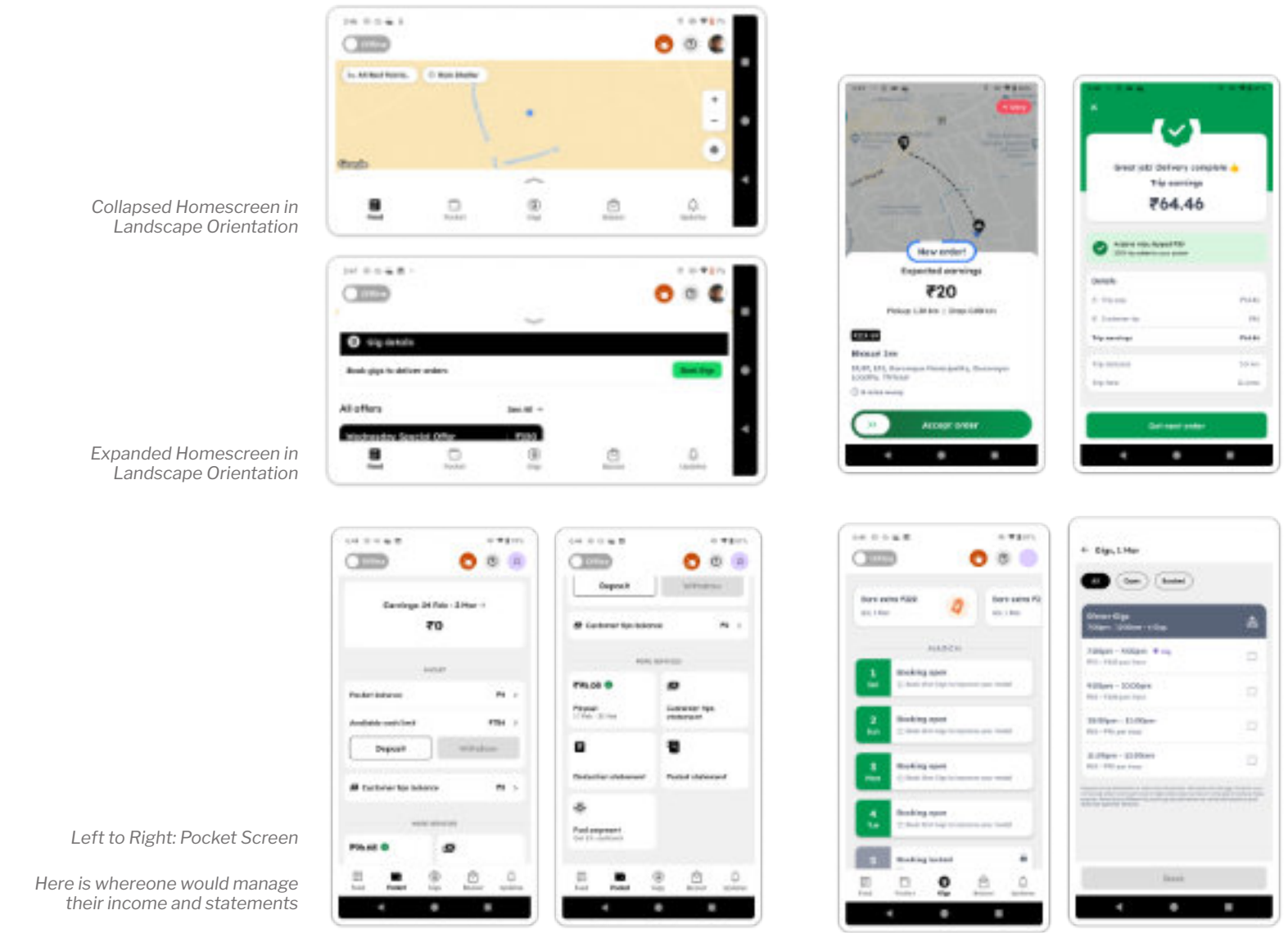
was difficult to interact with the phone or take a glance at necessary information. In the order assignment pop-up, the swipe to accept interface can be counter intuitive as swipe controls does not register clearly due constant vibrations and misjudged touch inputs.

The application is also not optimized for landscape use (Landscape layout help display more information, it can be clearly accomodated in larger sizes through multiple columns).

Since the rider interactions with the phone are solely through the touchscreen, it can become unreliable in rains due to the touch digitizer misjudging electrical currents from fingers through water drops on the screen.



Additional Application Screenshots



SINTEF Report on Screens & Distractions while Driving

This report by SINTEF helps shed light on to how interacting with touchscreens can be a safety hazard whilst on the move. The study combines an objective physiological measurement (eyetracking) with subjective self-report (NASA-RTLX) within a controlled, yet realistic, driving scenario where participants completed standardized tasks on a touchscreen interface. Despite being conducted in a car under Norwegian traffic conditions, the inferences help highlight how dangerous touchscreens can when used on the go.

“Touchscreen use requires significant attention and is distracting, potentially reducing safety.”

For Indian delivery riders on two-wheelers, the primary touchscreen device is their smartphone used for the delivery app. This causes visual, cognitive, and manual distraction. **Riding a two-wheeler requires constant balance and attention, making distraction much more dangerous than in a car.** Studies show mobile phone use while riding can lead to reduced speed, impaired peripheral vision, and increased perceived risk and mental effort. The pressure to complete orders quickly in the gig economy incentivizes riders to risk using their phone while moving

Traffic is an unpredictable chaos, where every second of your attention matters.

Maintaining continuous awareness of the traffic environment is essential for safe riding. The SINTEF study indicates that

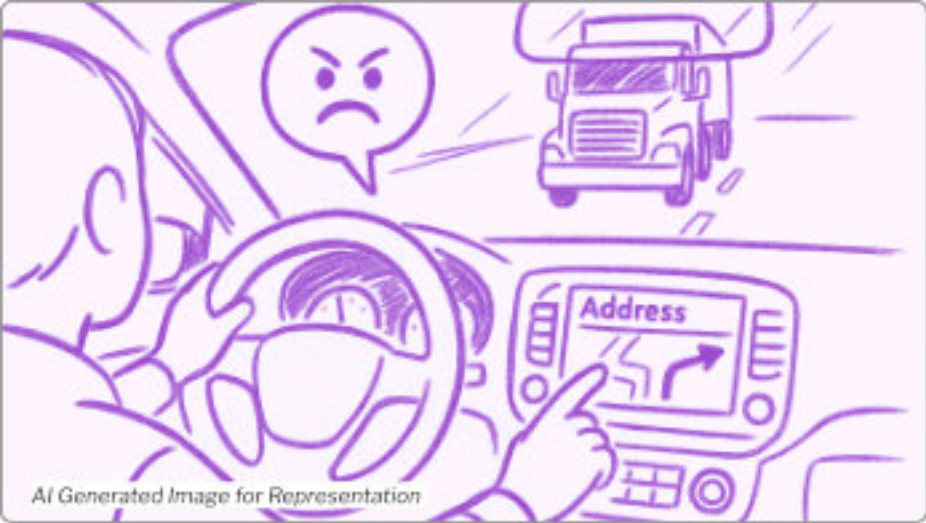
Commissioned by
Norwegian Council for Road Safety (Trygg Trafikk)

longer glances away from the road mean the traffic context can change significantly, increasing risk. Glances lasting over 2 seconds are strongly linked to increased collision risk in cars. For a rider moving **at just 22 km/h in the city, a 2-second glance means traveling over 12 meters without watching the road.** This lack of observation time is extremely dangerous.

Level of distraction varies by use-case context, simple tasks can take longer.

Delivery app tasks range from simple actions like accepting an order to complex ones like typing in addresses, contacting customers, or navigating. The SINTEF study found **simple tasks like temperature adjustment took an average of 3.4 seconds on screen, while entering navigation details took 15.7 seconds.** Tasks like attending customer calls, verifying locations, or texting require significant cognitive load and manual dexterity, which is particularly challenging to manage while operating a vehicle in India's dense and often chaotic traffic

“Setting up navigation required the longest time and most fixations on the touchscreen, significantly distracting drivers.”



Navigation is fundamental for delivery riders. The SINTEF report shows **entering an address took the longest average time on screen (15.7 seconds), involving an average of 41 fixations** (*fixations is a term used in this report to an instance of glance with intent to interact*).

