



# BLINK SHIELD

*A Step Towards Safer  
Roads in India”*

Presented by Team Humans

# PROBLEM STATEMENT

In India, where over **40%** of urban road accidents involve alcohol-impaired drivers, the lack of accessible and culturally sensitive self-assessment tools hinders individuals from making informed decisions about driving after alcohol consumption. Traditional methods like breathalyzers are costly and stigmatized, while existing mobile apps often compromise privacy or require additional hardware.

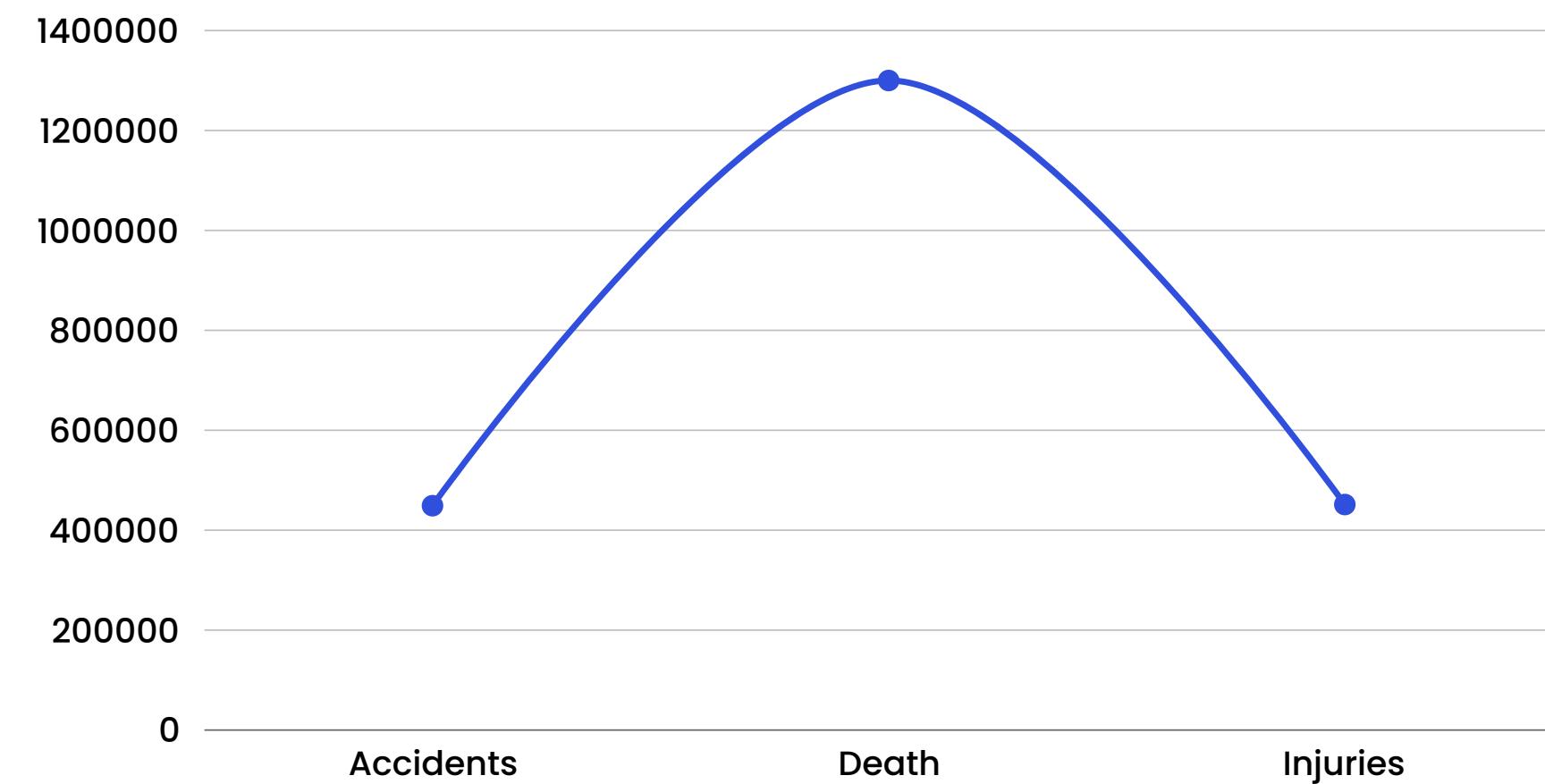
With over **750 million** smartphone users nationwide, there is an urgent need for an affordable, privacy-first, and user-friendly solution that empowers individuals to self-assess impairment and promote road safety.

