# INSOMNIATEC

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Sleep is Death
without
INSOMNIATEC

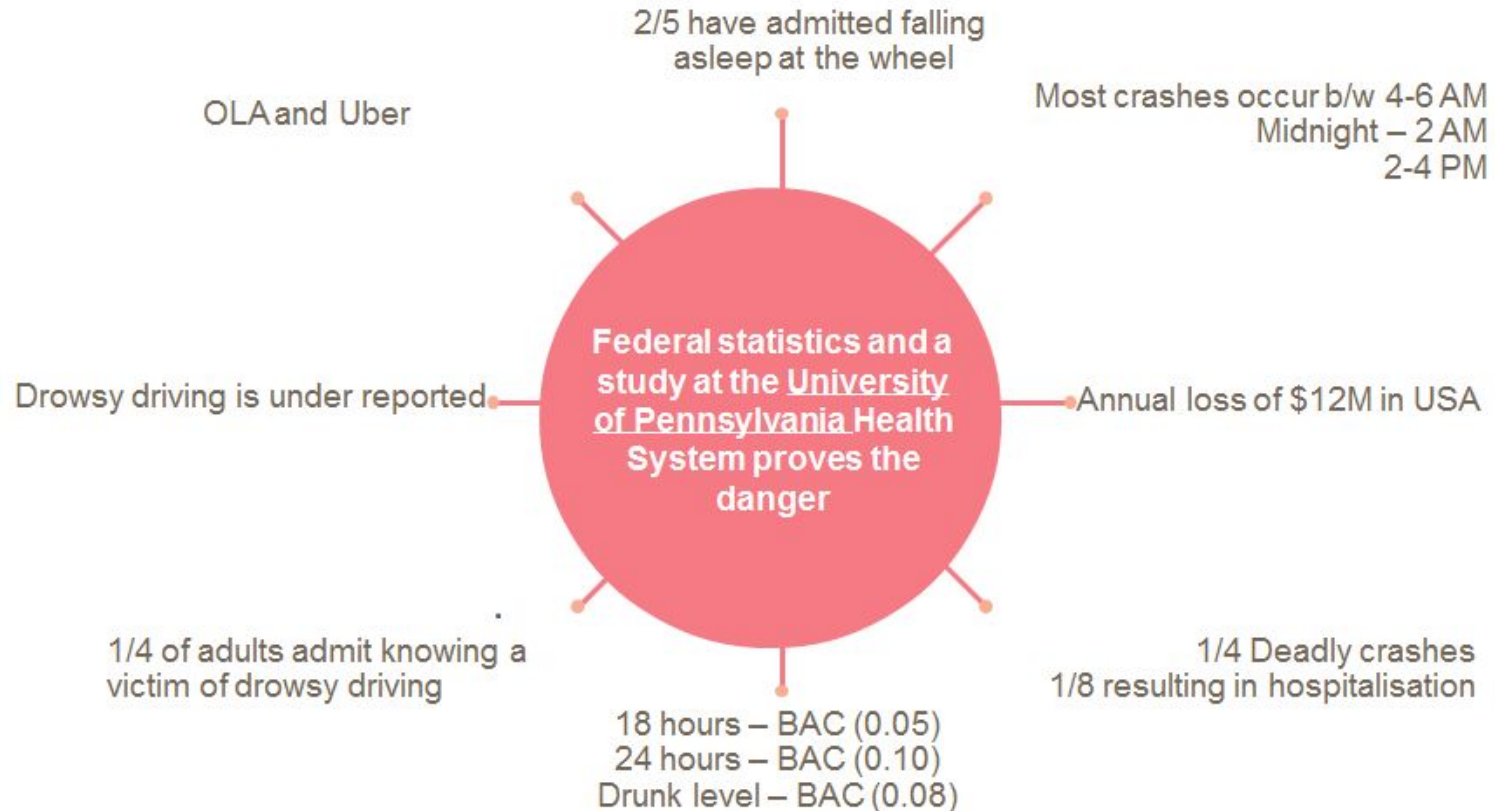Kaustubh Mundra
Sankalp Rastogi

This is
SAM

# Next Morning

# Motivation

- Fatigue is often the cause of serious automobile crashes
- Failing concentration impairs steering behavior and reduce reaction time
- Driver drowsiness increases the risk of collision by factor 4 to 6
- Monotonous driving can lead to loss of concentration
- Transition from being fatigued to nodding off is subtle