In Indian urban environments, which can be confusing with dense traffic and complex layouts, glancing at a screen for prolonged periods to type or adjust navigation is highly risky. It diverts the rider's crucial visual attention away from the road, increasing the likelihood of missing pedestrians, obstacles, or sudden traffic changes. Time pressure often prevents riders from pulling over safely

“Driver abilities, experience, and self-regulation skills are crucial for safe interaction with in-car systems”

The SINTEF study found that driver variability in task completion related to experience and self-regulation. A significant portion of Indian delivery riders are young (70% are 18-30), who may have smartphone familiarity but lack extensive professional riding experience or the self-control to prioritize safety when under pressure. **The gig model, with its incentives and penalties tied to speed and completion, often overrides safe self-regulatory choices.** Tailored training and guidance emphasizing safe app use practices and the importance of stopping for complex interactions are critical interventions

Study recommends mitigation measures such as improved user interfaces, physical buttons, voice control, pre-planning, and driver guidance

These recommendations are highly relevant for delivery rider apps. Delivery app interfaces should be simplified and require minimal complex input while riding. Voice control could potentially reduce the need for visual attention, although cognitive distraction remains. Comprehensive guidance and training on safe phone use while riding, including strict advice to pull over for any task requiring significant attention, are essential safety measures. Exploring technology like driver distraction monitoring for two-wheelers could also be a potential long-term solution.

Inferences & Key Takeaways

Location Safety Concerns

Lack of upfront details regarding delivery locations can pose safety risk in the scenarios they happen to be unsafe for the delivery riders.

In the current design of the delivery partner app, the location of the customer is not revealed in the beginning of the order assignment as a part of safety & privacy measures. However, this has fallen short of taking the perspective of delivery riders' safety as well.

Since location of the customer is only shown when the user has reached the restaurant to the pickup the order, they are significantly deep into delivery process - In a scenario where the delivery location is deemed to be unsafe by the rider and wish to cancel it, they have are faced with a challenging dilemma: cancel the order and risk their wages, or continue with the order and risk their personal safety.

Improving transparency whilst balancing customer privacy could help mitigate safety concerns.

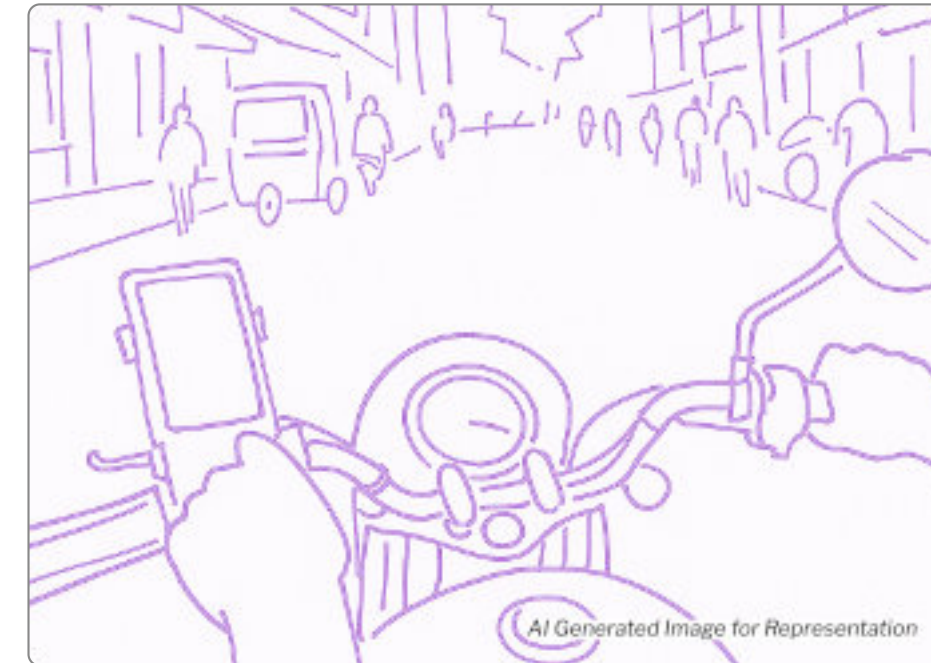
Unoptimized UX for Operation on-the-go

The smartphone, while undeniably a source of distraction, remains the central tool that delivery riders rely on to carry out their work-related responsibilities. It acts as their dashboard, their map, their communication device—all rolled into one. Throughout the order journey, they're required to interact with various application elements to keep the process moving. However, in its current state, the UX of most delivery apps is far from optimized for on-the-go usage.

Smaller touch targets, dense information layouts, and unclear visual hierarchies often fail to translate effectively when riders are moving, especially considering that their phones are mounted a few feet away and often angled awkwardly. This makes it difficult to absorb information in a single glance, forcing riders to take repeated visual breaks from the road. These compounded glances introduce serious safety risks, particularly on Indian roads where traffic patterns are unpredictable and riding etiquette is inconsistent.

Adding to this, the constant context-switching between the Delivery App, Maps, and Phone Dialer fragments the rider's flow and increases cognitive load. A thoughtfully integrated, ride-first UX that consolidates core actions, minimizes interaction effort, and supports at-a-glance readability could vastly improve rider safety and efficiency on the job.

Touchscreens as primary interaction medium are counter intuitive whilst on the move.



Muscle memory is a core fundamental UX element for users operating systems within a vehicle. It allows them to perform functions without taking their eyes off the road, relying instead on sound, peripheral vision, and haptic feedback.

As discussed earlier, touchscreens as an interaction medium add another layer of complexity and inefficiency to an already unoptimized UX. This is because touchscreens, by nature,

aren't very haptic as there are usually no tactile textures or guiding patterns to help users operate them without looking. The lack of physical feedback doesn't support the development of muscle memory, which in turn reduces user confidence when trying to interact with the screen blindly. This ultimately forces users to glance at the screen, taking their eyes off the road for several valuable seconds, increasing the risk of accidents caused by distracted driving.

Availing Emergency Services could be automated in cases of severe accidents

Delivery riders are among the most vulnerable on the road, often riding at speeds of 40 to 50 kmph to meet tight deadlines. Due to the inherent nature of two-wheelers, they face greater risk in accidents than other vehicles. At such speeds, even a minor accident can cause serious injuries. If proper help doesn't arrive quickly, the consequences can be severe, ranging from long-term complications to loss of life.

Golden hour, the first hour after an accident is especially critical. Quick intervention during this window can be the difference between survival and fatality. Given their high exposure to risk, delivery riders need systems that don't wait for someone to report the accident. Automating accident detection using on-board sensors, paired with real-time emergency alerts, can cut down precious minutes and get help to riders when they need it most. It's a step toward safer roads and saved lives

The Problem Statement

While managing orders on the go, delivery riders can experience fragmented interfaces, unclear delivery locations until after acceptance, and unsafe touchscreen interactions in high-traffic conditions.



Touchscreen interfaces demand visual attention and are difficult to use during motion



Riders frequently switch between apps per shift. Causing distraction and increased risk.

“Almost had a close-call while I was just trying to accept an order request on my phone, I jumped over a pothole in that instant and I almost lost control. I could have fallen onto an oncoming car.”

A Blinkit Delivery Rider, 31 years old



Delivery locations are hidden until after task acceptance. Posing safety risks to the rider.

“Sometimes an order may take you to a place is shady & unsafe, you won’t get to know where you are going to deliver once you are in the middle of the order process. From there on, it is a dilemma to risk my wages cancelling this order early on.”

A Zomato Rider, 24 years old



Intervention Points - HMW

Intervention points are inferred & interpreted by layering the research data with findings & insights.. These points listed through “How Might We...” format, then sorted & categorized in addressing key points from the problem statement

Ergonomics

How might we standardize a process flow seamless transition from an integrated to an independent product?

How might we help users confidently interact with core functions without greatly affecting the flow

How can we implement a docking mechanism that is easy to mount it on & off

How might we reduce interactions that require user to glance less at screen?

Usability

How might we reduce visual cognitive load without sacrificing core functions of the application?

How can we increase visibility of information necessary when on the move, requiring only short glances

How might we reduce apps needed to be switched before

How might we improve smartphone usability in harsh weather conditions which can render touch-screens ineffective (such as rain)

Convenience

How might we integrate navigation & call management into a single smartphone screen

How might we convert standard two-wheelers into a smart embedded devices?

How might we integrate their phones into their vehicle?

How might we effectively reduce/offload costs on developing a full-fledged smart system

Safety

How might we leverage sensor-stocks on smartphones to safety & convenience advantage?

How might we automate emergency measures & alerts in case of an accident?

How might we let user know of the delivery locations without compromising customer privacy.

