

## Game Summary

1. Title of the proposed game project: SAFE ROADS

### SAFE ROADS GAME USING **DeAuto NEV**

3. Brief description of the game idea highlighting innovative elements.

Effective design, engineering and delivery of blockchain technology aided game solution for vehicles and citizens to make roads safer and better for everyone using gamification, predictive analytics and automation.

#### (b) Science and working principle behind the game idea

Road and transport is an integral part of everyone's life. According to statistics, there is one death in four minutes due to a road accident in India. Our app solution will enable effective design, engineering and delivery of game based blockchain technology aided solution to make roads safer and better using predictive analytics and automation for incident reporting and reduction in hazardous transportation with capabilities pluggable and extendable to 5 different personas/characters: Driver, Police, Citizen, Dispatcher, Admin.

360 degrees access of the incidents to the action/ administration team. They can manage the complete lifecycle of incident reporting, overall status, traffic monitoring, managing police teams. Using machine learning they can also predict the incident occurrence at any area. This will help in taking necessary actions in advance to control the traffic. They can also use the solution for effective utilization of staff members and provide road safety counselling.

- Incident based reporting & Collision detection (even when vehicle is parked) and video footage associated with it using **DeAuto NEV**.
- Recognition area built in the central control to pick up your body movements, GAIT analysis, dashboard
- Built-in GPS technology useful in fleet management, tracking. Black box car tracking to be able to pre-empt and diagnose breakdowns.
- Real-time alert and live streaming. Any abnormal behavior/activity can be displayed on smart dashboard in the vehicle.
- Video footage for abnormal driver behaviour (complete view of the car with 2 cameras – front and back).
- Cloud-Connected Cars using **DeAuto NEV**, data driven analytics., real-time monitoring.

#### (c) Final outcome/deliverable of the project

Our vision is to develop a technical solution for driver monitoring, incident management and collision avoidance using gamification techniques in collaboration with **DeAuto NEV**:

Incident-based reporting & Collision detection (even when a vehicle is parked) and video footage associated with it.

- Video footage for abnormal driver behaviour (complete view of the car with 2 cameras – front and back)
- Real-time alert and live streaming. Any abnormal behaviour/activity can be displayed on the smart dashboard in the vehicle.
- Built-in GPS technology useful in fleet management and tracking. Black box car tracking to be able to pre-empt and diagnose breakdowns more quickly.
- Recognition area built in the central control to pick up your body movements, GAIT analysis
- Vehicles become IoT devices which can connect to smartphones, take voice commands, change the user interface.
- The Cloud-Connected Car Drives IoT Monetization. Real-time access to car availability and mobile connectivity enables better decision making systems.

(d) Who would be the beneficiary of this game innovation and why?

Ensure effective design and delivery of blockchain aided solution to make roads safer and better for everyone using predictive analytics and automation with capabilities pluggable and extendable to 5 personas/characters: Police, Citizen, Dispatcher, Admin, Driver.

1. **Police Force** - 360 degrees access of the incidents to the action/ administration team. They can manage the complete lifecycle of incident reporting, overall status, traffic monitoring, managing police teams. Using machine learning they can also predict the incident occurrence at any area. This will help in taking necessary actions in advance to control the traffic. They can also use the solution for effective utilization of staff members and provide road safety counselling.
2. **Ministry of Road and Transportation:** Endeavor to change the car accident scenario by use of car technology to make driving safer and monitored for drivers, authorities, as well as other 3rd parties. With a mix of hardware and software, we will provide intelligent feedback about drive quality and help analyze past incidents, as well as predict future incidents using **DeAuto NEV**.
3. **Citizens and Cab aggregators:** Reduction in the number of road accidents.
4. **Insurance Companies:** Aggregated/ anonymized driving data and incident data will be helpful to car insurance companies.

5. **OEMs and Dealerships:** Vehicle diagnostics and in-car service consumption will be helpful for OEMs and Dealerships.
6. **Smart Cities Policy Makers/ Government:** Real time traffic flow, incident alert and parking data will enable safer roads.
7. **Advertisers:** Customers/driver demographics will be available.
8. **Fleet customers:** fleet performance, compare against competition.

#### 4. Proposed costs and time frame

Sr.No	Items	Project Cost Own Share ( in lacs )	DeAuto NEV support sought ( in lacs )
1.	Outsourcing Charges for R&D/Design Engg/Consultancy/Testing/Expert cost	1	1
2.	Raw material/ Consumables/Spares	2	2
3.	Fabrication /Synthesis charges of working model or process	1	1
4.	Patent filing Cost	1	1
5.	Contingency	1	1

#### 5. Activity details/work plan on game sustainability

Sr.No	Activities	Monitorable Milestones	Duration (months)
1.	Engage DeAuto NEV community	Trust building and commitment. a. Mentorship b. Pilot based c. Learning and development	2
2.	Implement appropriate project strategy	Industry partnership Design Solution for Indian user base. Mentorship on business plans and feedback on execution and go to market strategy.	3

3.	Pilot Launch	Pilot solution implemented, and feedback gathered from the Indian community.	6
4.	Define management & governance structure	Execution team established Committed Team collaboration with Government, industry, universities, users.	2
5.	Expand	Business Development team Product Deployment started – Sales and Distribution New Website completed	2

We have a market potential with various stakeholders not only buyers of our technology but key collaborators- Federal/State Department of Transport: Breakdown data, accident data; OEM and Dealerships: Vehicle diagnostics, in-car service consumption; Smart Cities: Real-time traffic flow, incident alert, parking; Police Officers, dispatchers, drivers, pedestrians, passengers, civic bodies; Insurance Companies: Aggregated, anonymized driving data, incident data; Advertisers: Customer demographics.

Our business model has two aspects:

One Time Revenue: Sale of Software as a Service platform, hardware

Recurring Revenue: Subscription service for usage of Mobile Application

We plan to have 2 channels:

B2B (Business to Business) : This will aim to serve business institutions like insurance organizations, Government, co-working spaces.

B2C (Business to Consumer): This arm of the sales team will focus on citizens and sell the product as a value added service on their mobile phones and computers.

We also intend to partner with a network provider to bring our network usage cost down and Co-brand our product. We want to start with government institutions and business entities as it would help them monitor the operational efficiencies, accessibility and assessment and help us provide scale. After that we wish to target smartphone manufacturers to have this product as a factory fitted feature.

A key channel we wish to focus on strongly is that of Indian government partnership. With the government focusing more and more on road safety, we believe by working closely with the Indian government, we will be able to scale and achieve sustainability and impact.

# Business Plan

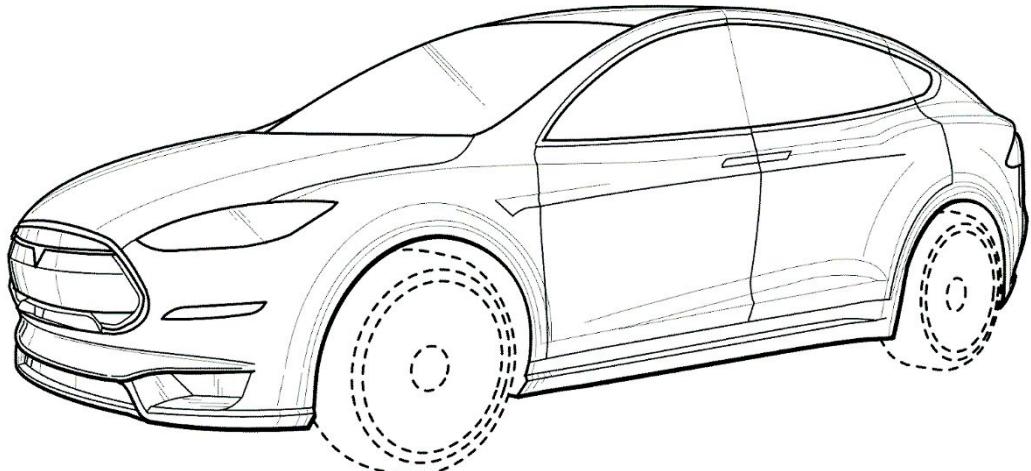


Pitch Desk by Safe Roads

Team:

Manu Sheel Gupta  
Deepti Gupta

Oct. 19, 2022



# Executive Summary

- More number of people died due to road accidents in South Asia in 2013-19, than all of our wars put together. One big reason is that there is very little driver accountability
- Endeavour to change the scenario by use of in-car technology to make driving safer and monitored for drivers, authorities, as well as other 3rd parties. With a mix of hardware and software we will provide intelligent feedback about drive quality and help analyze past incidents, as well as predict future incidents
- Flagship product will be a combination of intelligent on board sensors and a dashboard camera to provide user with unacceptable driving behavior along with video footage of the same
- Key product features to include video recording, event detection and reporting, GPS tracking, 4G- LTE and Wifi compatible with Wifi hotspot, vehicle diagnostics, maintenance reminders, drive quality scores, speed alerts and much more
- Product target segment includes OEMs & dealerships, car fleet owners including OLA and UBER, Insurance companies, and state governments
- Identified clear gap in the market and will focus development efforts towards building quality hardware, intelligent information processing and seamless user experience
- Seeking 15 lakhs for prototype development and testing and to test patentability of the idea



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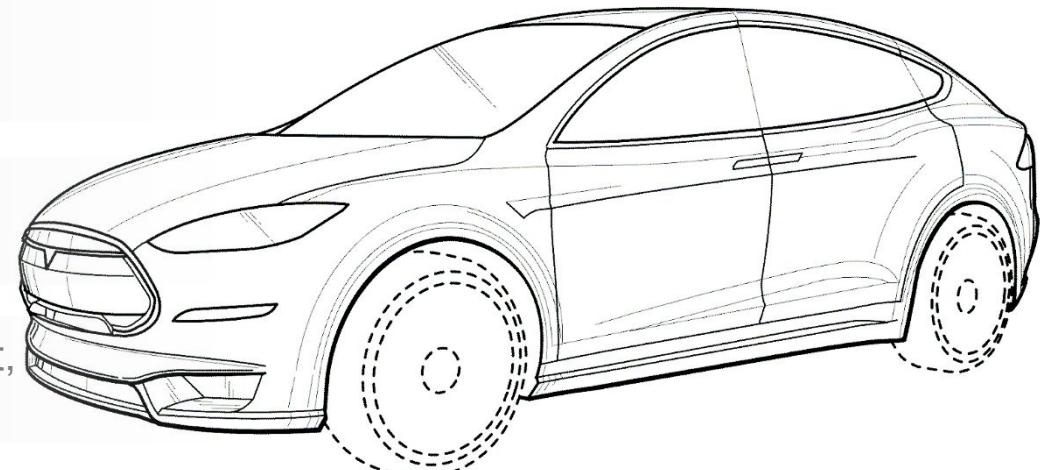
## Our Idea and its Need