# Market Analysis



2/5 have admitted falling asleep at the wheel

Most crashes occur b/w 4-6 AM
Midnight – 2 AM
2-4 PM

OLA and Uber

Federal statistics and a study at the University of Pennsylvania Health System proves the danger

Drowsy driving is under reported

Annual loss of $12M in USA

1/4 of adults admit knowing a victim of drowsy driving

18 hours – BAC (0.05)
24 hours – BAC (0.10)
Drunk level – BAC (0.08)

1/4 Deadly crashes
1/8 resulting in hospitalisation

# Indian - Context

- On Indian roads, approximately 140,000 people die every year of road accidents
- Drivers of heavy commercial vehicles drive for over 12 hours at a stretch
- 57% of truck accidents & 20-30% of all accidents are caused due to Drowsy driving
- 74% of SPAD (Signal Passing at Danger) by passenger trains were due to lack of alertness (2016 - 2017)

**Hardware**
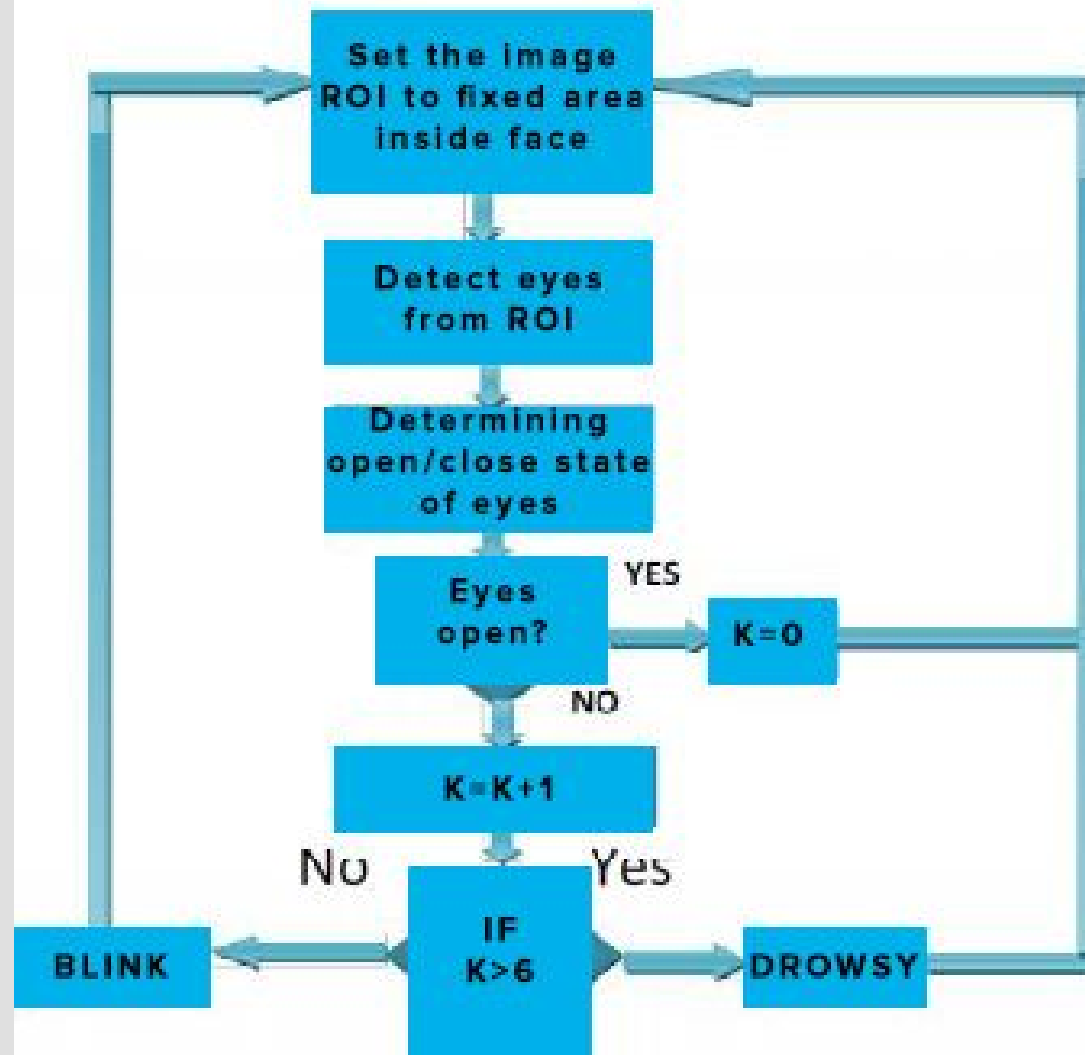Using **phone camera** for monitoring subject
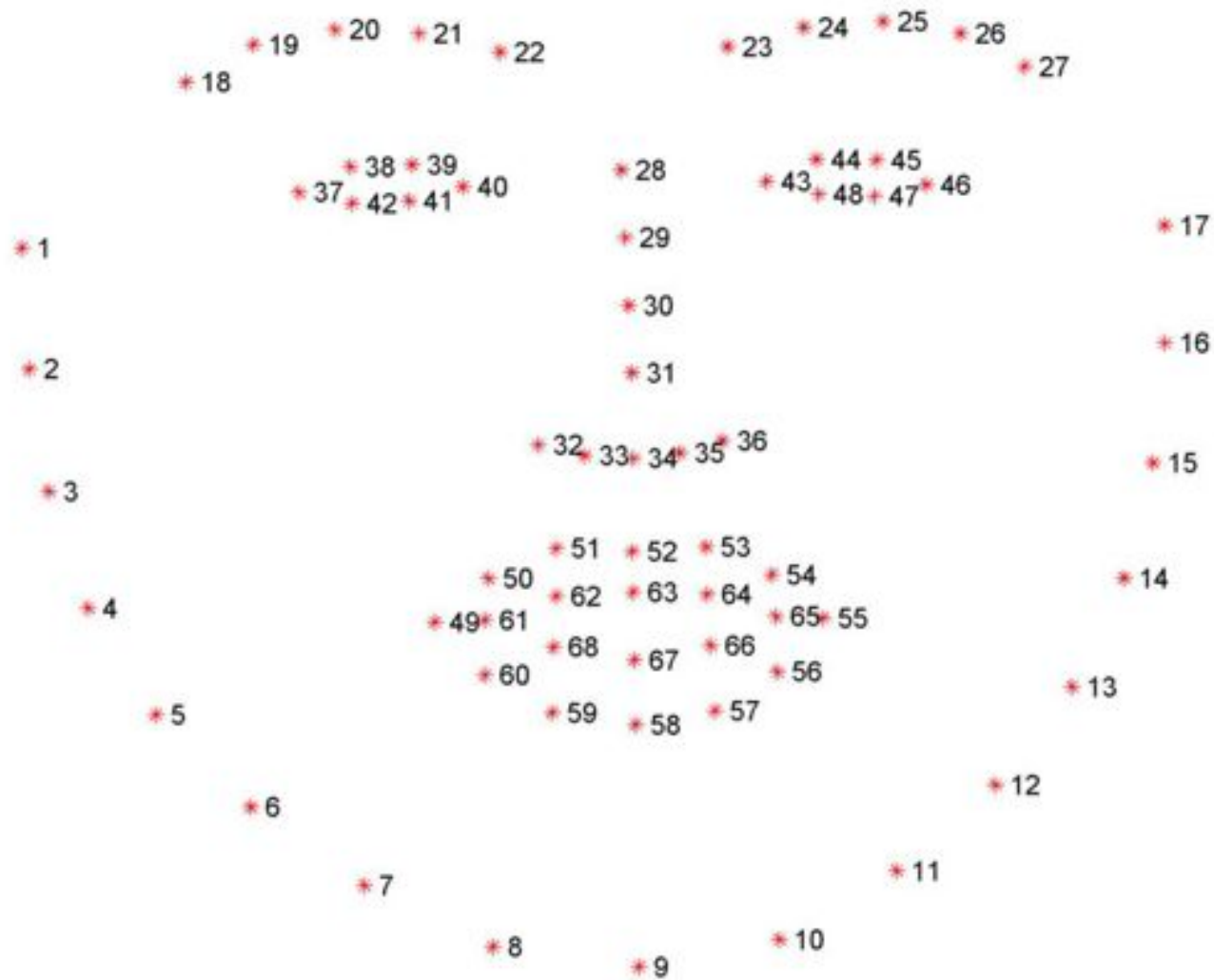
**Technology**
**Image Recognition** to detect drowsiness