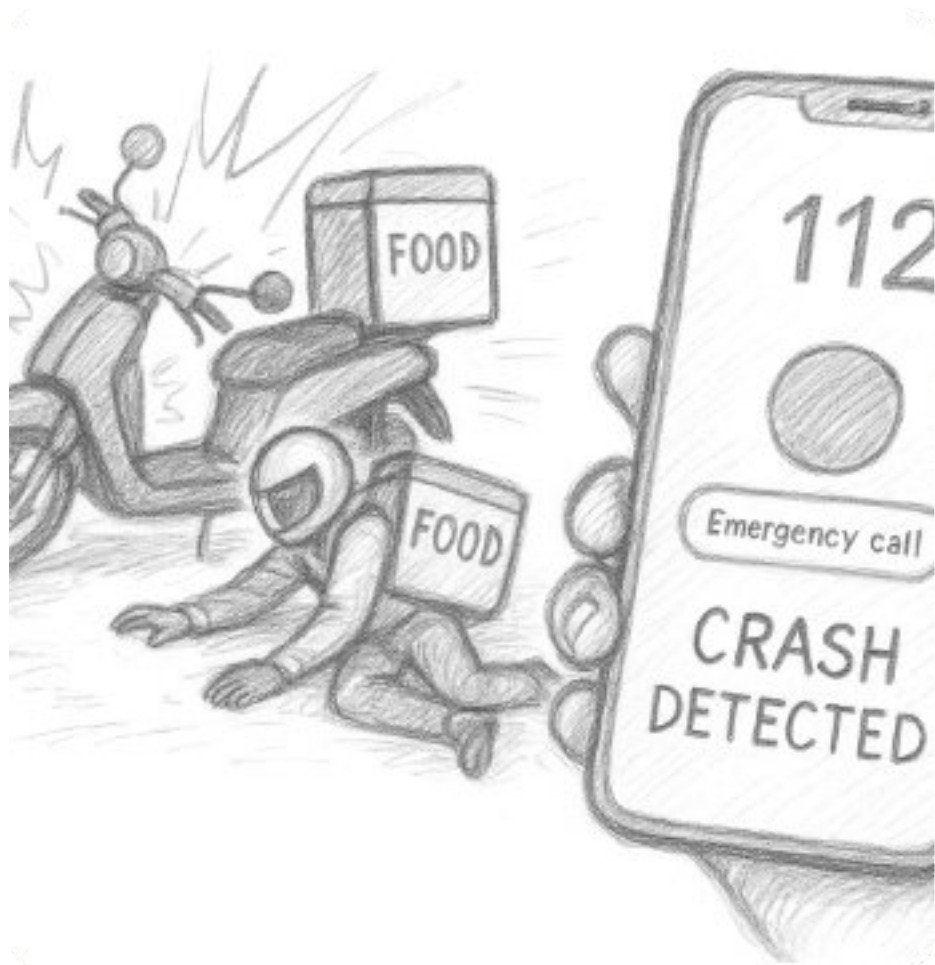
How might reduce distractions from the screen to ensure full focus on the road?

Possible Design Directions

Different Design Directions are explored after layering How Might We's, Problem Statements and Context. After evaluating feasibility, I proceeded with directions that are mix of few listed down below.

Automated Accident Detection through vehicular sensor data and smartphone sensor data, to automatically avail emergency help.

This direction explored the possibility of automated accident detection using both vehicle and smartphone sensor data. Vehicle data could be accessed through OBD ports to monitor speed, braking, and impact, while the smartphone's sensors could help detect sudden movement or force. Together, they could validate a crash event more accurately and trigger emergency help without user input. It was also observed that Vehicle Diagnostics Data obtained through OBD (On-Board Diagnostics) interface could provide broader context like vehicle type, allowing the smartphone interface to adapt accordingly. This opened up potential for a more context-aware system that adjusts the UI based on the vehicle it's connected to.



Voice Only Interface on-the-move

A voice-only or voice-first interface approach prioritizes interaction solely through voice commands, thereby minimizing the need for visual screen engagement or frequent manual input. The system would achieve this by integrating advanced Natural Language Models and potentially Local Large Language Models, which would be instrumental in accurately interpreting spoken commands and generating contextually relevant responses. The user interface itself would be designed with a minimalist philosophy, displaying only essential information pertinent to the current voice query.

However, the implementation of a voice-first interface, especially in a vehicular context, introduces potential drawbacks. Operating such an interface while riding can significantly contribute to cognitive load, as the driver must process auditory information and formulate verbal responses, diverting mental resources from the primary task of driving. This can lead to increased processing demands and potential distractions, impacting overall safety and efficiency during navigation or other critical operations. The constant need for precise verbal articulation and comprehension in varying acoustic environments further compounds this cognitive burden.



Enhanced and Integrated Smartphone Dock + Smartphone as a Key

This concept centers on a vehicle integrated smartphone dock, functioning also as a key. When a user places their smartphone into this dock, it effectively acts as a key fob, enabling the vehicle to start. Conversely, removing the phone from the dock is analogous to locking the vehicle. A critical design consideration for this dock is its ease of use, emphasizing a one-touch mechanism or lids for securing the smartphone, eliminating the need for screw-based tightening.

This system would utilize the vehicle's diagnostic port, typically used for maintenance checks, to establish a connection with the smartphone. A unique digital identifier from the connected smartphone would then be recognized by the vehicle's system, confirming authorization. This integration allows the smartphone to serve as a seamless key, simplifying the vehicle's start and stop procedures. Such a system enhances security by relying on a personal device and reduces the chances of a user forgetting their phone. Additionally, this integration presents opportunities to transform the vehicle itself into a central instrument cluster, displaying critical information directly through the docked smartphone's interface.

A possible challenge to this approach lies in the willingness of vehicle manufacturers to grant access to critical vehicle data via the diagnostic port. Many manufacturers intentionally lock down electronic control units (ECUs) and restrict access to proprietary vehicle data, primarily for security, intellectual

property protection, and control over aftermarket modifications. This reluctance to open up their systems could possibly limit the functionality and broad applicability of a third-party smartphone-as-key solution and may require tighter collaboration with OEMs.



A rider focused version of delivery partner application.

For this design direction, the focus is on developing a rider-centric version of a delivery partner application. This adaptation involves refining the user interface to incorporate larger touch targets and enhance visibility, optimizing it for use while in motion. A key feature includes a specialized driving mode within the application, which intelligently adjusts the interface to suit the demands of active riding. This mode aims to integrate various core functions into a singular, cohesive application, streamlining the user experience. Additionally, the design contemplates a custom D-Pad accessory. This accessory would be engineered to integrate with existing vehicles and their systems, providing a dedicated physical input method for the application, further enhancing usability and reducing the need for direct screen interaction while riding.

However, implementing such a system presents several challenges. The cost associated with manufacturing and distributing these additional D-Pad accessories could be a possible challenge, potentially affecting widespread adoption. Also, ensuring the ease of retro-fitment for this accessory across a diverse range of existing vehicle models and systems introduces significant engineering complexities, as compatibility and installation simplicity would be paramount for practical implementation.



Design Development

The Design Statement

This project reimagines the delivery rider's scooter dashboard by **transforming the smartphone into a deeply integrated interface**.

Once docked, the phone becomes the scooter's key and multifunctional display—**delivering real-time delivery updates, crash detection, and essential riding data through a clear, ergonomic UI**.

The aim is to **reduce friction, improve safety**, and offer transparent, at-a-glance information for riders navigating India's dense urban traffic.



Early Design Explorations

In the early stages of design development, features are rationalized and evaluated in the context of use of the go, which helped streamline the process for User-End Information Architecture. Once streamlined, rapid layout experiments are made whilst exploring modes of primary user navigation.

Feature Rationalization

D-Pad Navigation



PURPOSE Enable safe & reliable UI navigation with less glances on to screen

WHY? Touchscreens are error-prone during motion & harsh weather.

78.4% of attention goes to the screen during tasks (SINTEF), increasing crash risk. **Physical buttons reduce reliance on vision and promote muscle memory.**

Integration into Rider App

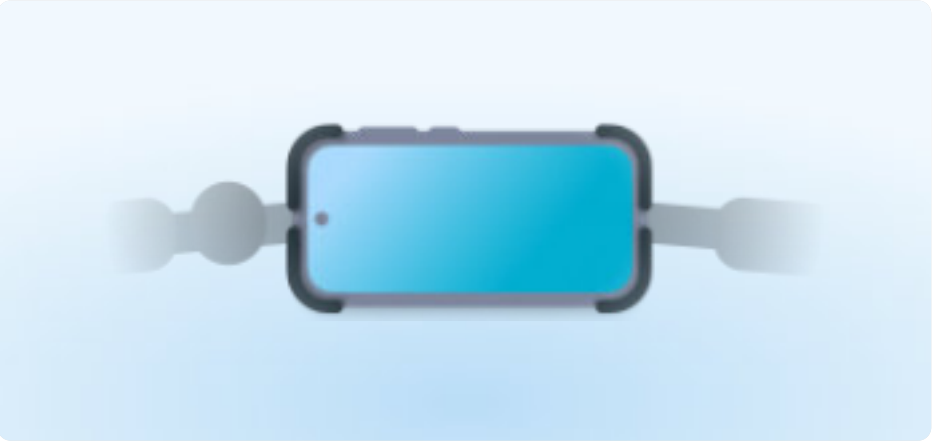


PURPOSE Promoting UX familiarity, convenience, & ease-of-use.

WHY? Users prefer to work on something they already are familiar with (Jakob's Law). This integration will serve as an extension of the delivery partner app.

Since, apps can be partitioned & bundled, this can be made as an optional download.