Competitive Landscape and our USP

Market Size and Opportunity

Business and Financial Model

Implementation, Team, Go to Market,  
Sales, Distribution



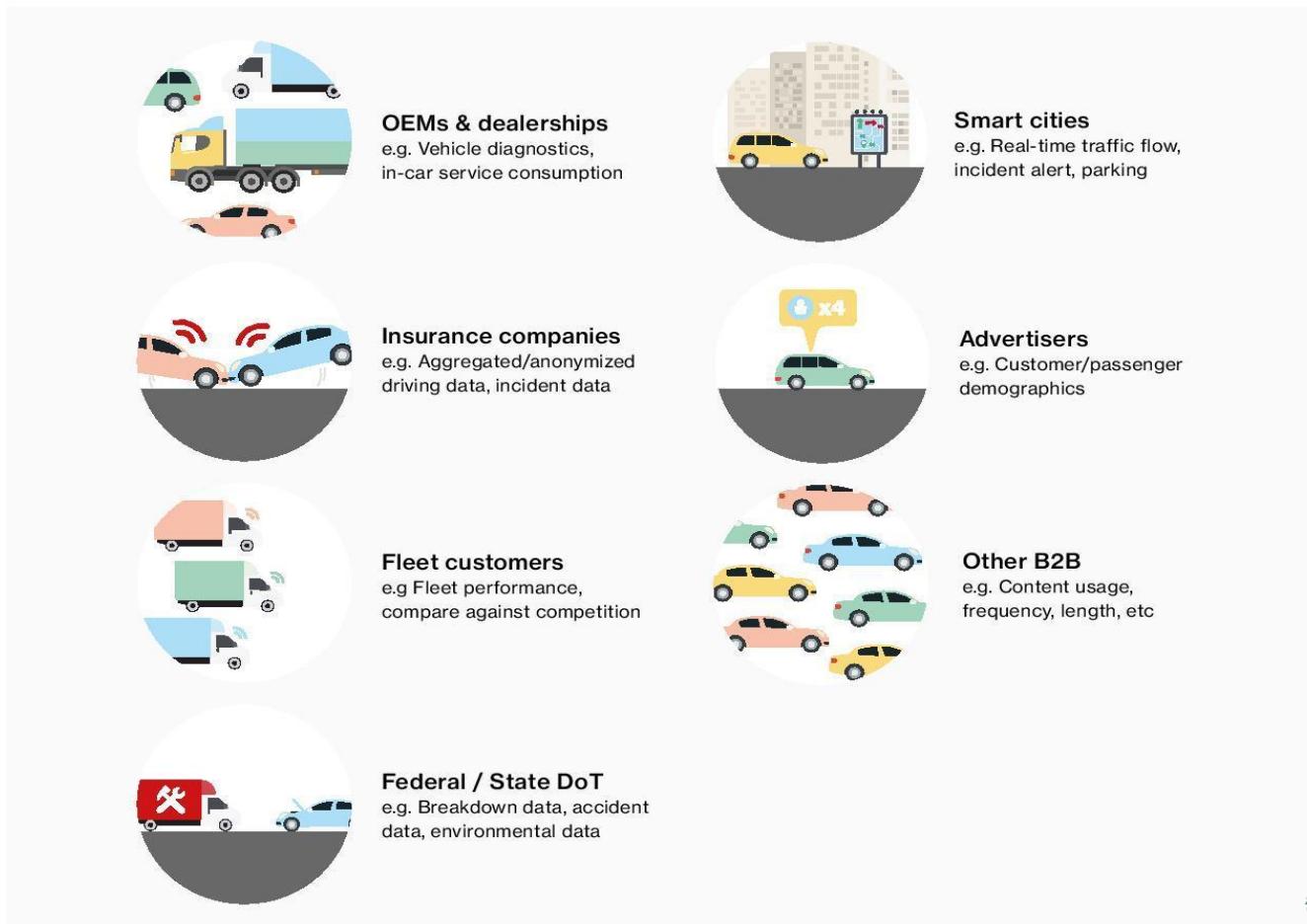
# Roads – A Giant Killing Machine



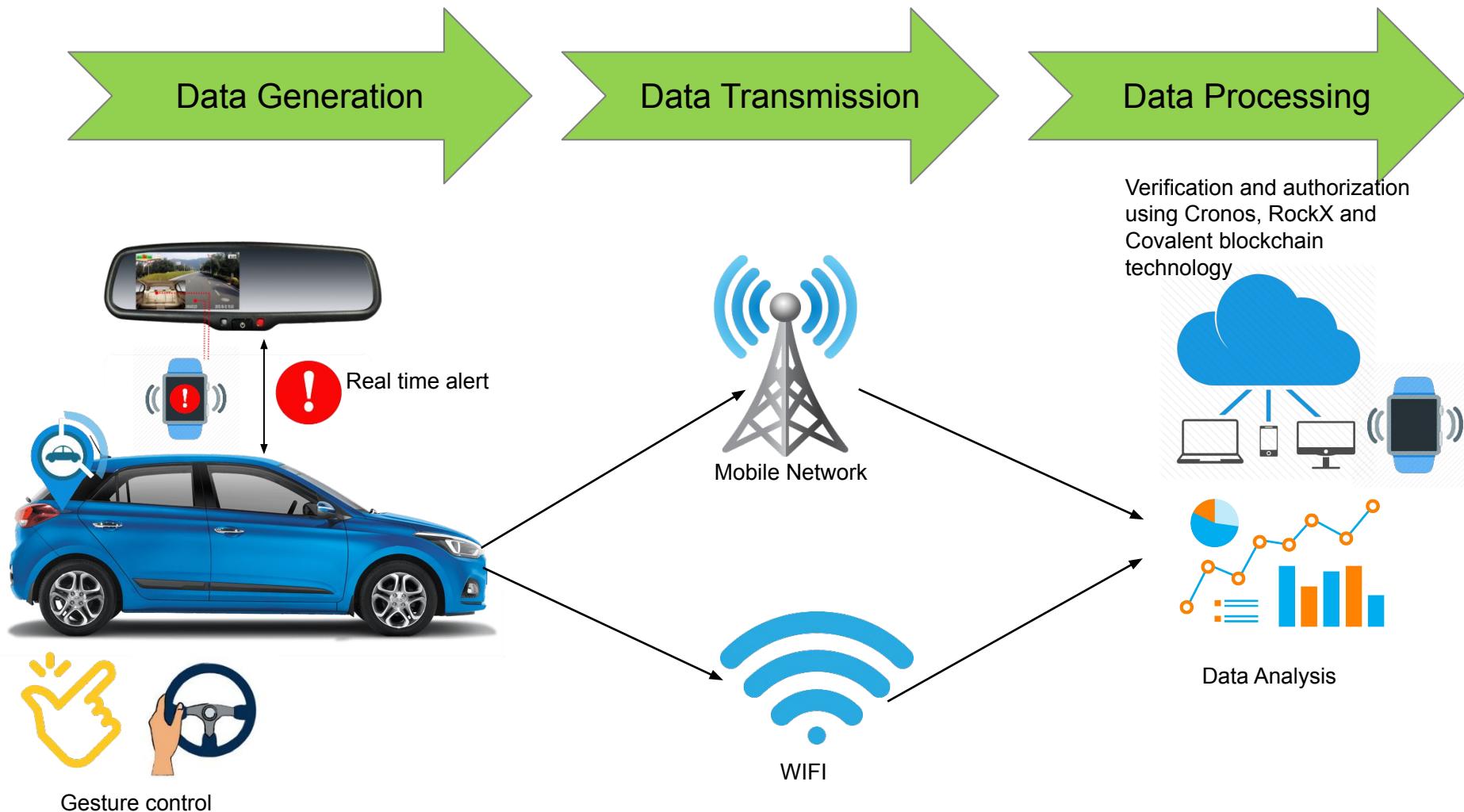
- The total number of road accidents increased by 2.5 per cent from 4,89,400 in 2014 to 5,01,423 in 2015
- Over 1,37,000 people were killed in road accidents in 2013 alone, that is more than the number of people killed in all our wars put together. This number increased to 1,46,133 in 2015
- There is one death every four minutes due to a road accident in India.
- 1,214 road crashes occur every day in India

# Our Vision

Our vision is to use in-car technology to make driving safer and monitored for drivers, authorities, as well as other 3rd parties. With a mix of hardware and decentralized software powered by FileCoin, XMTP Moralis, Tableland, Polygon, Fluence, Chainlink we will provide intelligent feedback about drive quality and help analyze past incidents, as well as predict future incidents using a gamified interface



# Our Idea

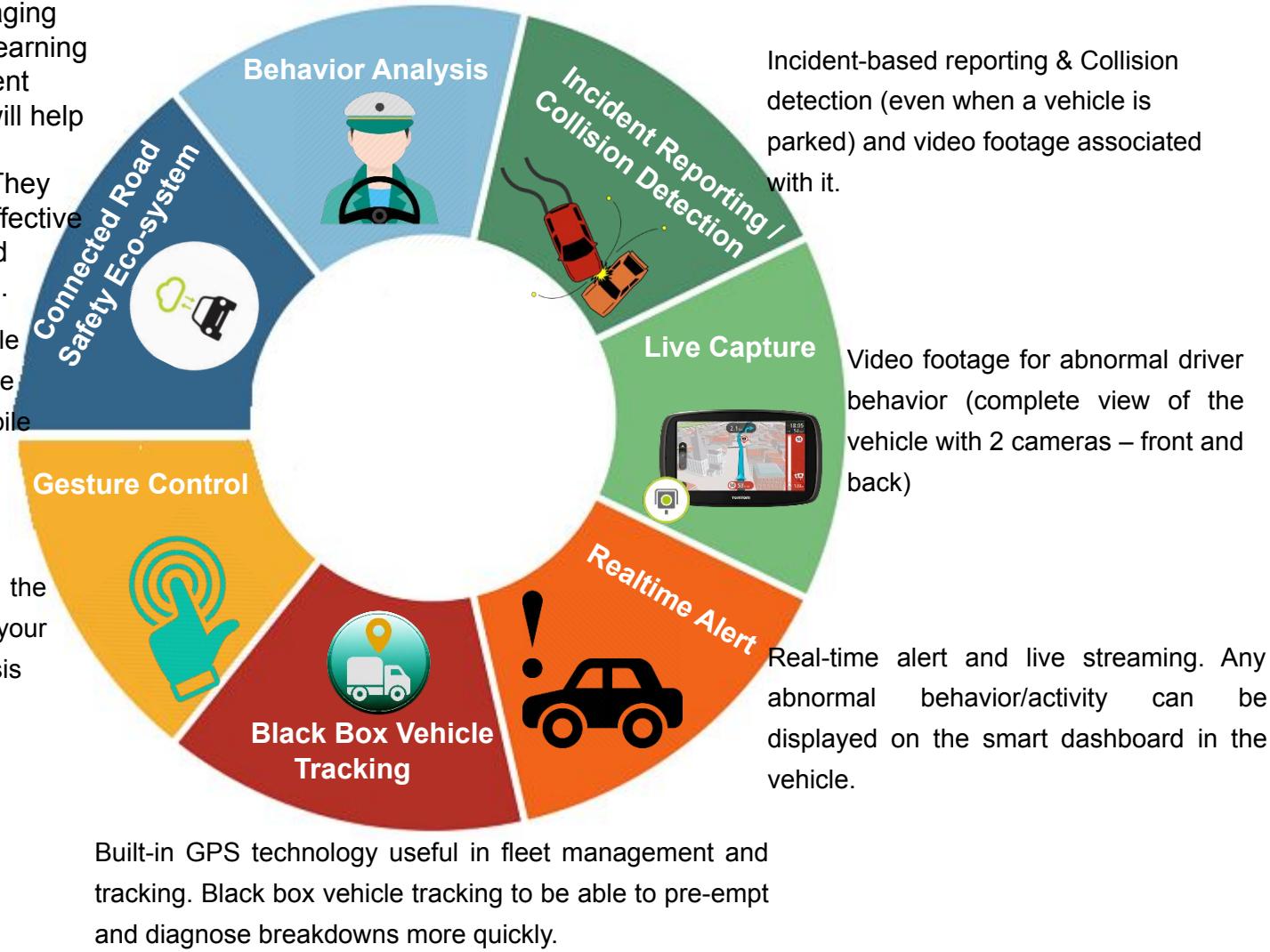


# Technical Solution Features for Driver

360 degrees access of the incidents to the action/ administration team. They can manage the complete lifecycle of incident reporting, overall status, traffic monitoring, managing police teams. Using machine learning they can also predict the incident occurrence at any area. This will help in taking necessary actions in advance to control the traffic. They can also use the solution for effective utilization of staff members and provide road safety counseling.