# INTRODUCTION

- Road Accident is a significant concern in every country. According to **WHO** (World Health Organization) reports, **1.3 million** people died in road traffic crashes.
- In India, the total number of **449,002** accidents in the year 2019 led to **151,113** deaths and **451,361** injuries.
- Drunk and driving alcohol is the momentous root cause of the accidental tragedy.

In India, police determine if a driver is under the influence of alcohol by:

- Breathalyzer Test
- HGN Test



## Breathalyzer Test: Measuring Blood Alcohol Concentration (BAC)

- **Private vehicle drivers:** 0.03% (30 mg of alcohol per 100 ml of blood)
- **Commercial vehicle drivers:** 0.04% (40 mg of alcohol per 100 ml of blood)

These limits are enforced under **Section 185** of the Motor Vehicles Act .

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For instance, the Bengaluru Traffic Police calibrate their devices every three months, acknowledging a probable error margin of  $\pm 5\%$ . To account for this, they typically do not penalize drivers with BAC readings below 40 mg/100 ml, even though the legal limit is 30 mg/100 ml.

## Blood Test: Confirmatory Testing

If a driver refuses the Breathalyzer test or if the results are contested, the police may require a blood test to accurately determine the BAC. This is especially pertinent if the driver is involved in an accident or exhibits clear signs of intoxication. **Section 203** of the Motor Vehicles Act empowers police officers to arrest individuals who refuse to provide a breath sample when there is reasonable suspicion of alcohol consumption.

# Legal Consequences

Driving under the influence of alcohol is a serious offense in India. Penalties under Section 185 of the Motor Vehicles Act include:

- First-time offenders: Fine up to **₹10,000** and/or imprisonment up to 6 months
- Repeat offenders: Fine up to **₹15,000** and/or imprisonment up to 2 years

Additionally, offenders may face license suspension and increased insurance premiums.