**SOLUTION**

**Alert**
**Alarm** rings to give drowsiness alerts

**Result**
Human gets a nice sleep after pulling over the car ;)

# Prototype

# What comes next?

| Add ons | Integration with Car | Improved Traffic |
|---|---|---|
| Night vision | Alert on screen | Steering pattern monitoring |
| Coffee shop recommendation | Alert on music player | Vehicle position in lane monitoring |
| Advising based on sleep pattern recognition | Vibrator on seat | Physiological measurement |
| | | Sign board recognition |

# Self Driving Cars in India

"We will not allow driverless cars in India. I am very clear on this,"

"In a country where you have unemployment, you can't have a technology that ends up taking people's jobs."

**Nitin Gadkari ,**
**Union Minister for Roads and Transport**

India would be the last place on earth to get Uber's self-driving or autonomous cars.

**Travis Kalanick ,**
**Uber Ex-CEO**

## Train engine moves on its own, driver chases it on bike

A driverless electric train engine travelled for 13 km without its loco pilot from the Wadi station in Karnataka. It was stopped by its loco pilot, who chased it on a motorbike and managed to board it. The engine started moving on its own after the Chennai-Mumbai train was halted for a diesel engine to be attached to the bogies.

by Aarushi Maheshwari / 9 Nov, 2017

inshorts
stay informed

# Comparison

- IIT Madras
- Volkswagen
- Volvo
- Jaguar Land Rover
- Mercedes-Benz

# Challenges

- Testing
- Measuring degree of drowsiness
- Success rate measurement
- Hardware life

# Testing

Simulated Environment

- A computer, a monitor, a realistic cockpit, a steering wheel, manual gear box and pedals

# Degree of Drowsiness

- The quality of the last sleep
- The circadian rhythm (time of day)
- The increase in the duration of the driving task
- Questionnaire

Karolinska sleepiness scale (KSS).

| Rating | Verbal descriptions |
|--------|---------------------|
| 1 | Extremely alert |
| 2 | Very alert |
| 3 | Alert |
| 4 | Fairly alert |
| 5 | Neither alert nor sleepy |
| 6 | Some signs of sleepiness |
| 7 | Sleepy, but no effort to keep alert |
| 8 | Sleepy, some effort to keep alert |
| 9 | Very sleepy, great effort to keep alert, fighting sleep |

# Success rate

| Sensor used | Drowsiness Measure | Detection techniques | Feature Extraction | Classification | Positive Detection rate |
|---|---|---|---|---|---|
| CCD micro camera with Infra-Red Illuminator | Pupil | Ada-boost | Red eye effect, Texture detection method | Ratio of eye-height and eye-width | 92% |
| Simple Camera | Eye blink | face and Diamond searching lgorithm to trace the face | continuous blinks, Frequency of eye blink | Region Mark Algorithm | 98% |

# Hardware

CCD micro infrared Cameras ~ Rs.2000

Analog light intensity sensor ~ Rs.127

GPS shield compatible with Raspberry pi ~ Rs.2073

Car Alarm ~ Rs 50

Monetisation ~ Rs 500
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TOTAL COST ~ 4750

# Alternate End to Story

SAM SUNG a song!

# Thank You



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