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Recognition area built in the central control to pick up your body movements, GAIT analysis



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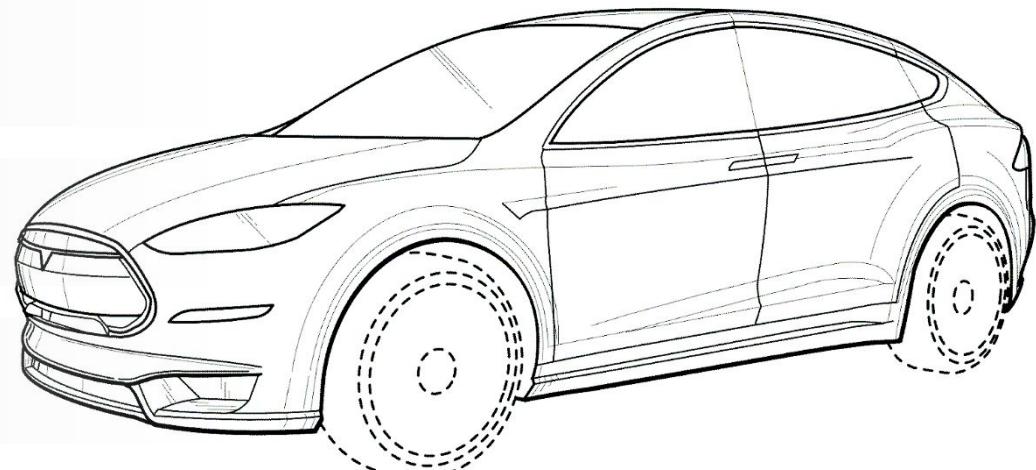
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# Competitive Landscape



Unintelligent Dash  
Cameras



Out of Context  
Telematics Solutions

- Cameras require simplified user interface and one has to know exactly what he/she is looking for
- OEM Telematics solution is bundled with a lot of features and only provide data or at best, information
- No player offers complete solution for the user

# Competitive Landscape - Global

## Verizon Hum

- Use OBD (On Board Diagnostics) to get data about vehicles and gives real time alerts to users
- Has other features like:
  - Roadside and emergency assistance
  - Maintenance reminders
- Cost - \$ 30 for hardware and \$10 subscription fee (2 year)
- They also have a variant which turns Hum device into a WiFi Hotspot (Hardware cost is \$150 and \$15 subscription fee (2 year))
- Other than this Verizon is betting on Telematics and connected cars, they have an entire suite of products providing features like Safety and security, Remote access, Family Driver Monitoring, Fleet monitoring, etc.

## Other OBD based Products

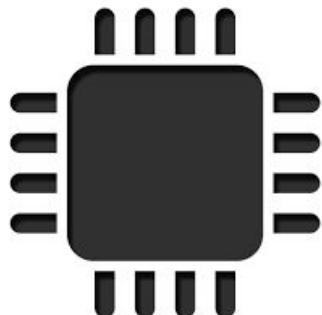
- Apart from these, there are many other OB readers like Dash Command, Torque etc. (which basically use OBD and send information to the App)
- Tools like Blue driver Professional OBD2 Tool help mechanics to understand issues with the car

# Our Value Proposition



## Hardware:

- Hi resolution front and back cameras for complete protection (both when car is running and when it is parked)
- Reliance on trusted technologies for reliable vehicle data



## Intelligent Information Processing:

- Incidence based reporting
- Understanding “What” happened and “Why”
- Build analytical and predictive capabilities to increase value of recommendations



## User Interface:

- Access past data without storage
- Actionable information

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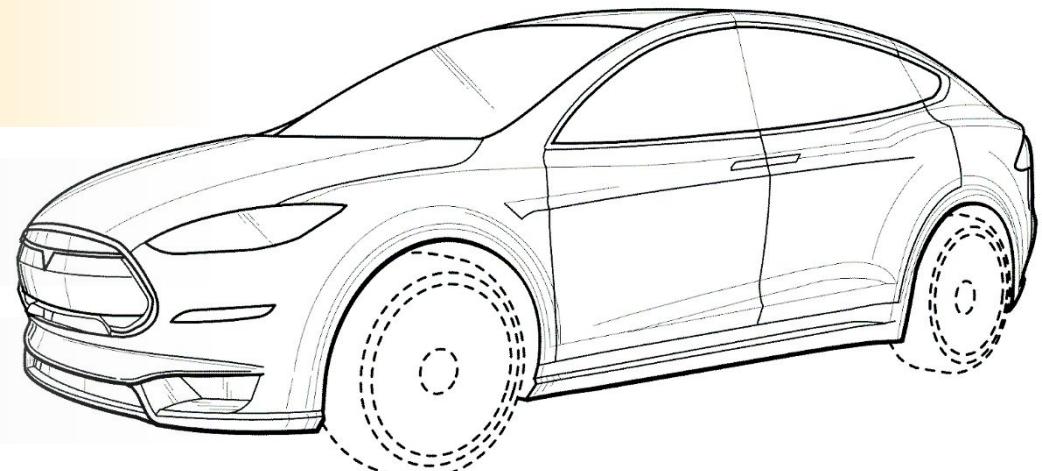
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# Target Customers and Market Sizing – Phase 1



	F17	F18	F19	F20
<b>Total PV Sales (2015 - 16)</b>	2872884	2959071	3047843	3139278
<b>Fleet Cars (% of PV)</b>	11%	13%	14%	15%
<b>New Fleet Cars</b>	316017	384679	426698	470892
<b>Existing Fleet Cars (with Cab Aggregators)</b>	550000	716212	952334	1198459
<b>% of New fleet cars with cab aggregators</b>	70%	80%	80%	80%
<b>New Fleet Cars (With Cab Aggregators)</b>	221212	307743	341358	376713
<b>% of cars discarded from roads</b>	10%	10%	10%	10%
<b>No. of Cars discarded from roads</b>	55000	71621	95233	119846
<b>Total Fleet Cars (With Cab Aggregators)</b>	716212	952334	1198459	1455327

## Target Customers and Market Sizing – Phase 2



Commercial Vehicles (over  
1.6 Crore vehicles sold in the  
past 5 years)



ASHOK LEYLAND



TATA MOTORS

Commercial Vehicles (over  
42 lakh vehicles sold in the  
past 5 years)

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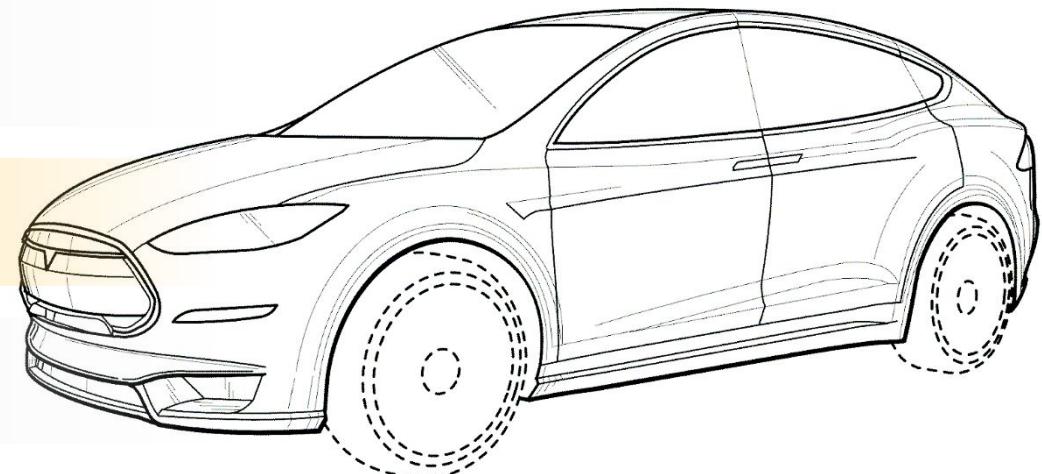
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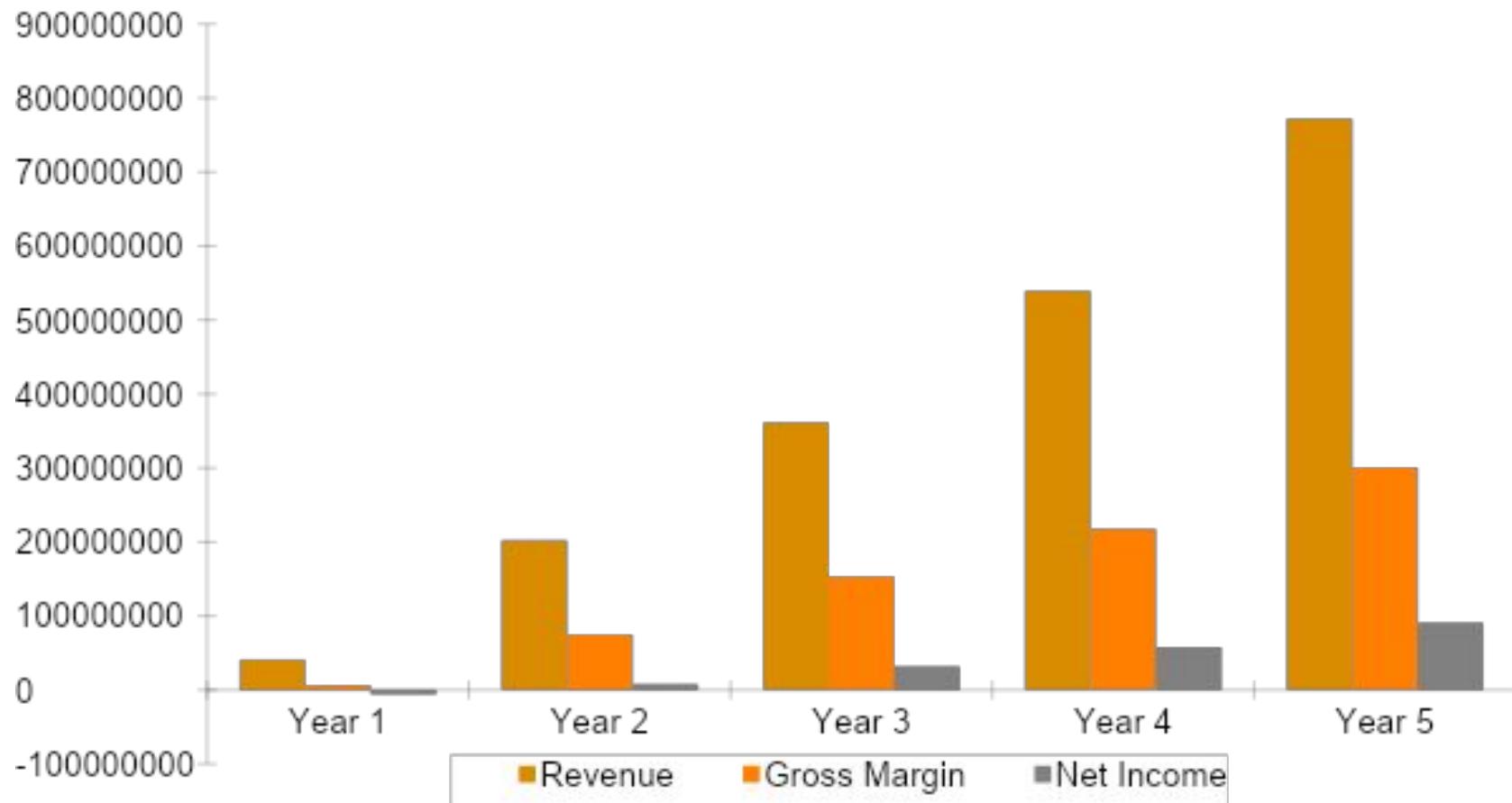
**Business and Financial Model**

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# Forecasted Revenue, Gross Margin, & Income

