

INSOMNIATEC



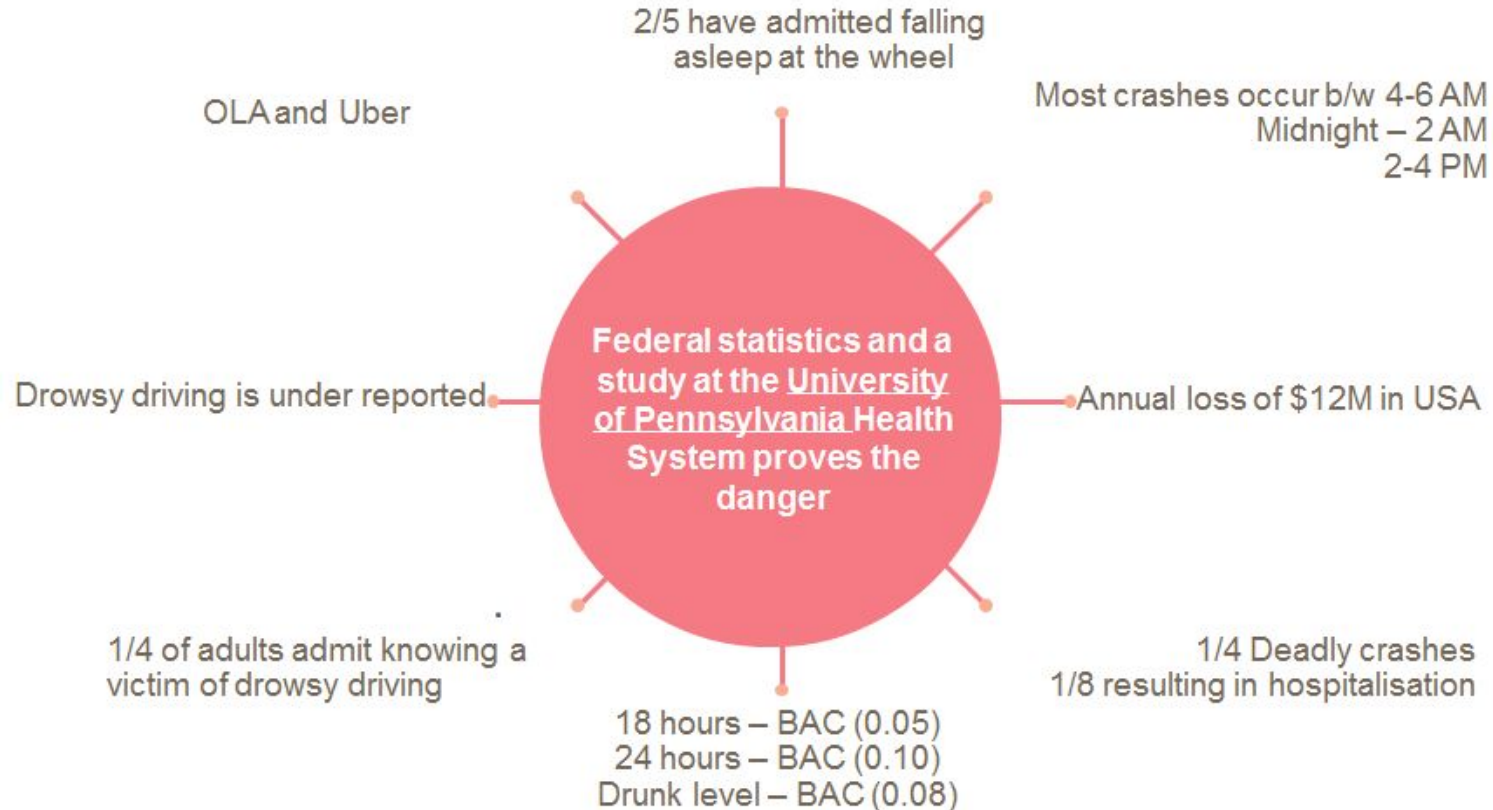
Sleep is Death
without
INSOMNIATEC

Kaustubh Mundra
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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