Smartphone as the Central Dashboard



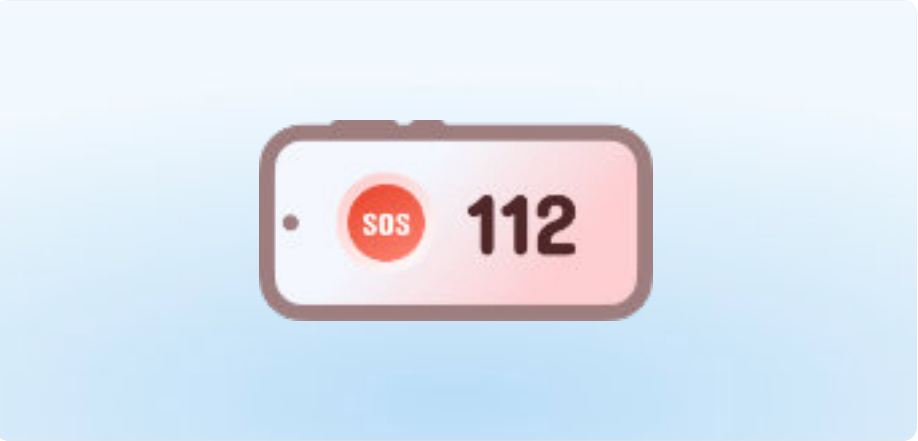
PURPOSE Reduce App Switching, provide information & functions at a common space

WHY? Smartphone processors are usually more powerful than ones in your typical EV Scooters. (Ather 450X uses Snapdragon 212 - an outdated entry level chipset, meanwhile a typical phone has a Octa Core Processors.)

Leveraging telemetry from the OBD connections, one can offload compute process to these devices.

This can **possibly be cost effective** and could easily be backported.

Automated Accident Detection System (AADS)



PURPOSE Trigger Emergency Alert when a sudden deceleration or impact is detected

WHY? Golden Hour of an accident is an important timeframe that could **help prevent deaths & long-term injuries**

AADS helps you **recieve emergency aid faster by automatically contacting emergency services** and contacts whilst broadcasting your location & other important health info

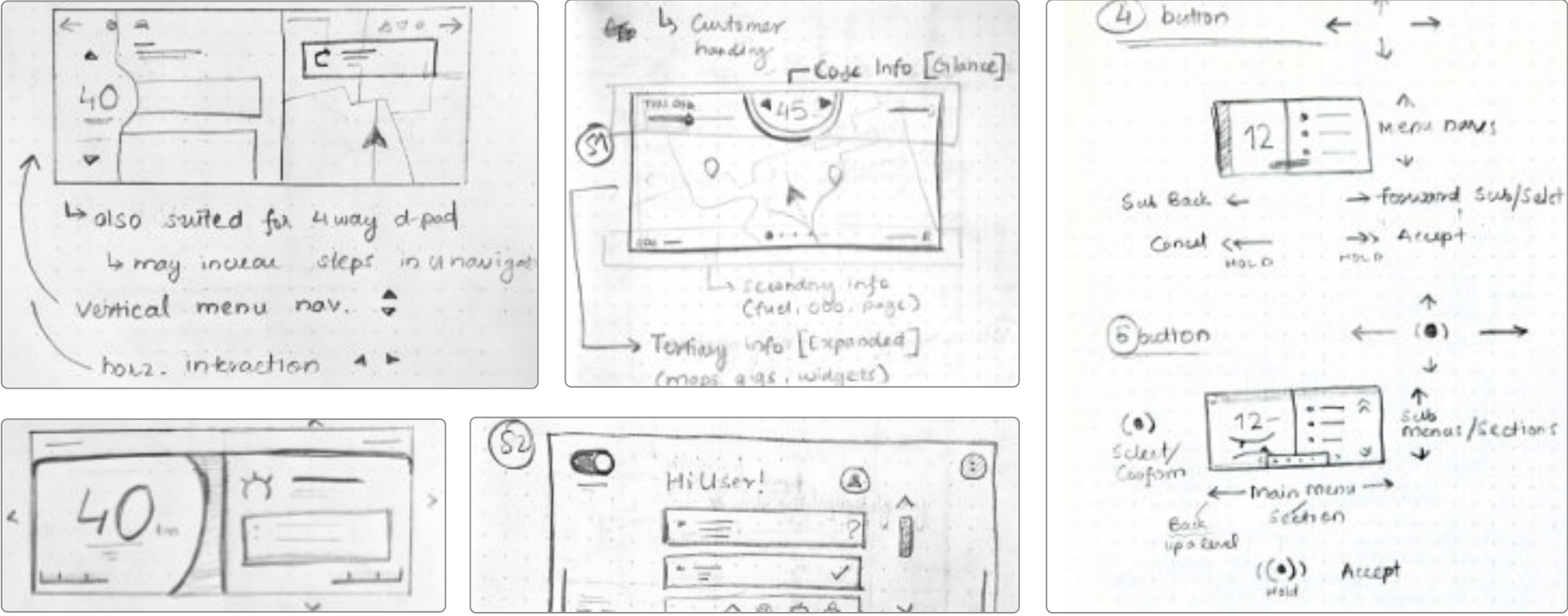
AADS can **leverage smartphone sensors & vehicle telemetry to calculate & detect an accident.**

General UI Layout Explorations

With both design directions & feature rationalizations set in place, I proceeded forward to exploring layout styles to explore suitable ways to organize and navigate information. Using rapid wireframing techniques, both on paper & figma helped me brainstorm and evaluate my choices quickly.

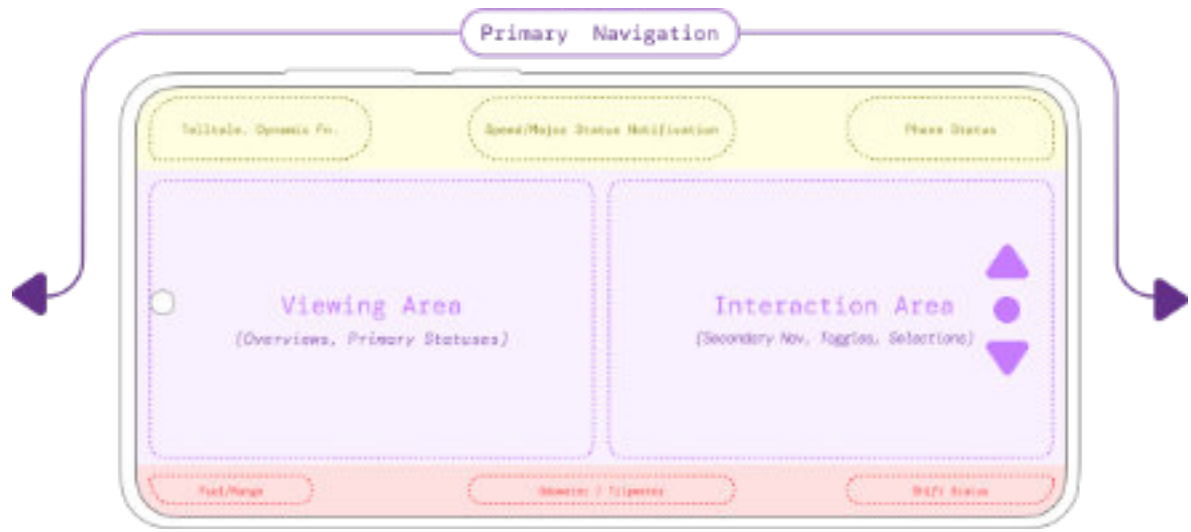
Wireframe & Navigation Exploration

User Interface Layout is explored along with experimenting different types of D-Pad Navigation (4-way & 5-way) button systems to evaluate scalability, ease of use, feasibility across different use cases



Finalized General Layout

Utilizing Jakob’s Principle of UX, familiarity is the key to approach - as this interface is a mere extension of the existing delivery partner application. The user interface is built in 3 key distinct rows, sorted by relevance and importance. Information across rows are dynamic and can vary visibility & adjust accordingly to clear clutter & maximise visibility

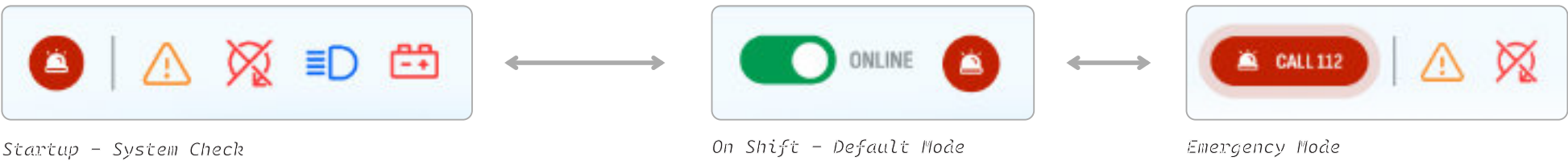


- | DISTINCT ROWS | D-PAD FIRST NAVIGATION | FIXED INTERACTION AREA |
|---|--|---|
| <ul style="list-style-type: none">• Grouping Information by Context & Relevancy• Enhancing visibility & reducing visual clutter• Dynamic visibility to reduce visual load | <ul style="list-style-type: none">• Easier navigation the move, enhanced tacility & muscle memory.• Touchscreens interactions are limited to scenarios such as:<ul style="list-style-type: none">a) When Vehicle is Stationaryb) Occasionally used functions | <ul style="list-style-type: none">• Minimising focus scattering, when interacting with D-Pad.• This serves as glance hotspot when user interacts with D-Pad ensuring that user flow stays consistent & familiar. |