All Figures in INR millions



# Projected Income Statement

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue					
Dash Solution - B2B	₹ 4,08,00,000	₹ 9,36,00,000	₹ 12,16,80,000	₹ 15,81,84,000	₹ 20,56,39,200
Dash Solution - B2C	₹ 0	₹ 10,50,00,000	₹ 13,65,00,000	₹ 17,74,50,000	₹ 23,06,85,000
Subscription Revenue	₹ 0	₹ 39,20,000	₹ 10,27,20,000	₹ 20,38,08,000	₹ 33,52,22,400
<b>Total Revenue</b>	<b>₹ 4,08,00,000</b>	<b>₹ 20,25,20,000</b>	<b>₹ 36,09,00,000</b>	<b>₹ 53,94,42,000</b>	<b>₹ 77,15,46,600</b>
Cost of Goods Sold	₹ 3,47,40,000	₹ 12,76,71,033	₹ 20,74,42,717	₹ 32,19,60,042	₹ 47,07,74,906
<b>Gross Margin</b>	<b>₹ 60,60,000</b>	<b>₹ 7,48,48,967</b>	<b>₹ 15,34,57,283</b>	<b>₹ 21,74,81,958</b>	<b>₹ 30,07,71,694</b>
% of Revenue	15%	37%	43%	40%	39%
Operating Expenses					
Engineering	₹ 57,05,367	₹ 1,45,74,300	₹ 1,90,08,400	₹ 2,59,25,650	₹ 3,58,17,775
% of Revenue	14%	7%	5%	5%	5%
Marketing/Sales	₹ 53,33,936	₹ 4,86,13,433	₹ 8,13,05,633	₹ 9,95,43,021	₹ 12,31,73,404
% of Revenue	13%	24%	23%	18%	16%
Administration	₹ 6,99,600	₹ 32,41,267	₹ 78,47,500	₹ 97,84,170	₹ 1,22,59,924
% of Revenue	2%	2%	2%	2%	2%
<b>Total Operating Expenses</b>	<b>₹ 1,17,38,903</b>	<b>₹ 6,64,29,000</b>	<b>₹ 10,81,61,533</b>	<b>₹ 13,52,52,841</b>	<b>₹ 17,12,51,104</b>
% of Revenue	29%	33%	30%	25%	22%
Income Before Int & Taxes	-₹ 56,78,903	₹ 84,19,967	₹ 4,52,95,750	₹ 8,22,29,118	₹ 12,95,20,591
% of Revenue	-14%	4%	13%	15%	17%
Interest Expense	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
Interest Revenue	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
<b>Income Before Taxes</b>	<b>-₹ 56,78,903</b>	<b>₹ 84,19,967</b>	<b>₹ 4,52,95,750</b>	<b>₹ 8,22,29,118</b>	<b>₹ 12,95,20,591</b>
Tax Exp	\$0	\$8,22,319	\$1,35,88,725	\$2,46,68,735	\$3,88,56,177
<b>Net Income</b>	<b>-₹ 56,78,903</b>	<b>₹ 75,97,648</b>	<b>₹ 3,17,07,025</b>	<b>₹ 5,75,60,382</b>	<b>₹ 9,06,64,413</b>
% of Revenue	-14%	4%	9%	11%	12%

# Projected Balance Sheet

	Year 1	Year 2	Year 3	Year 4	Year 5
<b>ASSETS</b>					
<b>Current Assets</b>					
Cash	₹ 23,12,325	₹ 9,88,27,225	₹ 12,01,11,437	₹ 16,91,60,652	₹ 25,43,95,794
Net Accounts Rec	₹ 77,61,000	₹ 1,72,93,100	₹ 2,99,24,625	₹ 4,47,28,733	₹ 6,39,74,072
Inventory (60 days)	₹ 1,08,00,000	₹ 1,92,40,000	₹ 2,50,12,000	₹ 3,25,15,600	₹ 3,54,96,600
<b>Total Current Assets</b>	₹ 2,08,73,325	₹ 13,53,60,325	₹ 17,50,48,062	₹ 24,64,04,984	₹ 35,38,66,466
<b>Gross Fixed Assets</b>	₹ 10,10,000	₹ 29,90,000	₹ 66,70,000	₹ 74,30,000	₹ 81,90,000
Less Accum Depreciation	₹ 1,10,611	₹ 8,41,944	₹ 25,05,944	₹ 41,87,944	₹ 56,21,278
<b>Net Fixed Assets</b>	₹ 8,99,389	₹ 21,48,056	₹ 41,64,056	₹ 32,42,056	₹ 25,68,722
<b>TOTAL ASSETS</b>	<b>₹ 2,17,72,714</b>	<b>₹ 13,75,08,381</b>	<b>₹ 17,92,12,118</b>	<b>₹ 24,96,47,040</b>	<b>₹ 35,64,35,188</b>
<b>LIABILITIES</b>					
<b>Short Term Liabilities</b>					
Accounts Payable (30 days)	₹ 54,22,450	₹ 1,12,95,000	₹ 1,68,67,583	₹ 2,62,29,483	₹ 3,78,31,400
Salaries Payable (30 days)	₹ 5,29,167	₹ 20,80,833	₹ 38,21,583	₹ 45,64,221	₹ 55,39,178
Taxes Payable (365 days)	₹ 0	₹ 7,13,802	₹ 33,97,181	₹ 61,67,184	₹ 97,14,044
Line of Credit (0% of net A/R)	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
Current Portion of Capital Equipment Lease	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
Current Portion of Long Term Debt	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
<b>Total Short Term Liabilities</b>	<b>₹ 59,51,617</b>	<b>₹ 1,40,89,636</b>	<b>₹ 2,40,86,348</b>	<b>₹ 3,69,60,888</b>	<b>₹ 5,30,84,623</b>
<b>Long Term Liabilities</b>					
Capital Equipment Lease (3 years)	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
Long Term Debt (5 years)	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
<b>Total Long Term Liabilities</b>	<b>₹ 0</b>	<b>₹ 0</b>	<b>₹ 0</b>	<b>₹ 0</b>	<b>₹ 0</b>
<b>TOTAL LIABILITIES</b>	<b>₹ 59,51,617</b>	<b>₹ 1,40,89,636</b>	<b>₹ 2,40,86,348</b>	<b>₹ 3,69,60,888</b>	<b>₹ 5,30,84,623</b>
<b>Equity</b>					
Preferred Stock	₹ 2,15,00,000	₹ 12,15,00,000	₹ 12,15,00,000	₹ 12,15,00,000	₹ 12,15,00,000
Common Stock	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
Retained Earnings	-₹ 56,78,903	₹ 19,18,745	₹ 3,36,25,770	₹ 9,11,86,152	₹ 18,18,50,565
<b>Total Equity</b>	<b>₹ 1,58,21,097</b>	<b>₹ 12,34,18,745</b>	<b>₹ 15,51,25,770</b>	<b>₹ 21,26,86,152</b>	<b>₹ 30,33,50,565</b>
<b>LIABILITIES &amp; EQUITY</b>	<b>₹ 2,17,72,714</b>	<b>₹ 13,75,08,381</b>	<b>₹ 17,92,12,118</b>	<b>₹ 24,96,47,040</b>	<b>₹ 35,64,35,188</b>

# Projected Cash Flows

	Year 1	Year 2	Year 3	Year 4	Year 5
<b>BEGINNING CASH</b>	₹ 0	₹ 23,12,325	₹ 9,88,27,225	₹ 12,01,11,437	₹ 16,91,60,652
<b>Sources of Cash</b>					
Net Income	-₹ 56,78,903	₹ 75,97,648	₹ 3,17,07,025	₹ 5,75,60,382	₹ 9,06,64,413
Add Depr/Amort	₹ 1,10,611	₹ 7,31,333	₹ 16,64,000	₹ 16,82,000	₹ 14,33,333
Issuance of Preferred Stock	₹ 2,15,00,000	₹ 10,00,00,000	₹ 0	₹ 0	₹ 0
Issuance of Common Stock	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
<b>Plus Changes In:</b>					
Accounts Payable (30 days)	₹ 54,22,450	₹ 58,72,550	₹ 55,72,583	₹ 93,61,900	₹ 1,16,01,917
Salaries Payable (30 days)	₹ 5,29,167	₹ 15,51,667	₹ 17,40,750	₹ 7,42,638	₹ 9,74,958
Taxes Payable (365 days)	₹ 0	₹ 7,13,802	₹ 26,83,379	₹ 27,70,003	₹ 35,46,860
Additions to Line of Credit (0% of net A/R)	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
Additions to Capital Equipment Lease (3 years)	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
Additions to Long Term Debt (5 years)	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
<b>Total Sources of Cash</b>	₹ 2,18,83,325	₹ 11,64,67,000	₹ 4,33,67,737	₹ 7,21,16,922	₹ 10,82,21,481
<b>Uses of Cash</b>					
<b>Less Changes In:</b>					
Net Accounts Rec	₹ 77,61,000	₹ 95,32,100	₹ 1,26,31,525	₹ 1,48,04,108	₹ 1,92,45,340
Inventory (60 days)	₹ 1,08,00,000	₹ 84,40,000	₹ 57,72,000	₹ 75,03,600	₹ 29,81,000
Gross Fixed Assets	₹ 10,10,000	₹ 19,80,000	₹ 36,80,000	₹ 7,60,000	₹ 7,60,000
Reductions To Credit Line	₹ 0	₹ 0	₹ 0	₹ 0	₹ 0
<b>Total Uses</b>	₹ 1,95,71,000	₹ 1,99,52,100	₹ 2,20,83,525	₹ 2,30,67,708	₹ 2,29,86,340
<b>CHANGES IN CASH</b>	₹ 23,12,325	₹ 9,65,14,900	₹ 2,12,84,212	₹ 4,90,49,215	₹ 8,52,35,142
<b>ENDING CASH</b>	₹ 23,12,325	₹ 9,88,27,225	₹ 12,01,11,437	₹ 16,91,60,652	₹ 25,43,95,794

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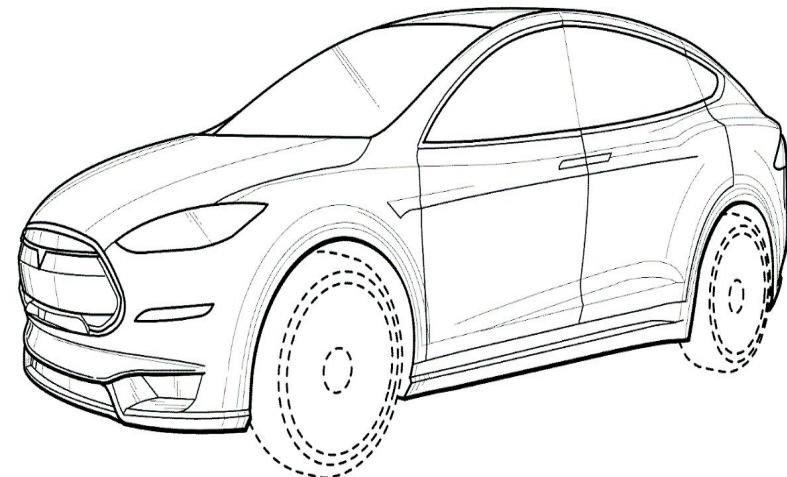
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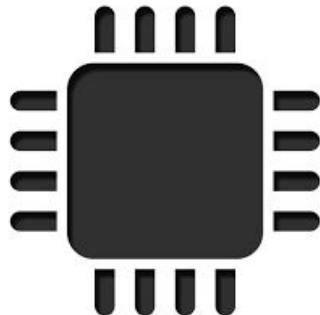
**Implementation, Team, Sales, Distribution**



# Value Proposition



- Hi resolution front and back cameras for complete protection (both when car is running and when it is parked)
- Reliance on trusted technologies for reliable vehicle data



## Intelligent Information Processing:

- Incidence based reporting
- Understanding “What” happened and “Why”
- Build analytical and predictive capabilities to increase value of recommendations



## User Interface:

- Access past data without storage
- Actionable information

# Our Team



Manu Sheel Gupta: Co-founder, Director at SEETA and Director, Aspiring Investments Corp  
Manu is also Mentor, Visiting Expert at NSIT Incubation Centre funded by Delhi Government.