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)

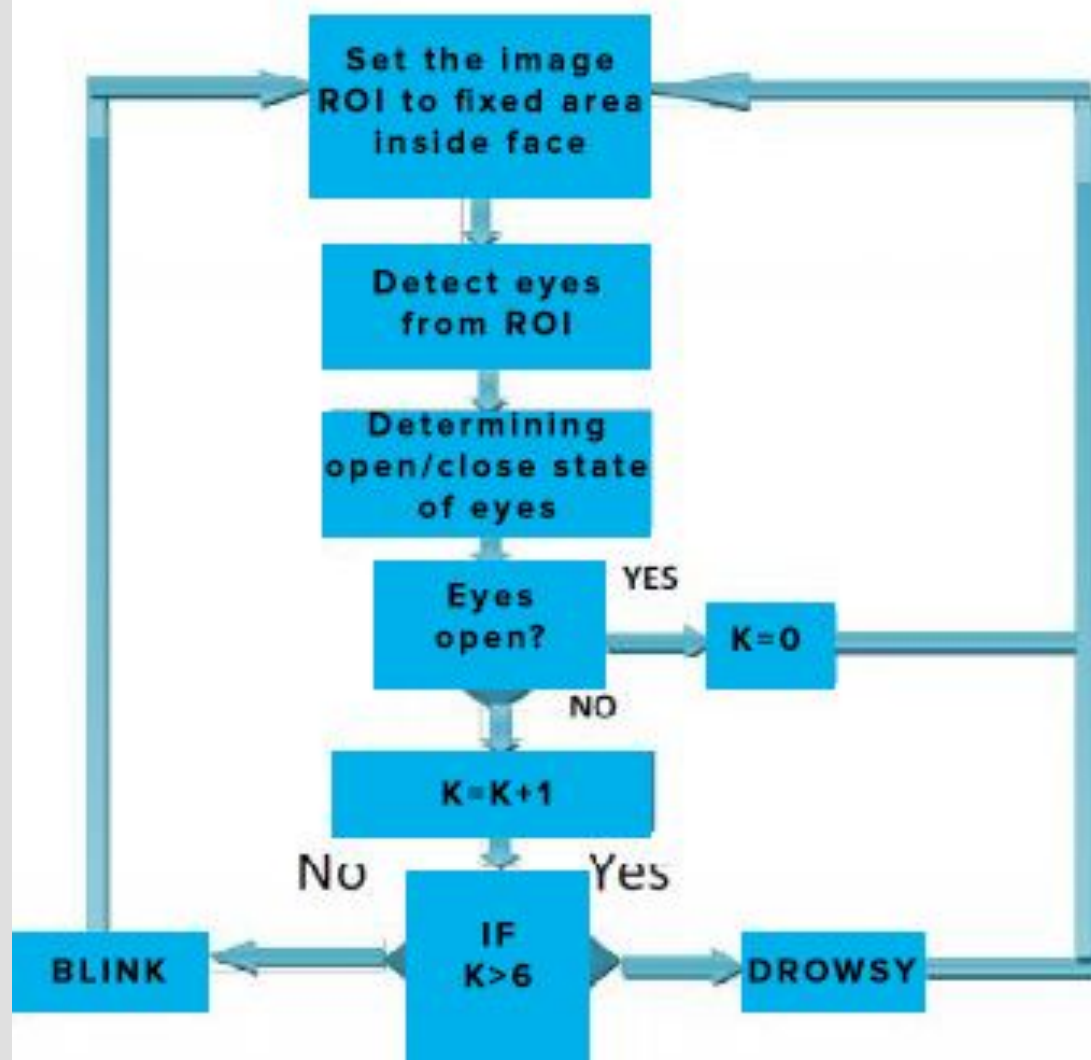
Hardware
Using **phone camera** for
monitoring subject