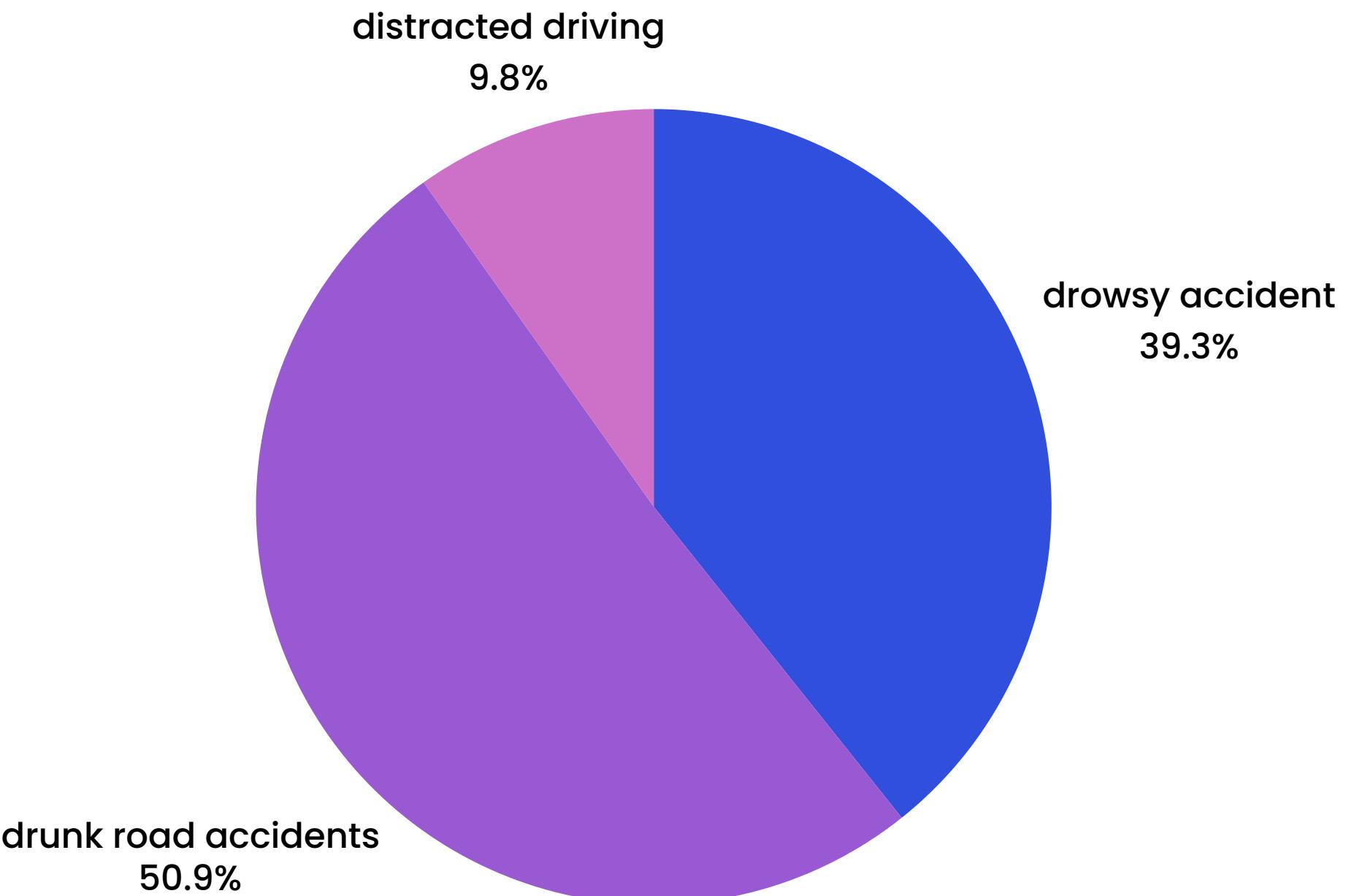
# DRUNK DRIVING IN INDIA

## Statistics

- Fatalities: In 2022, 4,201 fatalities were attributed to drunk driving, accounting for approximately 2.5% of total road accident deaths in India.
- Enforcement: Delhi Police reported booking over 16,000 individuals for drunk driving in 2023

## Limitations

- Enforcement Gaps: Implementation of breathalyzer tests is inconsistent across regions. Some areas lack adequate equipment or trained personnel.
- Public Awareness: Despite laws, a significant portion of drivers remain unaware of the dangers and legal consequences of drunk driving.



# Impact of BAC Levels on Driving Ability

BAC Level	Typical Effects on the Body	Predictable Effects on Driving
0.02%	<ul style="list-style-type: none"><li>- Slight relaxation</li><li>- Mild euphoria</li><li>- Altered mood</li></ul>	<ul style="list-style-type: none"><li>- Decline in visual functions (e.g., tracking moving objects)</li><li>- Reduced ability to perform two tasks simultaneously (divided attention)</li></ul>
0.05%	<ul style="list-style-type: none"><li>- Exaggerated behavior</li><li>- Impaired judgment</li><li>- Lowered alertness</li><li>- Release of inhibition</li></ul>	<ul style="list-style-type: none"><li>- Reduced coordination</li><li>- Difficulty steering</li><li>- Decreased response to emergency situations</li></ul>

- **0.02% BAC:** A driver might feel relaxed but experiences slight visual impairment.
- **0.05% BAC:** The driver feels coordination issues, making tasks more challenging.

# Distracted Driving

## Statistics

- Fatalities: In 2022, 3,395 deaths were linked to the use of mobile phones while driving .

## Limitations

- Data Collection: Accurate data on distracted driving incidents is limited, making it challenging to assess the full scope of the problem.
- Legislation and Enforcement: While laws exist against mobile phone use while driving, enforcement varies, and penalties may not be stringent enough to deter behavior.

# Drowsy Driving

## Statistics

- Underreporting: Precise numbers are hard to determine. However, data from the Yamuna Expressway indicates that over 44% of accidents were due to drivers dozing off.