- Former South Asia Lead at One Laptop Per Child, Cambridge, United States of America
- Associate Product Manager at Servigistics India Office
- Co-authored over 15 research papers published in international conferences, journals
- Invited speaker at RSA Conference, San Francisco; Google, India and University of Delhi
- Education: Bachelor of Engineering in IT from NSIT, University of Delhi, India.

South Korea Collaboration: Special Award Presented to SEETA, 24th Global Contest, South Korea. The award was presented to SEETA on behalf of its remarkable results at 24th Global Software Contest hosted by IPAK and NIPA, South Korea.



Deepti Gupta: Product Engineer, Consultant and Open Source Contributor

- Developer at SAP
- Open Source Contributor



Vithika Gupta: Software Engineer, App Developer and Community Engineer

- Developer of Business and Financial products.
- Education: Computer Engineer, Banasthali University, India

## The Solution: How it works?

The technical solution demonstrates capabilities which are pluggable, extendable to 5 different personas :

### Citizen, Police Officer, Dispatcher, Admin and Driver

Persona based Capabilities:

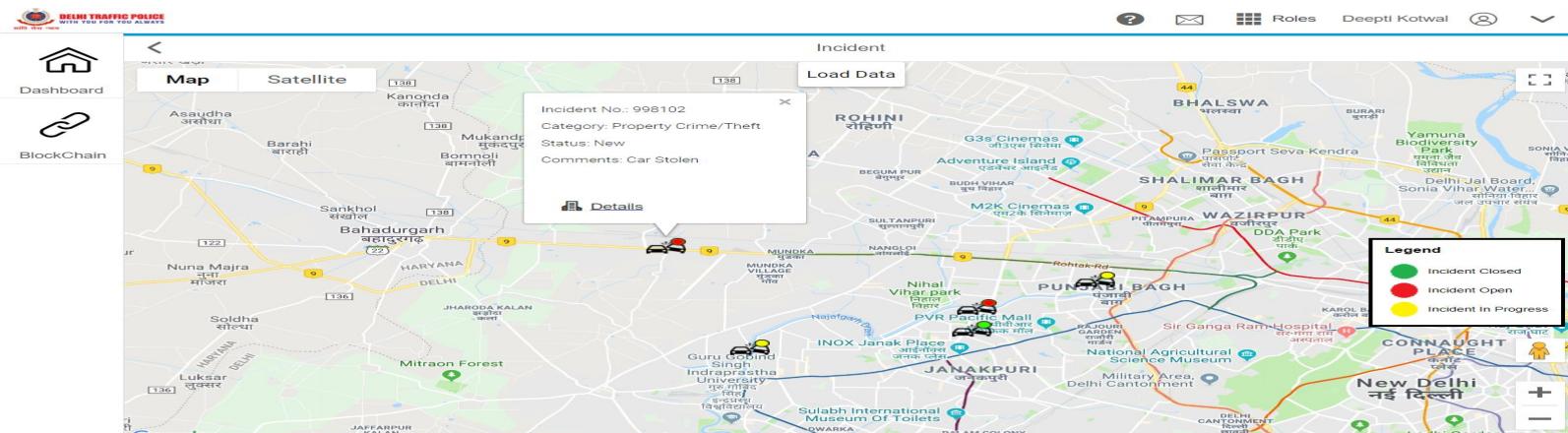
- 1) **As a citizen:** → Ability to create SOS: incident created automatically, added to ICM (Investigative Case management)  
→ Create incident: Can directly create an incident/ticket on different categories.  
→ Track the status of the incident (in progress/complete)/navigate to details of the same.  
→ Provide feedback/view happiness review on the same.

The citizen functionalities are also made available on the mobile, which can provide live interactivity.

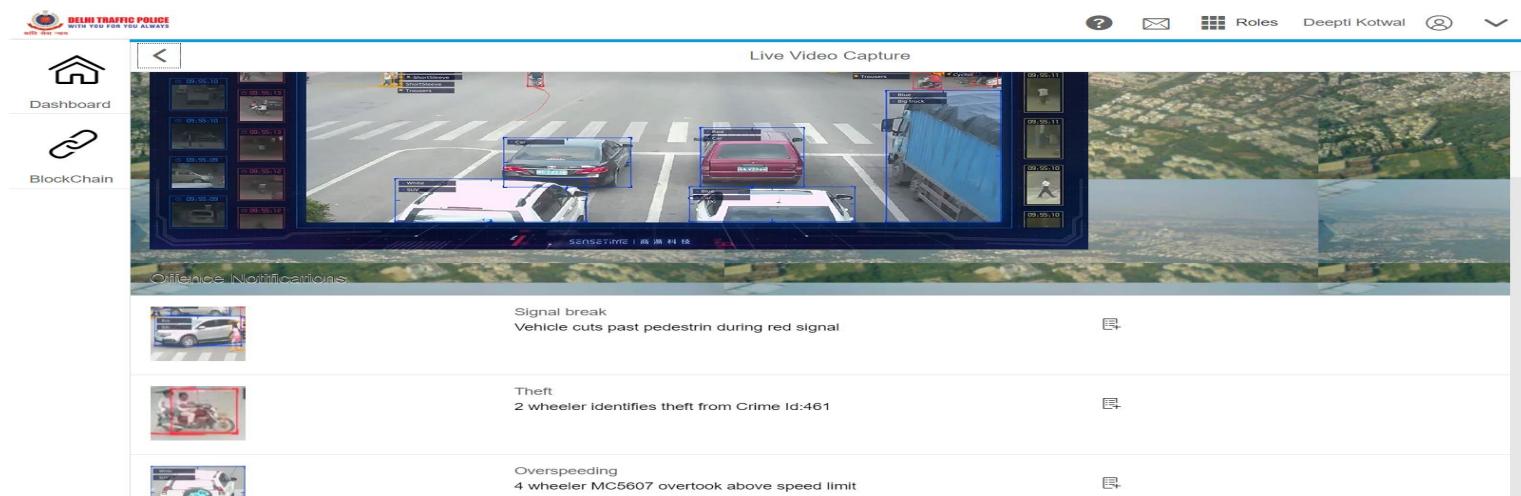
The screenshot shows the 'Create Incident' screen of the Delhi Traffic Police mobile application. At the top, there is a header bar with the 'DELHI TRAFFIC POLICE' logo and the tagline 'WITH YOU FOR YOU ALWAYS'. To the right of the logo are icons for help, email, roles, user profile, and a dropdown menu. Below the header is a navigation bar with two items: 'Dashboard' (represented by a house icon) and 'Blockchain' (represented by a chain link icon). The main content area is titled 'Create Incident' and features a large image of a cityscape. Overlaid on the image are several icons representing different incident types: Fight, Vice, Theft, Fire, Accident, Kidnapping, Traffic, Blast, Earthquake, and Others. Below the image, there are input fields for 'Picture' (with a camera icon), 'Location' (with a map pin icon), and 'Emergency' (with a checked checkbox). A dropdown menu for 'Type' is open, showing 'Blast' as the selected option. Below the type dropdown are fields for 'Date' (set to 'Fri Aug 24 2018 09:28:58 GMT+0530 (India Standard Time)') and 'Time' (set to '9:28:58 AM'). At the bottom right of the screen are two buttons: a green 'Create' button and a red 'Cancel' button.

## How it works?

**2) As a police officer:** A police officer can view incidents to which s/he is assigned. the ones new, in progress and can also upload evidence to close the same. S/he can view the same on the map and click on details to navigate further, view details, add details. All of this will be recorded in central investigative case management system (ICM).



**3) As a dispatcher assigning cases :** Assigning incidents to police staff reported at run-time. Dispatcher can view the nearest police station, which is available and can handle the cases based on their credibility. They have access to view the current situation using real-time camera application and sort information obtained from cameras. Video analytics brings in capabilities of what you could understand from the vehicles/license plates and identify suspicious object/issues.



# How it works?

4) As an administrator /police head: As an administrator, the police head could get complete overview of :

- Analytics of the incidents, road safety eco-system
- Analytics of the police force teams, staff members
- Understand social media trends, road safety norms
- Health summary of the police staff, scheduling and managing the staff, incident prevention data



**HOME**

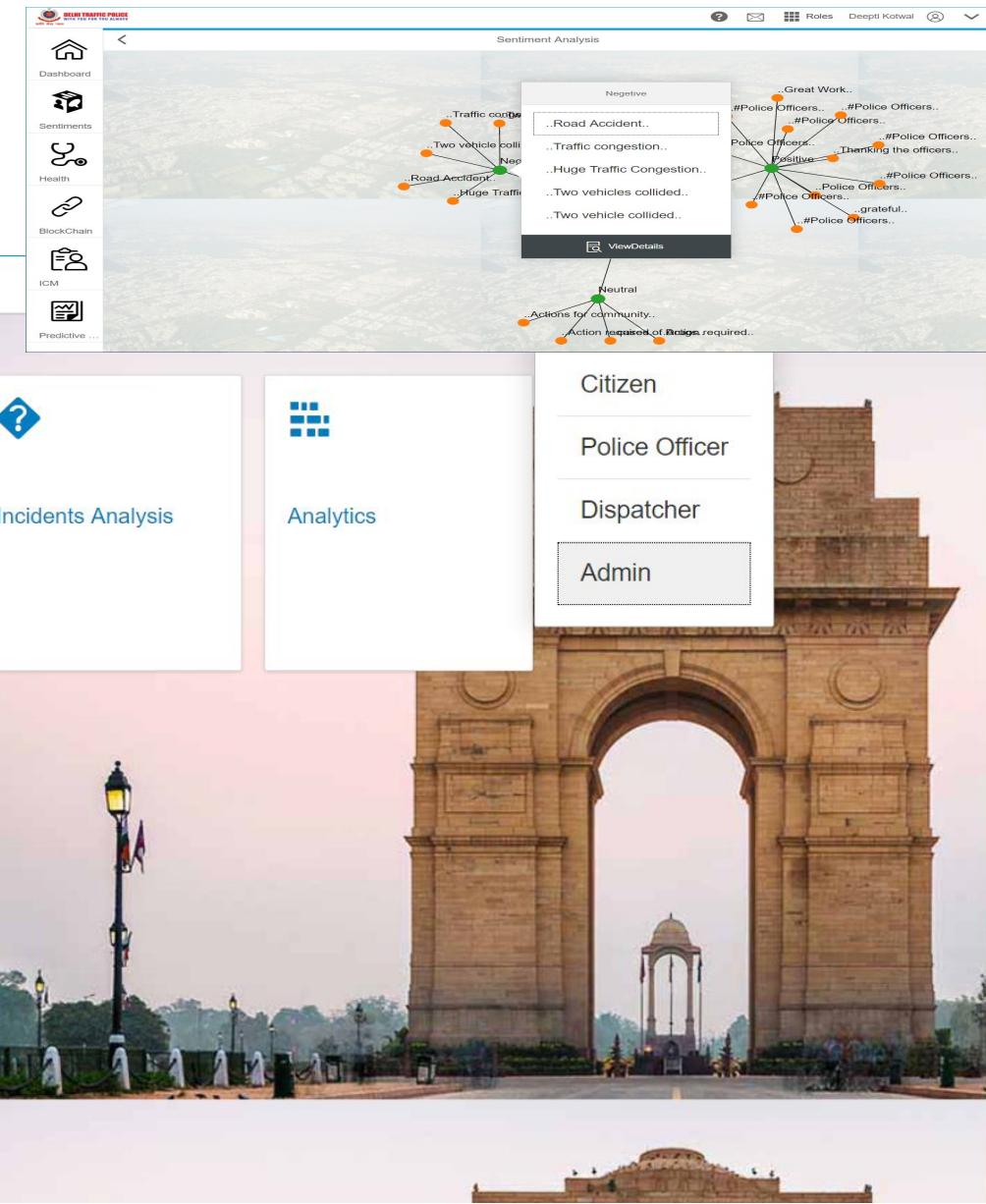
- Dashboard
- Sentiments
- Health
- BlockChain
- ICM
- Predictive ...