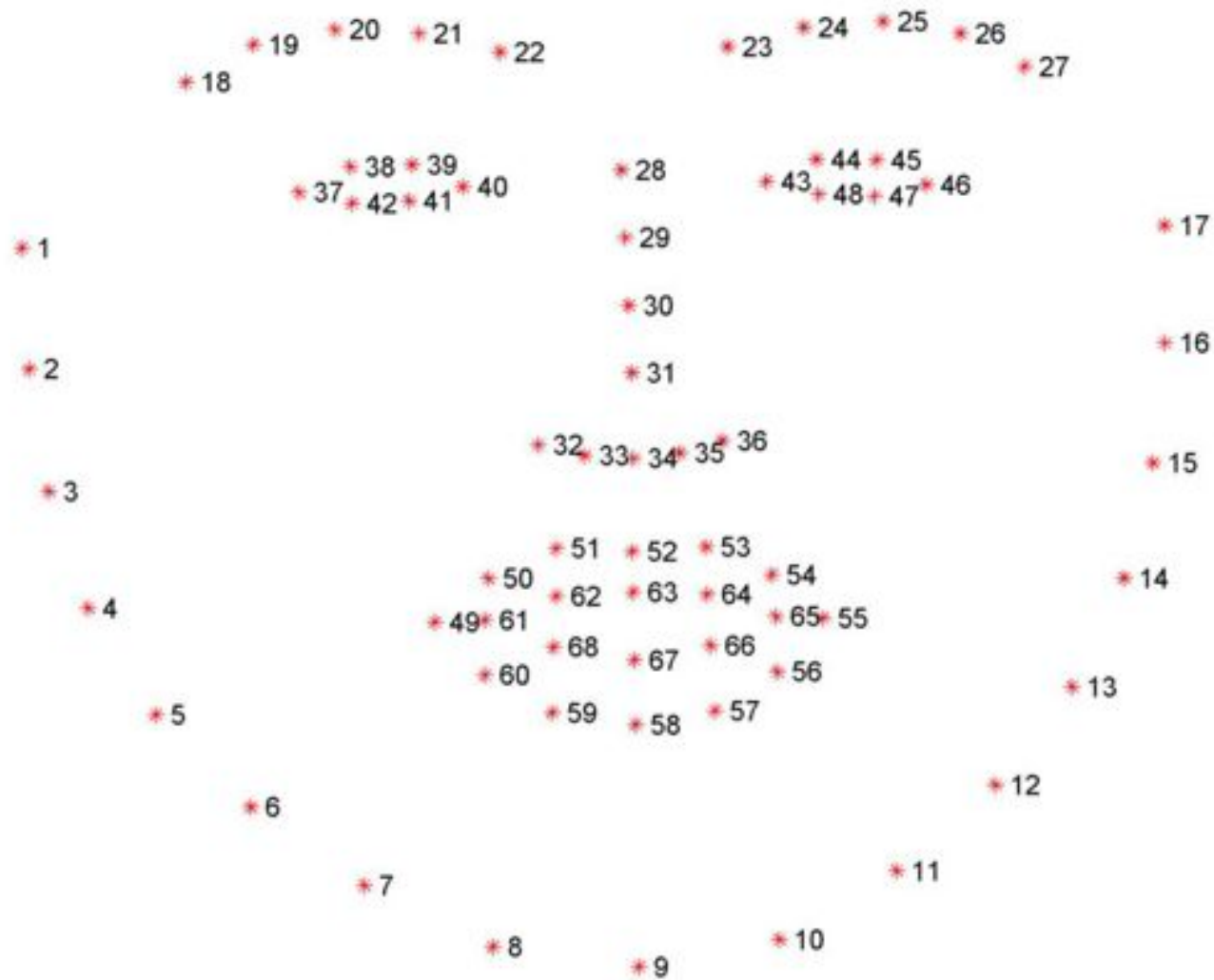
Technology
Image Recognition to detect
drowsiness

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

Night vision

Coffee shop
recommendation

Advising based on sleep
pattern recognition

Integration with Car

Alert on screen

Alert on music player

Vibrator on seat

Improved Traffic

Steering pattern
monitoring

Vehicle position in lane
monitoring

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

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

TOTAL COST ~ 4750

Alternate End to Story

SAM SUNG a song!

Thank You



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