## Limitations

- Awareness: Public understanding of the risks associated with drowsy driving is low.
- Monitoring: There is a lack of systems to monitor driver alertness and provide warnings or interventions.

# CURRENT SOLUTIONS

- **Hardware dependency** – both systems require dedicated hardware installation in vehicles

## LIMITATIONS

### HI-TECH ROBOTIC SYSTEMZ LTD (THRSL) – NOVUS AWARE

Utilizes AI and computer vision to monitor driver behavior, focusing on eye, face, head, and gaze to detect drowsiness and distraction.

### STARKENN – STARKENN ATTENTION'

Employs computer vision and AI to detect driver fatigue and distraction, providing real-time alerts.

- **Cost limitations** – they are not cost-effective for individual users or smaller operations

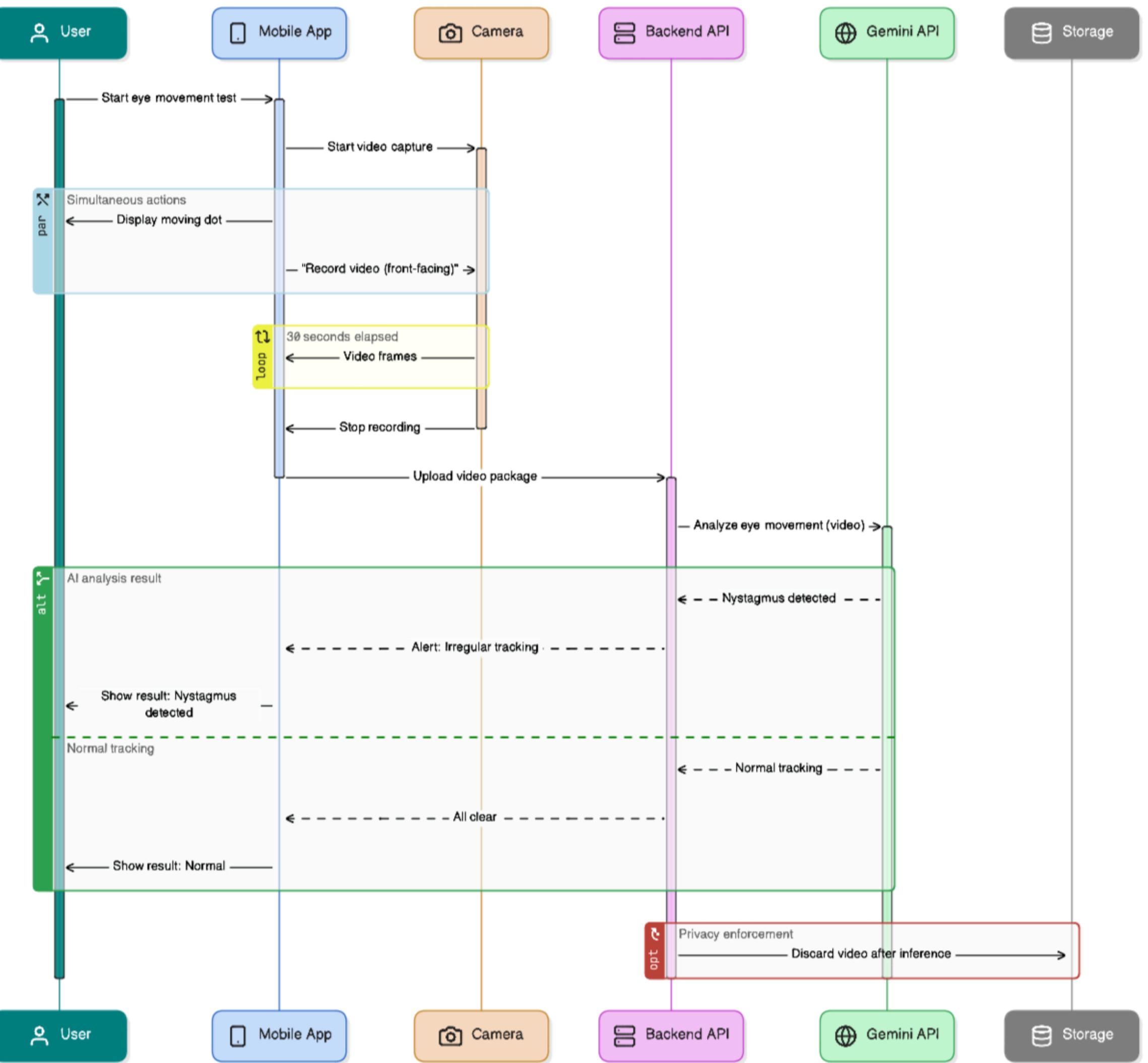
# **OUR SOLUTION**

# what it does?

Blinkshield mobile application that conducts a swift, AI-driven Horizontal Gaze Nystagmus (HGN) test using your phone's front-facing camera. By following a moving dot on the screen, the app records your eye movements to detect signs of impairment, such as erratic motion or nystagmus. The entire process takes under 30 seconds, providing a rapid and private assessment of your fitness to drive.

# how it works?

- **Frontend:** Built with React Native, the app displays a moving dot while simultaneously recording video from the front-facing camera.
- **Video Capture:** After the 30-second test, the recorded video is packaged and sent to our backend for analysis.
- **Backend:** A FastAPI server receives the video and forwards it to the Gemini API, which evaluates the eye movement data to detect signs of nystagmus or irregular tracking behavior.
- **Privacy by Design:** No video is stored; it's used only temporarily for inference and then discarded, ensuring a secure and private experience.



# Key Achievements

- Successfully implemented a working **HGN-style** test using only a smartphone.
- Replaced traditional local tracking tools with Gemini's powerful video analysis.
- Created a **full end-to-end system**: video capture → AI analysis → actionable impairment feedback – all within seconds.
- Maintained a clean and simple user experience while working across multiple tech stacks under tight time constraints.

## Future Enhancements

- **Eye Coloration Analysis:** Integrate MediaPipe and OpenCV to evaluate redness, discoloration, or other visual indicators that could signal fatigue or substance use.