**Social Media Sentiments**

**Health Summary**

**Incidents Analysis**

**Analytics**



# Mobile version of the Platform: How it works?



1 Camera Management - add/edit/delete cameras  
Click "+" icon to add cameras; Click "-" icon to delete cameras; Click "i" icon to edit cameras; Prepopulated 4 Onvif demo cameras, 10 http/rtsp cameras and 1 iOS back facing camera.



2 Object Detection Video Analytics Configuration  
Go to Settings->Object Detection->Model to select engine; Go to Object Filters to configure selected engine object types to detect or alarm; Turn on/off detect/alarm for each object or bulk change.



3 Live Streaming with Object Detection Video Analytics  
Implemented FFmpeg http/rtsp player; Overlays include Logo / Camera name / detected object type and location bounding boxes / Engine name and current FPS; Raise alarms in red bounding box.



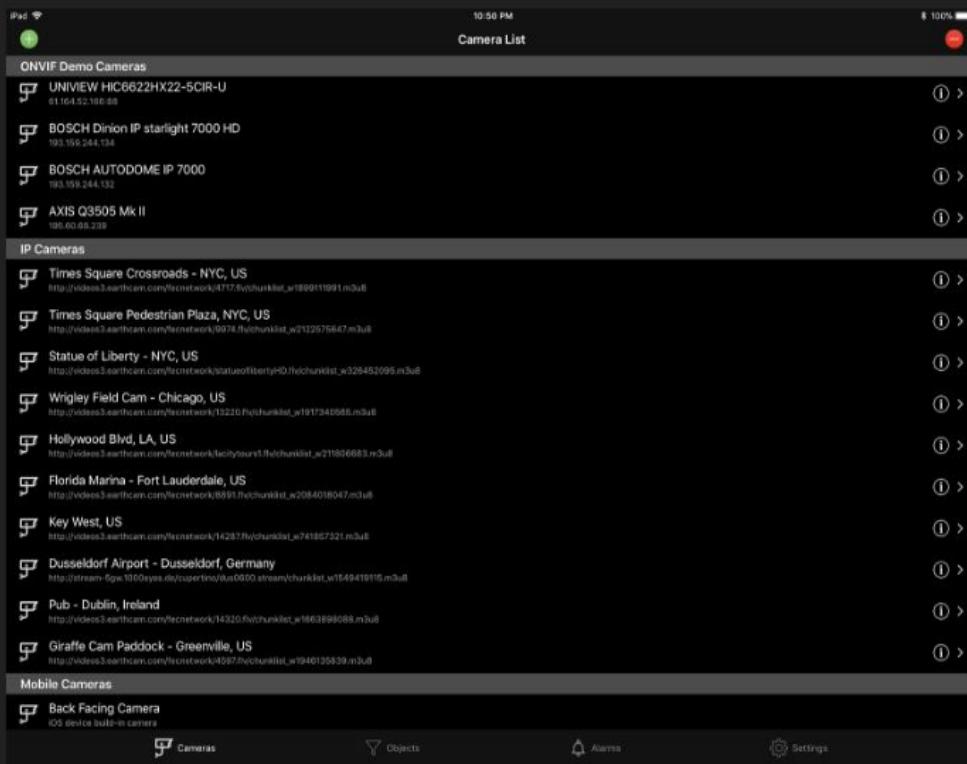
4 Alarm Viewer - view alarms and archive in details  
Load saved alarms (green border) from IPFS/Ethereum; Metadata includes timestamp, camera name, object type and engine; Double click alarm to show in fullscreen; Select alarm (grey background color) to save.



5 Blockchain Alarm Storage - alarm metadata & image  
Save/Delete alarm metadata and image to/from IPFS p2p distributed web; Store the hash returned from IPFS to Ethereum Test Network; Provided links to access alarms and blockchain transaction details.

# Camera Management

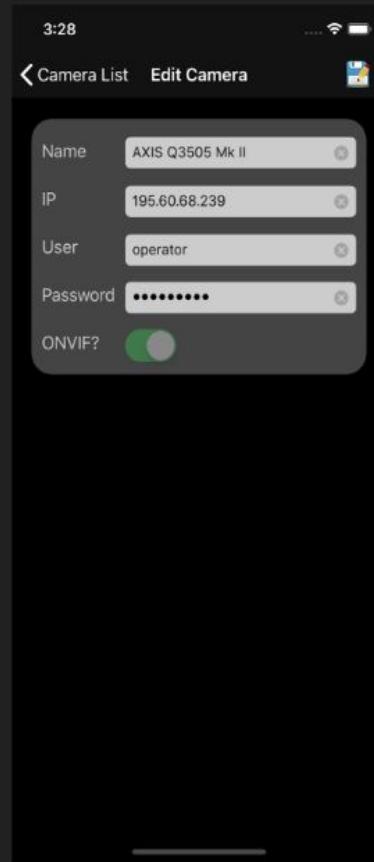
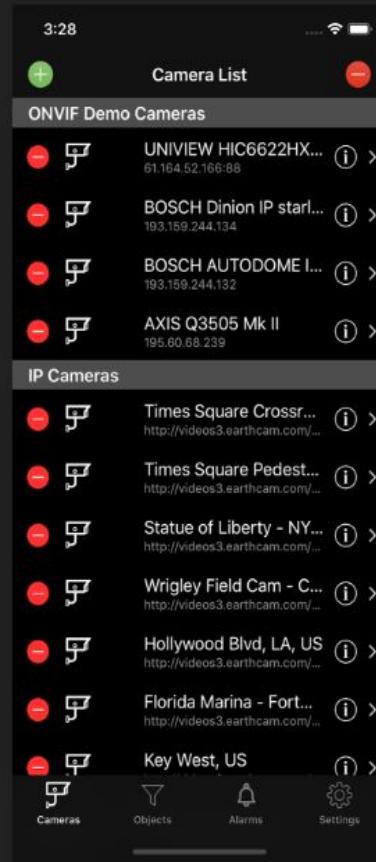
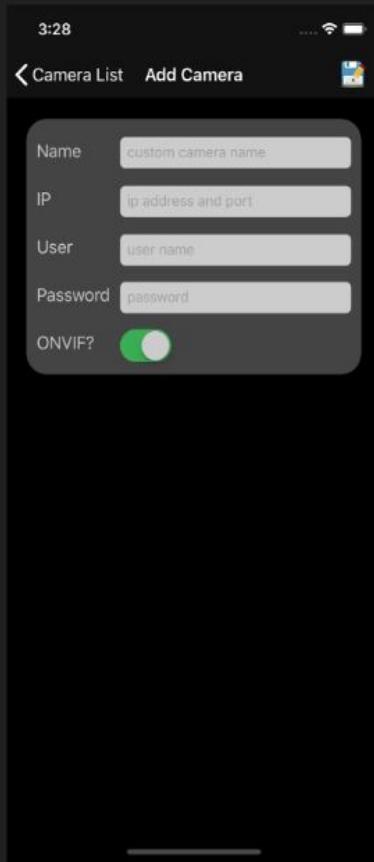
## Camera Management - camera list



- App initial view
- Three types of cameras
  - **ONVIF** - supports onvif protocol
  - **IP** - supports http/rtsp protocol
  - **Mobile** - device build-in camera
- Prepopulated 4 ONVIF cameras, 10 IP cameras and 1 iOS back facing camera
- Click “+” icon on the top left navibar to show add camera dialog
- Click “-” icon on the top right navibar to show delete icon ahead of each camera row
- Click “i” icon at the end of each camera row to show camera edit dialog
- Click camera name to start playing live streaming

# Camera Management Screens

## Camera Management - add / delete / modify cameras

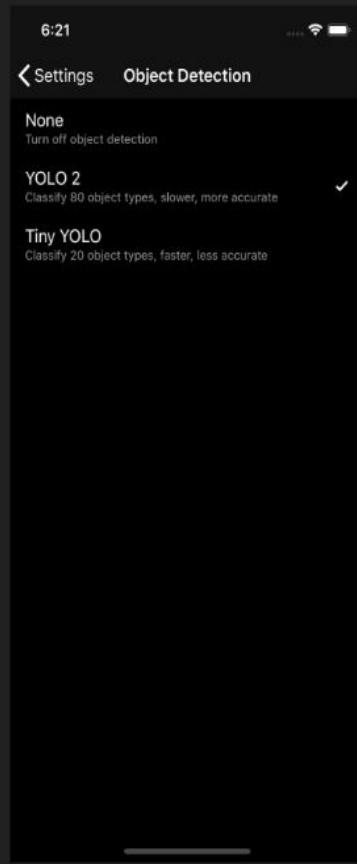


# Settings



- **Object Detection**  
Select video analytics engine or turn off video analytics
- **Alarm**  
Set alarm threshold - the interval between taking alarm snapshots
- **IPFS**  
Infura remote node information
- **Ethereum**  
Wallet, balance, gas price and smart contract information
- **About**  
Author contact information

# Settings – Object Detection selection options

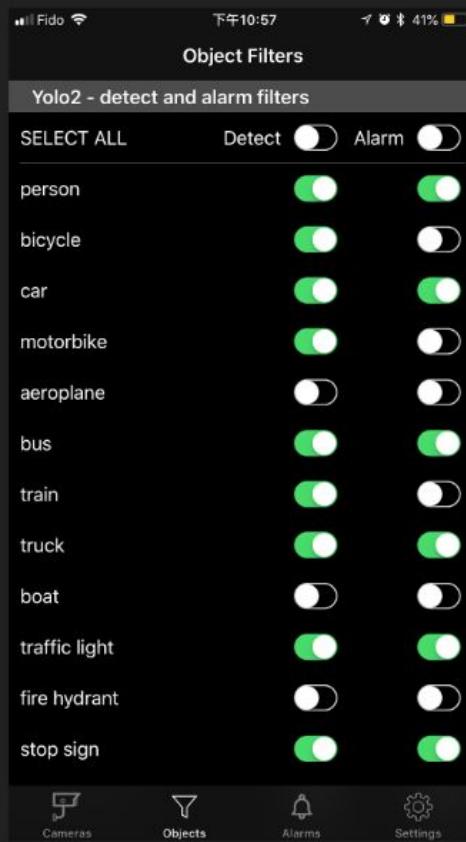


## Three selection options

- None: show video streaming without running analytics
- YOLO 2: Object detection algorithm with pre-trained model can detect and localize 80 object types. It runs in 2-3 FPS on iPhone X or iPad Pro. Version 2 has better accuracy.
- Tiny YOLO: Object detection algorithm with pre-trained model can detect and localize 20 object types. It runs in nearly real-time (20-30 FPS) on iPhone X or iPad Pro. Tiny version has worse accuracy but faster detecting speed.
- YOLO 2 is the default option

# Object Detection Video Analytics

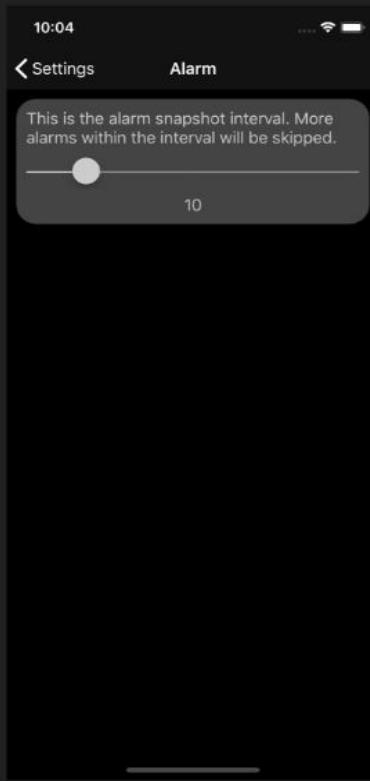
## Object Detection Video Analytics Configuration