Component & Iconography

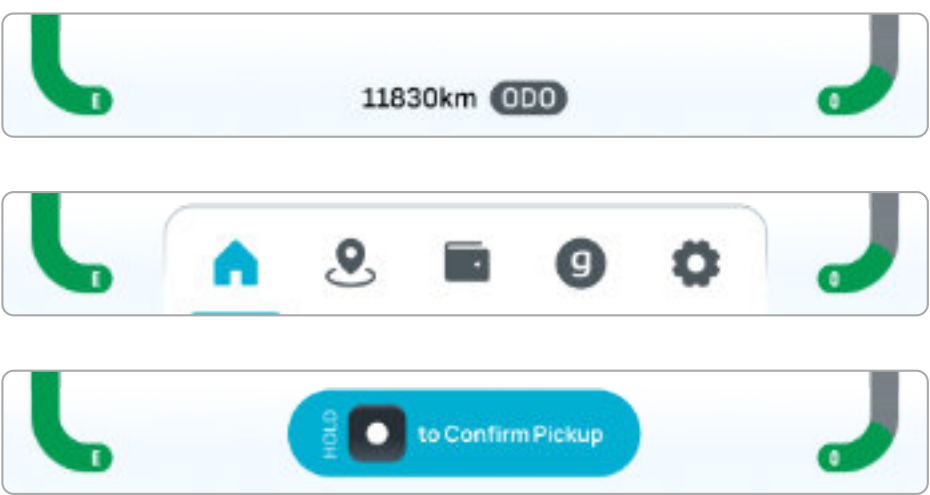
Dynamic Components

Components toggle their visibility and adjust their relative position in response to the current user context.

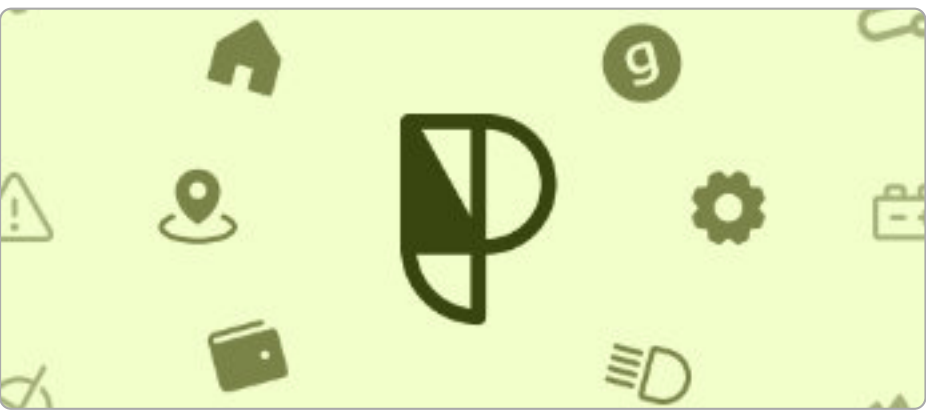


Bottom Bar

Houses informational trip, fuel and gig timing meters. The bottom bar is dynamic and also serves as indicator for primary navigation and primary button tool tips.

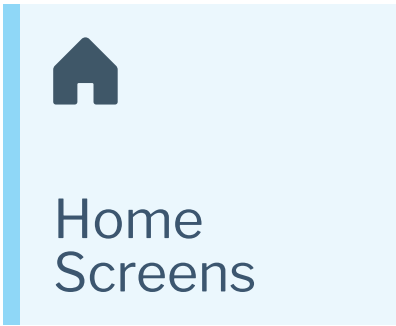


Phosphor Icons

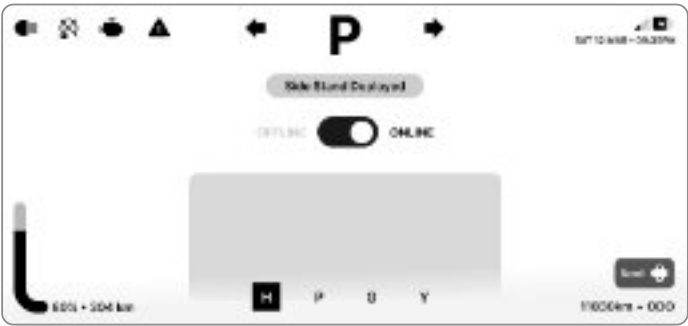


Iconography is provided by Phosphor Icons set, a mix of phosphors and custom icons are used

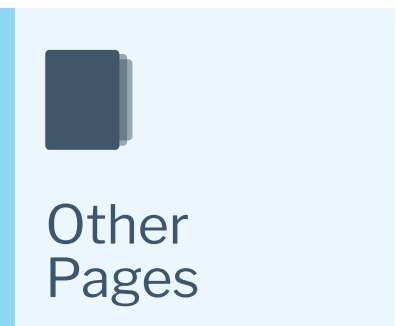
Low Fidelity Figma Frames



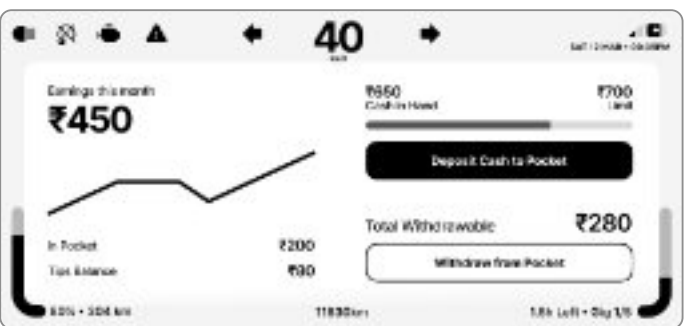
Riding - Maps Widget in View



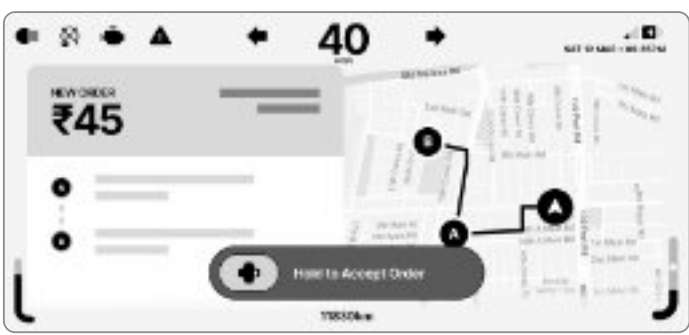
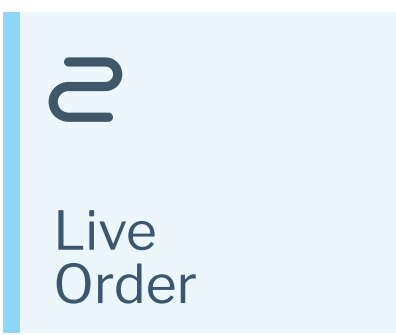
Parked - Feed