- **Vehicle Integration:** Link ClearGaze directly to a user's vehicle, where a failed test would trigger a lockout and prevent the car from starting, adding a proactive layer of safety.
- **Multi-Signal Detection:** Combine both motion (nystagmus) and visual indicators (eye coloration) to create a more robust and medically relevant assessment.

# COMPARATIVE ANALYSIS

Feature	THRSL – Novus Aware	Starkenn Attention	blinkshield
Hardware Requirement	yes	yes	no
Target Audience	commercial fleets	commercial fleets	individual users and fleets
Installation Complexity	high	high	low
Cost	high	high	low
Privacy Measures	limited	limited	robust
Offline Functionality	no	no	yes
Real-time Alerts	yes	yes	yes
Customization for India	moderate	high	high

# USER PERSONA



## Tejpal Yadav

**Age** - 38

**Education** - High school diploma

**Location**: Malhanwara, Madhya Pradesh, India

**Occupation**: Long-haul Truck Driver

**Marital Status**: Married with two children

### Bio

Tejpal Yadav has been a dedicated truck driver for over 15 years, navigating the challenging terrains of rural and urban India. With a family to support, he often takes on extended routes, driving through the night to meet tight delivery schedules.

### Hobbies and Interests:

Time with  
Friends & Family

### Frustrations and Painpoints

- **Fatigue**: Extended driving hours lead to drowsiness, increasing the risk of accidents.
- **Privacy Concerns**: Hesitant to use monitoring systems that store personal data.
- **Technical Barriers**: Limited access to high-end technology in rural areas

### Impacts after solutions

- **No Additional Hardware**: Utilizes his existing smartphone, eliminating extra costs.
- **Quick Self-Assessment**: A 30-second test to gauge alertness before starting his journey.
- **Data Privacy**: Ensures that no personal data is stored, addressing his privacy concerns.
- **Offline Functionality**: Operates without internet, perfect for remote routes.

### Quote:

"I strive to keep the roads safe, not just for me, but for everyone. But with long hours and fatigue, it's challenging to stay alert all the time."

# OUR TEAM

Our Team Consists of 4 pillars.

**Chirayu Gaur**

UX Researcher

**Aahan Trikha**

Backend Developer

**Yugal Lohani**

Backend Developer

**Yash Wardhan**

Frontend Developer/UI  
Designer



# THANK YOU