- The list content depends on the engine chosen in settings
- Yolo 2 classifies 80 object types which is listed in this diagram
- Detect refers to the bounding boxes and name around object on video
- Alarm refers to the red bounding boxes and ALARM label on object
- User can choose to turn on / off detect or alarm for each individual type
- User has option to turn on / off detect or alarm for all types
- Turn off detect would also turn off alarm automatically. If an object can't be detected, it can't be alarmed
- Detect is on by default for all object types
- Alarm is off by default for all object types

# Alarm Settings

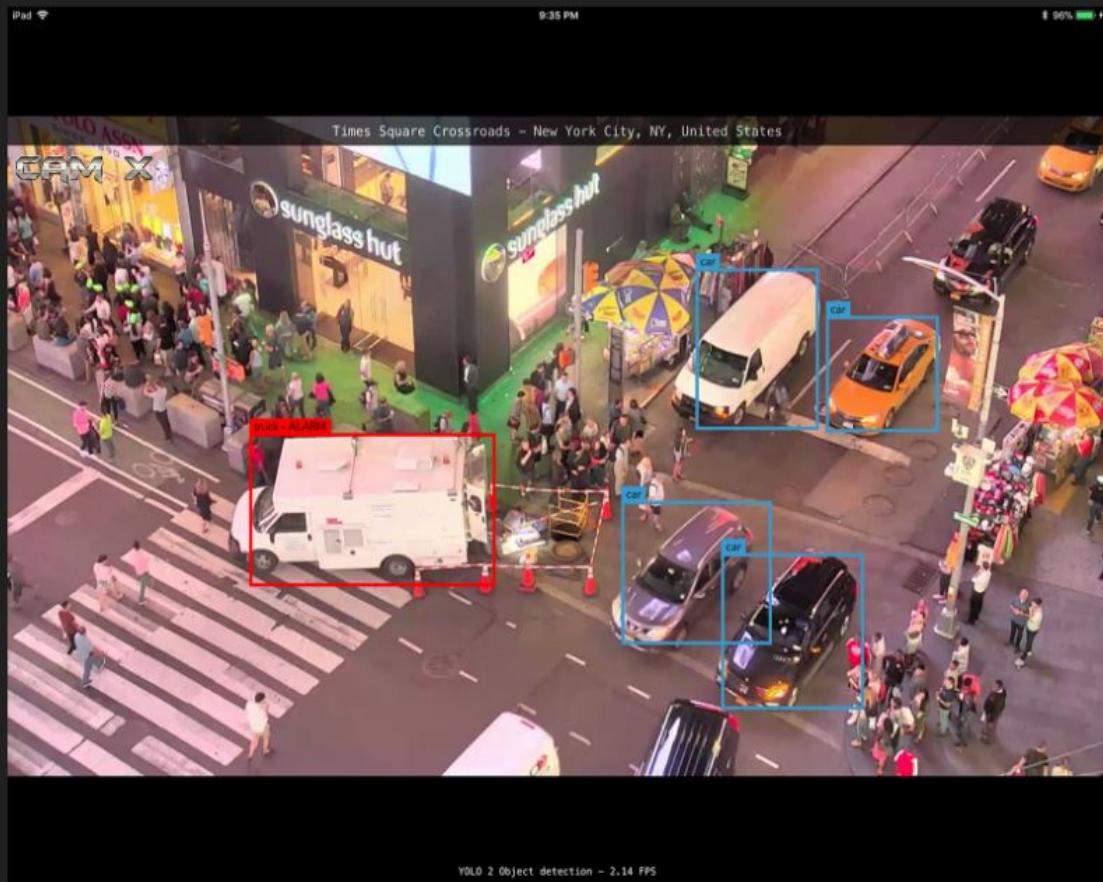
## Settings - Alarm



- When an alarm occurs, a snapshot is taken
- This setting is used to avoid taking too many useless snapshots. Multiple objects could be alarmed in a frame. Alarm on still object stays for every frame.
- Minimum threshold value is 1 second
- Maximum threshold value is 60 seconds
- Default threshold value is 10 seconds
- Additional alarms generated during the interval will be ignored

# Camera Live Streaming Function

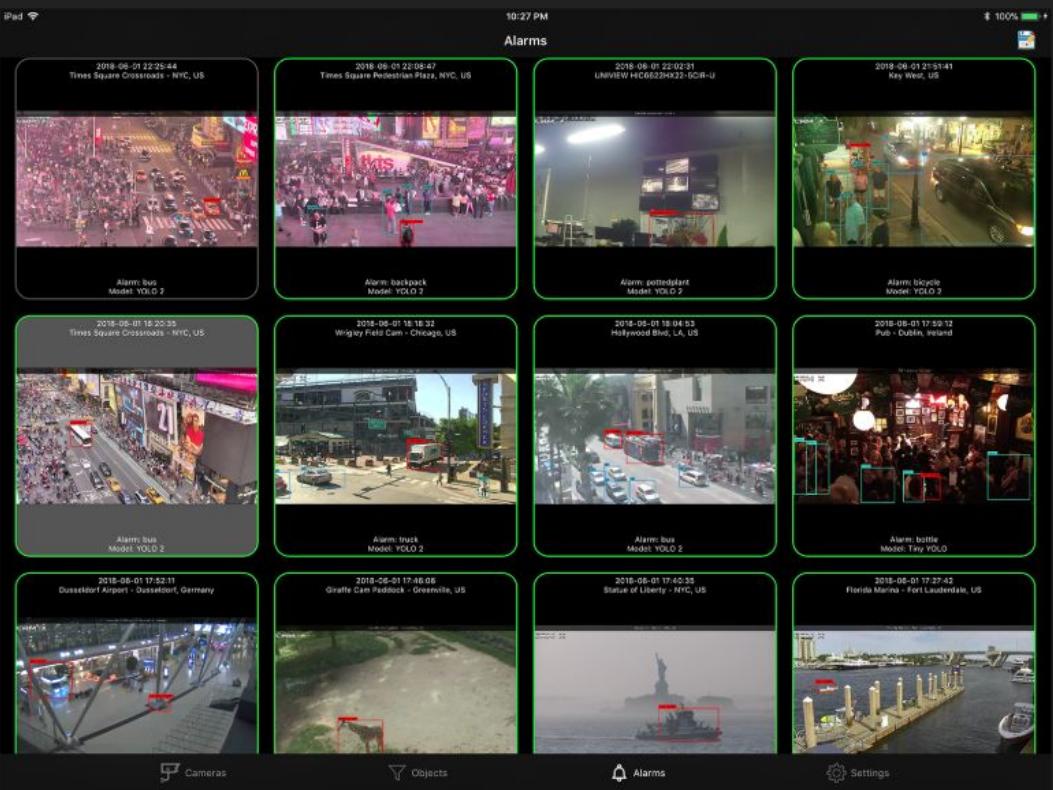
## Camera Live Streaming



- Decorations: Logo, camera name, detect bounding boxes with object type name, red alarm bounding boxes with alarm label, engine name and current FPS.
- Video decoded by FFmpeg library
- Video streaming runs in fullscreen mode. Tap on screen to bring top navbar and bottom tabbar back.
- Maximum 10 objects detected or alarmed per frame
- Alarms generate snapshots and kept in memory temporarily.

# Alarm Viewer

## Alarm Viewer



The screenshot shows a 3x4 grid of camera feeds from various locations. Each feed includes timestamp, location, camera name, engine name, object name, and a thumbnail image. The first four feeds in the top row have green borders, indicating they are saved alarms. The bottom row has gray borders, indicating they are unsaved alarms. A selected alarm in the second column of the top row has a gray background. Navigation icons at the bottom include 'Cameras', 'Objects', 'Alarms' (selected), and 'Settings'.

- First time visit this view per app launch loads saved alarms from IPFS & Ethereum
- Saved alarms have green border
- Unsaved alarms have gray border
- Only supports single selection
- Selected alarm has gray background
- Double click cell to show in fullscreen
- Each cell shows alarm timestamp, camera name, engine name, object name triggers the alarm, snapshot
- Tap Save icon at top right navbar to save / delete alarm or view details

## IPFS - what?



- IPFS stands for InterPlanetary File System
- IPFS is the Distributed Web
- IPFS is a peer-to-peer hypermedia protocol to make the web faster, safer and more open.
- IPFS aims to replace HTTP and build a better web for all of us.
- <https://ipfs.io/>

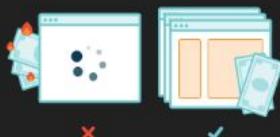
# IPFS – Why?

## IPFS - why?

HTTP

VS

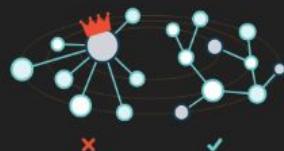
IPFS



Inefficient and expensive. Get file from a single computer at a time.



Humanity's history is deleted daily. The average lifespan of a web page is 100 days.



Centralization limits opportunity. Increasing consolidation of control is a threat.



Addicted to the backbone. Developing world. Offline. Natural disasters. Intermittent connections.

Get pieces from multiple computers simultaneously. Zero duplication saves storage.

Provides historic versioning (like git). Simple to set up resilient networks for mirroring of data.

Makes the original vision of the open and flat web a reality.

Powers the creation of diversely resilient networks which enable persistent availability.

# IPFS – how?

## IPFS - how?



Each file and all of the blocks within it are given a unique fingerprint called a cryptographic hash.



IPFS removes duplications across the network and tracks version history for every file.



Each network node stores only content it is interested in, and some indexing information that helps figure out who is storing what.



When looking up files, you're asking the network to find nodes storing the content behind a unique hash.



Every file can be found by human-readable names using a decentralized naming system called IPNS.

# Ethereum

## Ethereum - what?



- Ethereum is an open-source, public, blockchain-based distributed computing platform and operating system.
- Offers smart contract (scripting) functionality enables developers to build and deploy decentralized applications (DApp)
- Supports a modified version of Nakamoto consensus via transaction based state transitions.
- Provides a decentralized Turing-complete virtual machine, the Ethereum Virtual Machine (EVM) which can execute scripts using an international network of public nodes.
- “Gas” an internal transaction pricing mechanism is used to mitigate spam and allocate resources on the network.
- Ether is a cryptocurrency whose blockchain is generated by the Ethereum platform.
- Ether can be transferred between accounts and used to compensate participant mining nodes for computations performed.

# Ethereum – why?

## Ethereum - why?

- **Immutability:** A third party cannot make any changes to data.
- **Corruption & tamper proof:** Apps are based on a network formed around the principle of consensus, making censorship impossible.
- **Secure:** With no central point of failure and secured using cryptography, applications are well protected against hacking attacks and fraudulent activities.
- **Zero downtime:** Apps never go down and can never be switched off.