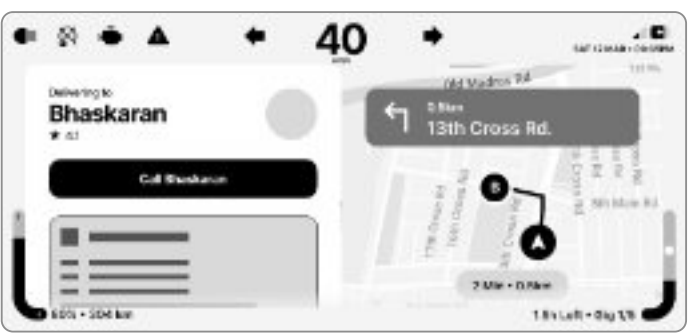
Expanded Maps Page



Earnings Page



Live Order - Assignment



Live Order - Delivery Navigation

3

Final Design Outcome



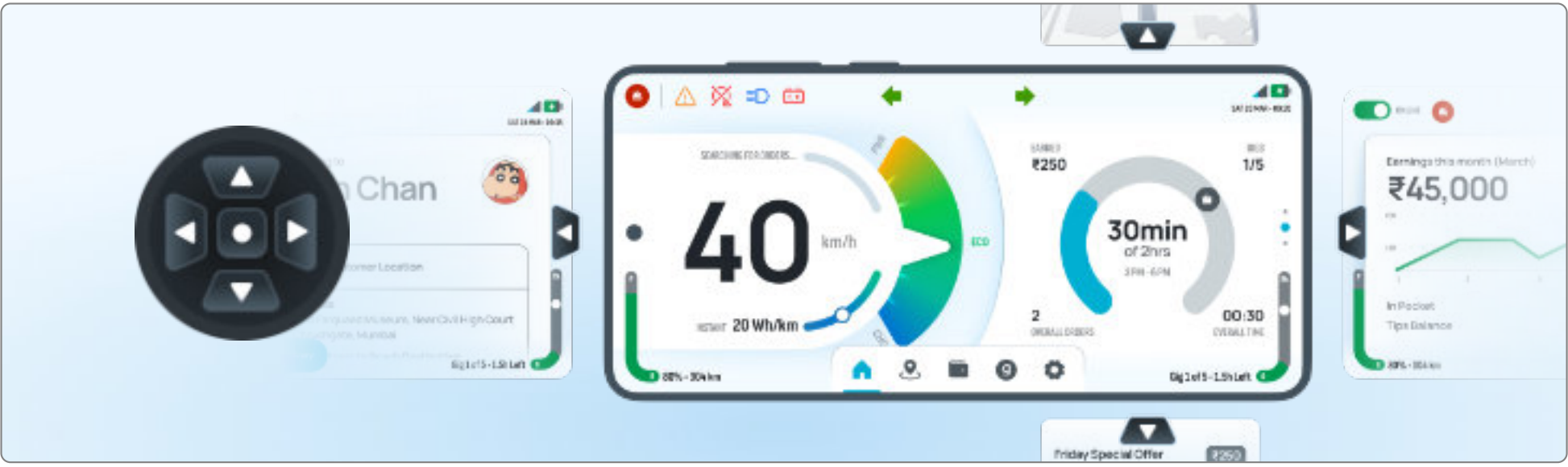
The Interface

An Overview

The homescreen transforms into a multifunctional cluster showcasing vehicle data pulled from OBD as well as contextually aware widgets that update in context to delivery riders’s work responsibilities. The interface is adorned with a simple yet light primary colors that give contrast to the elements in the foreground, making it easier to read even under sunlight.

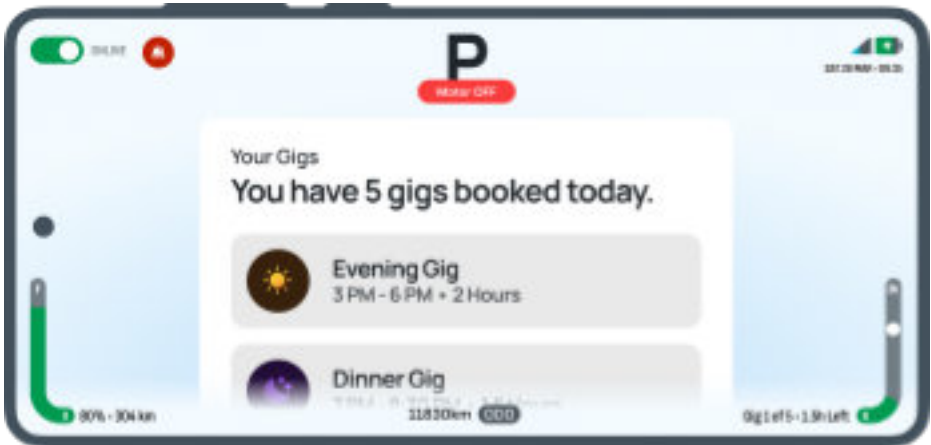


Navigation Methods



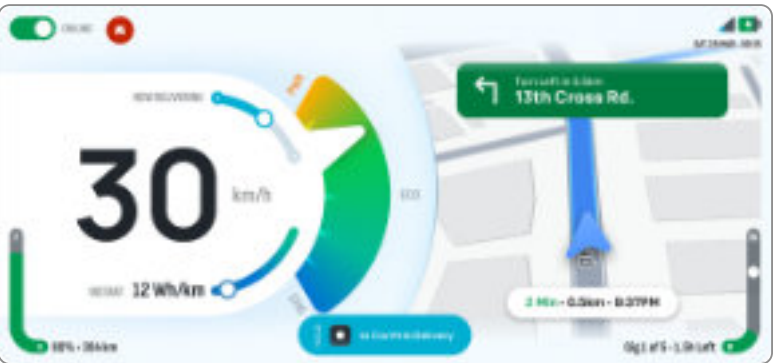
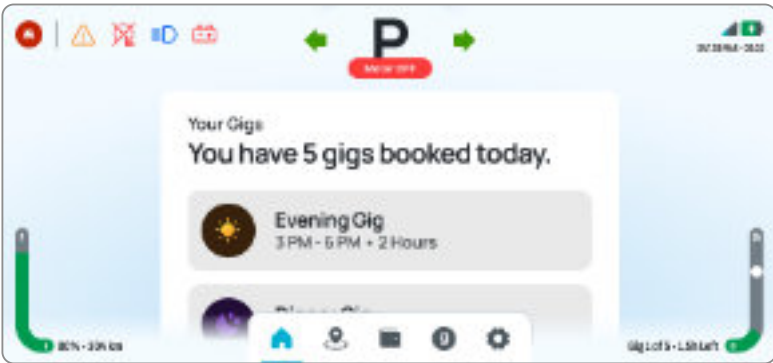
The interface is optimized for and primarily depends on 5-button directional button pad to navigate the interface. With easier and simplified navigation flow, the horizontal navigation keyset controls the primary navigation between major sector, and the vertical key set controls secondary navigation within each section. The select key lets you select/toggle within these sub-sections.

The interface also allows for touch based interactions in scenarios where it’s applicable such as: less frequently used actions, actions that only show up the vehicle is stationary (i.e. Parked Mode) - this ensures a hybridized interface that allows versatility to use however they like it.



Home Feed, an interface that is only available when stationary, allows touch interactions

All the Screens



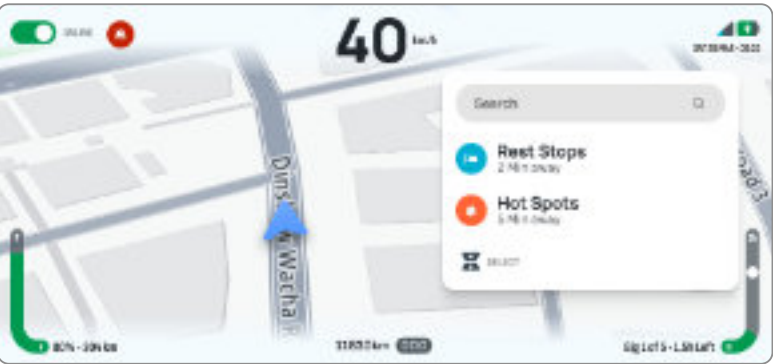
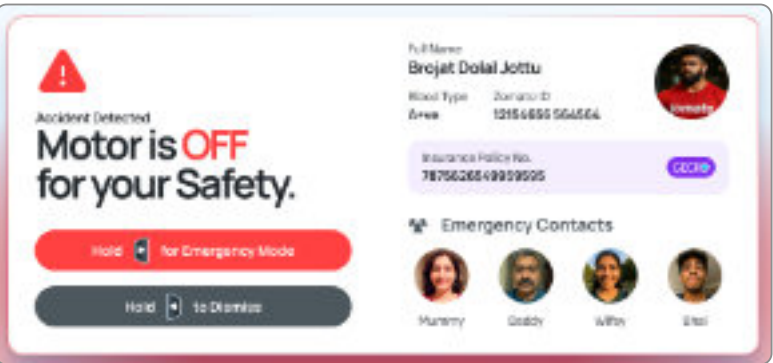
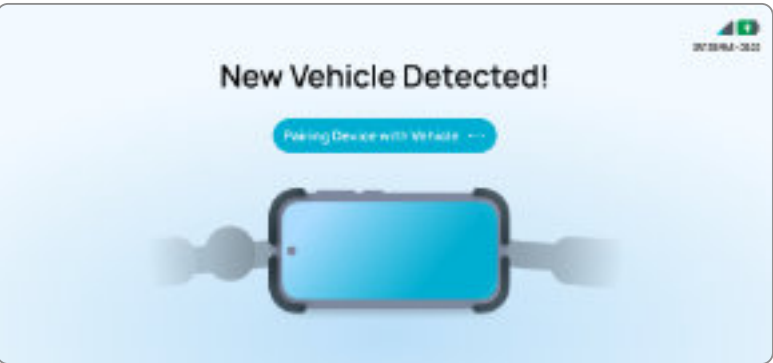
Left to Right:

1. Feed Screen (Parked Mode)

2. Home Screen (Delivery Process, Navigation Running)

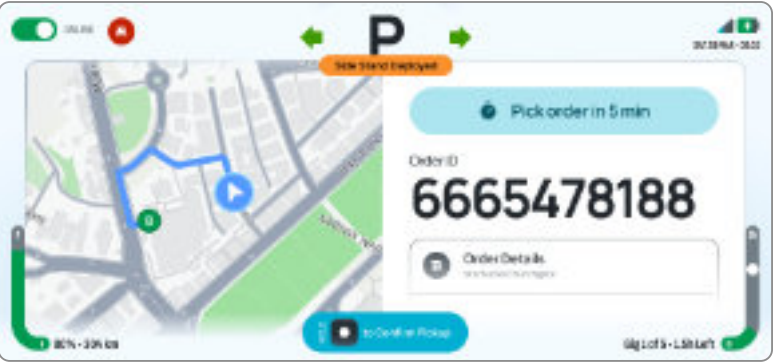
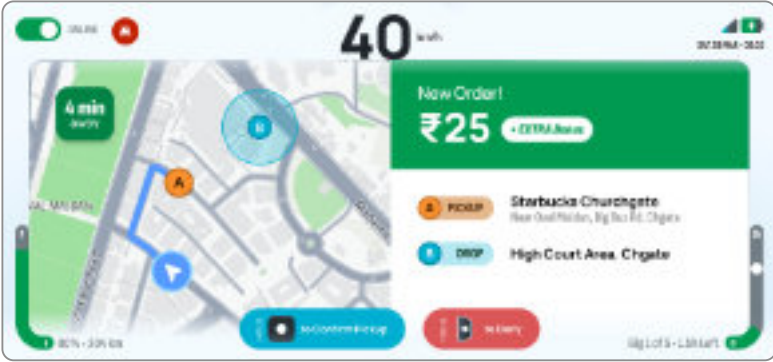
7. First time onboarding screen, shows when a vehicle is detected.

8. Accident Detection Screen, Automatically pops-up when an accident is detected. Shows important information for first aid responders



9. Gigs Screen, shows an overview of performance and and the duration of current gig

10. Pocket Screen shows an overview of months, layout are adapted from the original app to fit well on an vehicle friendly display

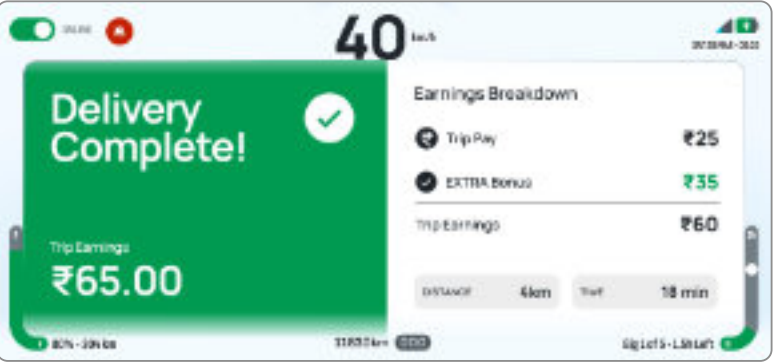
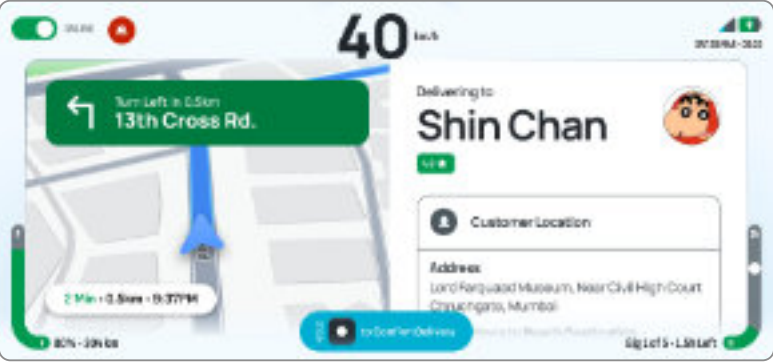


5. Order Assignment Screen, More emphasis on pickup and drop locations. The customer location is shown as an approximate area, helping preserve customer privacy whilst providing transparency to users. Accepting opens a live order view page

6. Order Pick Up Screen under Live Order Page, similar layout, maps being emphasised - touchscreens are permissible due to vehicle being mostly stationary.

11. Delivery Screen under Live Order Page

12. Delivery Completion Screen



User Flows

User flows help illustrate the functioning and working of the interface. A selected user flows are displayed here to highlight some of it's intended function and layout.

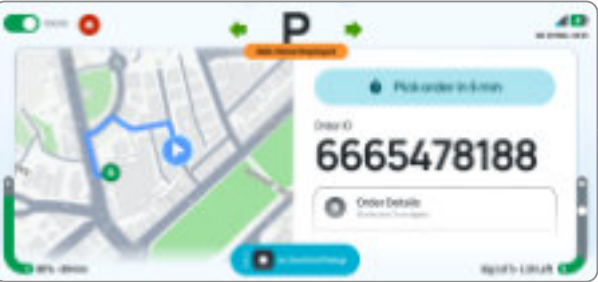
Order Delivery



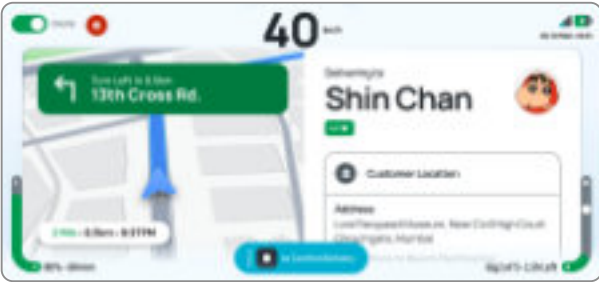
User is in the ONLINE actively searching for orders, Order Tracking Component says “Searching for Orders..”



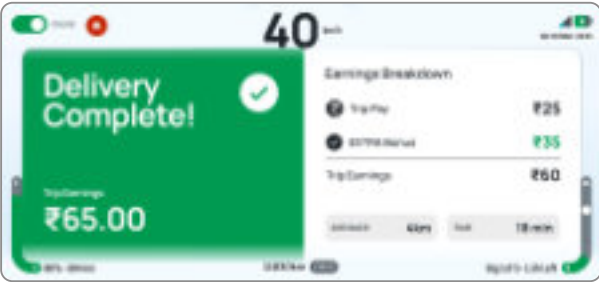
When an order is assigned, a pop will show asking confirmation to take on the order.
Unlike the original pop-up, this one clearly shows locations to go in detail, customers' location is shown as an approx area to get an understanding of the locality they are heading to.



Once they reach the restaurant to pick up, the information is still neatly laid out without having to exit the RiderDash mode.
Touchscreen interactions work as user's vehicle is largely stationery in this part of process flow



When user is set out for delivery, maps widget seamlessly integrates navigation into delivery management



When delivery is handed over and marked complete, user is greeted with a success screen, giving focus to visibility & accessibility.

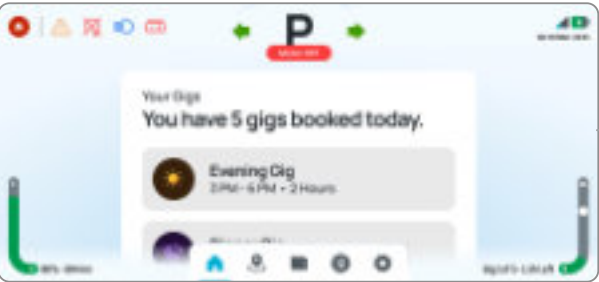
Docking device for the First Time



When a device is docked for the first time, the application will show a confirmation and starts pairing automatically.



Once paired to the device, it will ask a confirmation before user starts using the RiderDash mode



Rider is greeted with a familiar feed home page yet optimized for larger visibility



Once user shifts to drive/begin accelerating, the home feed gives way to dashboard.

User Testing



A short user testing was conducted with a total of 4 participants, taking turns at interacting with a simulated user flow. After the test was conducted a short interview was conducted to evaluate the ease of doing their tasks. This testing was conducted to check feasibility, ease-of-use and functionality of the designed screens.

The Testing Setup

The set-up consisted of a smartphone running the figma prototype mounted on to a handlebar of a bicycle using a typical motorcycle smartphone mount. Alongside, a custom fabricated D-Pad was installed next to left hand grip.

Custom Fabricated 5 button Directional Pad

The D-Pad is a custom fabricated part that allowed the project to conduct the test in a realistic manner despite the limitations. This following D-Pad is joint effort of both the author completely 3D Printed and uses an ESP8266 programmed to simulate a xbox console’s d-pad, which is a compatible format for figma and devices to recognize across the board.

The D-Pad was made possible in a joint collaboration with Mr. Yashovardhan Shetty to help design and print the model.



Findings

Most users in the test praised the interface being easy-to-use and legible due to familiar layout and large elements. It took the users approximately 1-2 minutes of exploring until they familiarized themselves to the layout, they also commented that the d-pad navigation is easier to use than touch screens once you get familiarized. One user commented that a concave like shape on the face of d-pad would be better to rest fingers and guide muscle memory more cleanly.

In the delivery screens, users praised the fact the their pick up and drop points are easily visibile, and easy to pick up on. They also praised the visibility of drop points which helped them judge safety and distance from their location

During test, 2 of 4 users were confused with interacting the maps sheet in the Expanded Map View Page. Users attributed it to a misleading button guide wherein the user misintrepreted the guide that showed the select button as button to interact with the screen.

Visibility of ticker text next to Fuel Meters & Gig-O-Meter were slightly difficult to read as they were too small to focus on quickly and required additional glances.

Conclusion & Scope

This project significantly pushed my design skills, especially in the new domain of automotive interface design. The core challenge was creating a seamless, friction-free interface that aligned with both design goals and user needs.

Adopting a hands-on design research approach was crucial. It helped me deeply empathize with users, which was vital for such an ambitious undertaking. While the project's full scope included industrial design, HMI, and design engineering, we focused on the UX/UI phase due to resource, time, and feasibility limits. This concentrated effort led to substantial learning and a broader perspective.

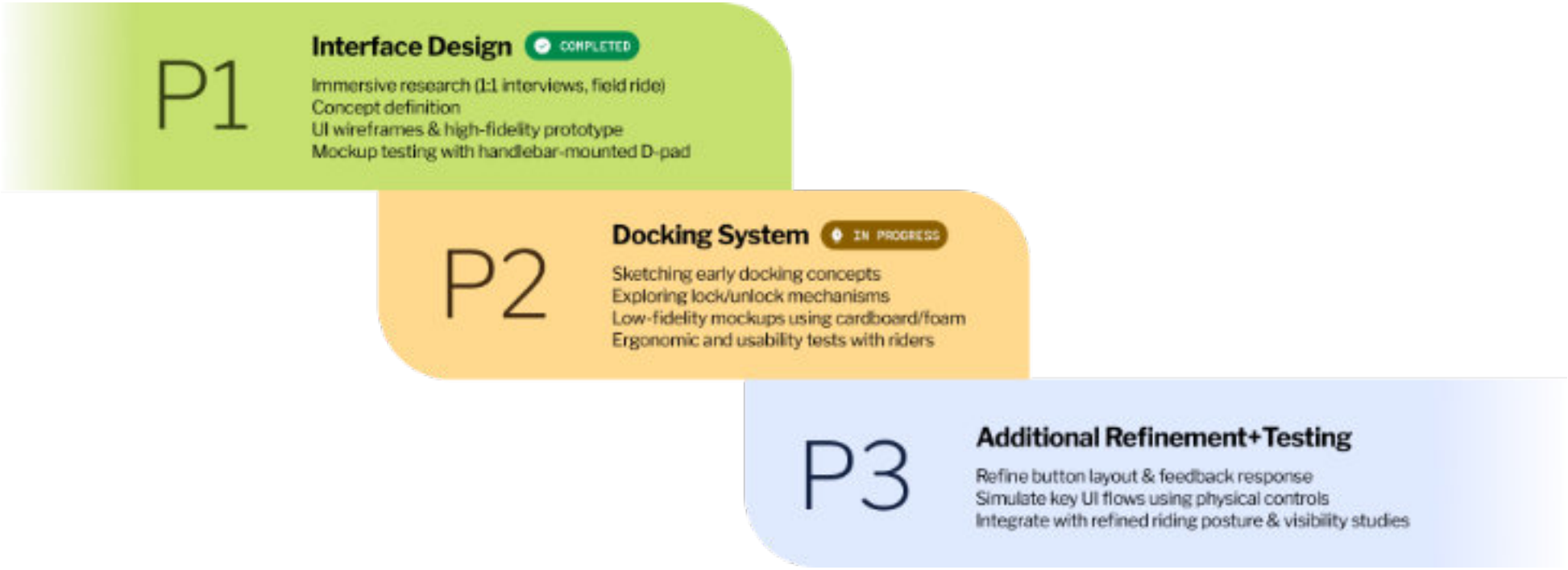
Delivery riders are a critical link in the gig economy, but their work is inherently risky. They deserve a thoughtfully designed interface that prioritizes their safety and convenience, ultimately boosting their efficiency. Moving forward, I plan to refine the interface, explore deeper tech integration with vehicle systems, and develop an all-weather mounting mechanism that’s easy to use.

This project was a chance to go beyond my usual design abilities and tackle areas I'd struggled with. Designing interfaces for cars was completely new, and it came with its own set of problems. The main goal was to make an interface that users could interact with easily, without any extra hassle,

all while sticking to the project's design and problem statements.

Getting hands-on with design research really helped me understand and connect with the users. This was key for such a big project. Even though the project was ambitious and covered industrial design, HMI, and design engineering, we could only finish the UX/UI part because of limited resources, time, and practicalities. Still, this focused effort taught me a lot and made me think about things differently.

Delivery riders in today's gig economy are a vital connection between customers and businesses, but their job is risky. They need a well-designed interface that puts their safety and convenience first, making them as efficient as possible. My next steps involve improving the interface further, looking into more advanced tech integration with vehicle systems, and creating a mounting mechanism that works in all weather and is simple to attach and detach.



Bibliography

Reports

- Moe, D., & Roche-Cerasi, I. (2024). Infotainmentsystemer og oppmerksomhetsfordeling i bil
<https://sintef.brage.unit.no/sintef-xmlui/handle/11250/3161863>

Academic Articles

- Prakobkarn, P., Luangwilai, T., Prempre, P., & Kunno, J. (2024). Prevalence of motorcycle accidents among food delivery drivers and its relation to knowledge, attitudes, and practices in urban areas in Bangkok, Thailand.
<https://doi.org/10.1371/journal.pone.0303310>
- Qian, Q., He, J., & Shi, J. (2024). Analysis of factors influencing aberrant riding behavior of food delivery riders: A perspective on safety attitude and risk perception. Transportation Research Part F: Traffic Psychology and Behaviour.
<https://doi.org/10.1016/j.trf.2023.12.007>
- De Waard, D., Schepers, P., Ormel, W., & Brookhuis, K. A. (2010). Mobile phone use while cycling: incidence and effects on behaviour and safety. Ergonomics,
<https://doi.org/10.1080/00140130903381180>

- Ahmad, A., & Omar, E. N. (2023). Exploring Challenges of Food Delivery Riders in The Gig Economy – A Conceptual Model. Advances in Business Research International Journal
<https://ir.uitm.edu.my/id/eprint/87280/1/87280.pdf>
- Dong, H., Zhong, S., Xu, S., Tian, J., & Feng, Z. (2021). The relationships between traffic enforcement, personal norms and aggressive driving behaviors among normal e-bike riders and food delivery e-bike riders. Transport Policy
<https://doi.org/10.1016/j.tranpol.2021.09.014>
- Nguyen-Phuoc, D. Q., Nguyen, N. T., Su, D. N., Nguyen, M. H., & Oviedo-Trespacios, O. (2023). Deadly meals: The influence of personal and job factors on burnout and risky riding behaviours of food delivery motorcyclists. Safety Science
<https://doi.org/10.1016/j.shaw.2023.03.004>

Online Media

- Riderwings Foundation. (n.d.). Problems Faced by Delivery Riders.
<https://riderwings.org/delivery-riders-problems/>

- Road Safety Commission. (2024). Mobile Phone Distraction and how it influences road safety (Fact Sheet). Government of Western Australia.
<https://www.wa.gov.au/government/publications/mobile-phone-distraction-and-how-it-influences-road-safety>
- Zaidi, Y., & Guha, A. (2024, December 14). Indian gig economy in 2024: Faster delivery and slow movement of rights for ‘delivery partners’. The Indian Express.
<https://indianexpress.com/article/opinion/columns/india-gig-economy-2024-faster-delivery-slow-movement-rights-partners-9724584/>
- ETSC. (2022, November 11). Road collisions more likely for takeaway riders in the gig economy..
<https://etsc.eu/road-collisions-more-likely-for-takeaway-riders-in-the-gig-economy/>
- Bicycle Network. (2024, September 11). Tech solutions for driver distraction.
<https://bicyclenetwork.com.au/newsroom/2024/09/11/tech-solutions-for-driver-distraction/>
- Gupta, D. (2018, September 27). The Swiggy Delivery Challenge (Part One). Swiggy Bytes — Tech Blog.
<https://bytes.swiggy.com/the-swiggy-delivery-challenge-part-one-6a2abb4f82f6>
- maglo_maniac. (2024, July 1). AMA, Completed a Month as Zomato Delivery Partner. Reddit
https://www.reddit.com/r/indiasocial/comments/1dtoyj0/ama_completed_a_month_as_zomato_delivery_partner/