# Settings

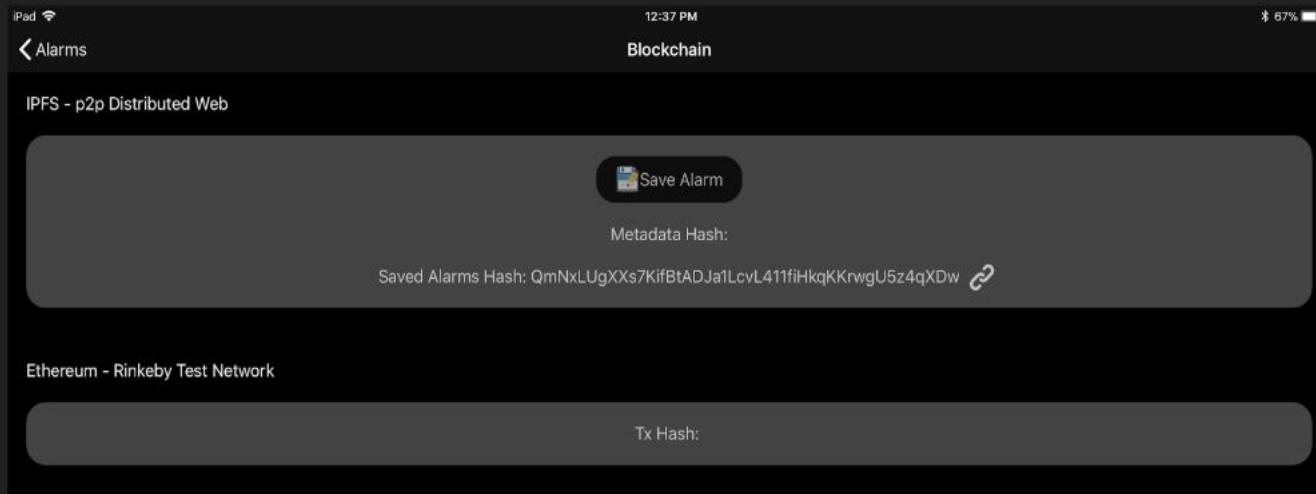
## Settings - IPFS Infura remote node



- Infura provides secure, reliable, and scalable access to Ethereum APIs and IPFS gateways.
- <https://infura.io>

# Blockchain – Save Alarm

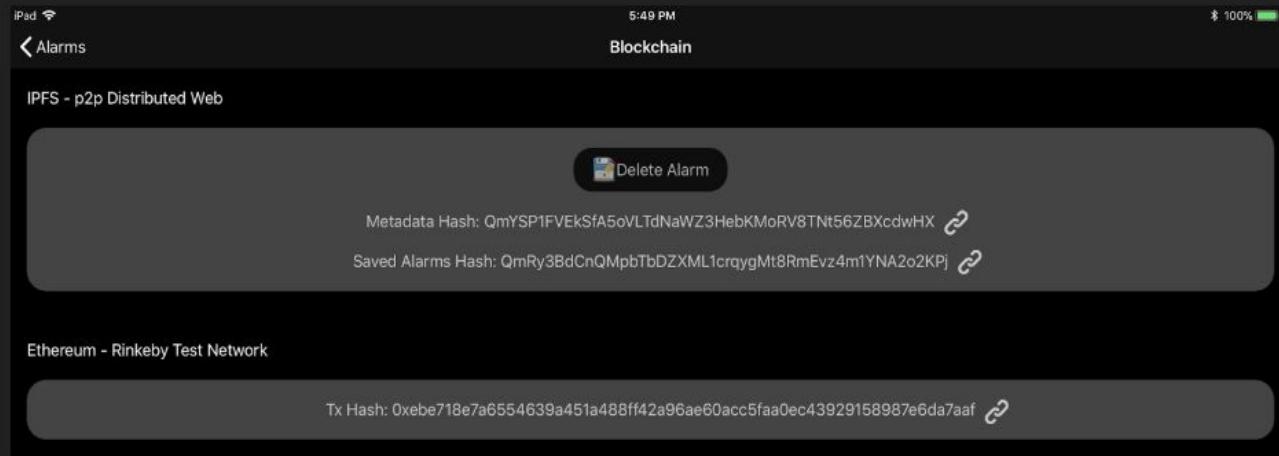
## Blockchain - save alarm



- Click **Save Alarm** to save selected alarm image and metadata into IPFS.
- A **Metadata Hash** will be generated and displayed. Click link to view on web.
- **Saved Alarms Hash** is the link to file contains all saved alarms. It's empty when the user runs cam X first time after installation. An UUID generated as the hash key used in Smart Contract. Click link to view on web. The hash will change whenever the file content updates.
- Updated Saved Alarms Hash will be saved to Ethereum via smart contract.
- **Tx Hash** is the transaction receipt returned by Ethereum. Click link to view details.
- When the app runs next time, Saved Alarms Hash will be restored from Ethereum.

# Blockchain – Delete alarm

## Blockchain - delete alarm



- Click **Delete Alarm** to delete selected alarm image and metadata from saved alarms file. Alarm image and metadata are permanent.
- **Saved Alarms Hash** will be changed. Click to view on web and verify selected alarm deleted from the file.
- Updated **Saved Alarms Hash** will be saved to Ethereum via smart contract.
- **Tx Hash** is the transaction receipt returned by Ethereum. Click link to view details.

# Ethereum – Smart Contract

## Ethereum - Smart Contract



```
pragma solidity ^0.4.24;

contract CamX {

    mapping(string => string) ipfsHash;

    function addHash(string key, string value) public {
        ipfsHash[key] = value;
    }

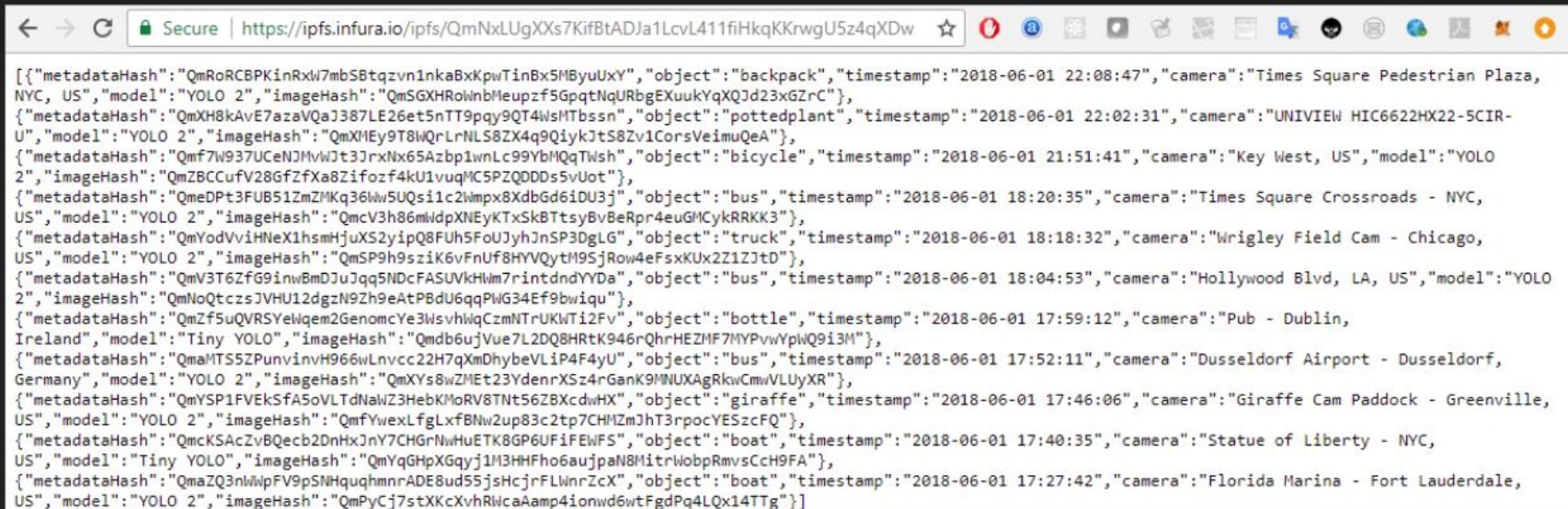
    function getHash(string key) public view returns (string) {
        return ipfsHash[key];
    }
}
```

### DApp steps:

1. Write smart contract code in Solidity \*.sol
2. Compile at <https://remix.ethereum.org>
3. .sol binary sent back to dapp
4. Deploy contract to network
5. Return address and abstract binary interface (ABI)
6. APIs available to be called on blockchain

# Blockchain – saved alarms hash web page

Blockchain - saved alarms hash webpage



The screenshot shows a web browser window with the URL <https://ipfs.infura.io/ipfs/QmNxLUgXXs7KifBtADJa1LcvL411fiHkqKKrwgU5z4qXDw>. The page displays a large JSON array of approximately 30 objects, each representing a saved alarm. Each object contains fields such as 'metadataHash', 'imageHash', 'object', 'timestamp', 'camera', and 'model'. The objects describe various cameras and their captures from different locations like Times Square, Hollywood Blvd, and the Statue of Liberty.

```
[{"metadataHash": "QmRoRCBPKinRxlw7mbSBtzqvvn1nkaBxKpwTinBx5MByuUxy", "object": "backpack", "timestamp": "2018-06-01 22:08:47", "camera": "Times Square Pedestrian Plaza, NYC, US", "model": "YOLO 2", "imageHash": "QmSGXHRoWnbMeupzf5GpqtnQurbgEXuukYqXQjd23xGzrc"}, {"metadataHash": "QmXKh8kAvE7azaVqaJ387LE26et5nTT9pqy9QT4WshTbssn", "object": "pottedplant", "timestamp": "2018-06-01 22:02:31", "camera": "UNIVIEW HIC6622HX22-5CIR-U", "model": "YOLO 2", "imageHash": "QmXMEy9T8wQrlrNLS8ZX4q9IykJtS8Zv1CorsVeimuQeA"}, {"metadataHash": "Qmf7W937UCeNJlMlWjt3JrxNx65Azbp1wnLc99YbMQqtWsh", "object": "bicycle", "timestamp": "2018-06-01 21:51:41", "camera": "Key West, US", "model": "YOLO 2", "imageHash": "QmZBCCuFv28GfZfxa82ifoozf4kU1vuqMC5PZQDDs5vUot"}, {"metadataHash": "QmeDpt3FUB51ZmZMKq36Ww5UQsi1c2Wmpx8XdbGd6iDU3j", "object": "bus", "timestamp": "2018-06-01 18:20:35", "camera": "Times Square Crossroads - NYC, US", "model": "YOLO 2", "imageHash": "QmcV3h86MldpxXNEyKTxSkBTtsyBvBeRpr4euGMCykRRRK3"}, {"metadataHash": "QmYodVviHNeX1hsmHjuXS2yipQ8FUh5FoUJyhJnSP3DgLG", "object": "truck", "timestamp": "2018-06-01 18:18:32", "camera": "Wrigley Field Cam - Chicago, US", "model": "YOLO 2", "imageHash": "QmSP9h9szik6vFnUf8HYVQytM9SjRow4efsxKUx2Z1Zjt0"}, {"metadataHash": "QmV3T6zfG9inwBmdJuJqq5NdcFASUVkHwlrintndndYYda", "object": "bus", "timestamp": "2018-06-01 18:04:53", "camera": "Hollywood Blvd, LA, US", "model": "YOLO 2", "imageHash": "QmNoQtczsJvHu12dgzN9Zh9eAtPBdU6qqPG34Ef9bwiqu"}, {"metadataHash": "QmZf5uQVRSEwQem2GenomcYe3lsvhlwqCzmNtRUKwTi2Fv", "object": "bottle", "timestamp": "2018-06-01 17:59:12", "camera": "Pub - Dublin, Ireland", "model": "Tiny YOLO", "imageHash": "Qmdb6ujVue7L2DQ8c2H7qXmDhybeVLip4F4yU"}, {"metadataHash": "QmaMT55ZPunvivnH966wLnvc22H7qXmDhybeVLip4F4yU", "object": "bus", "timestamp": "2018-06-01 17:52:11", "camera": "Dusseldorf Airport - Dusseldorf, Germany", "model": "YOLO 2", "imageHash": "QmXYs8wZMet23YdenrXSz4rGanK9MNUXAgRkwCmwVLUuyXR"}, {"metadataHash": "QmYSP1FVEksfAs5oVLTdNaWz3HebkMoRV8TNT56ZBXcdwHX", "object": "giraffe", "timestamp": "2018-06-01 17:46:06", "camera": "Giraffe Cam Paddock - Greenville, US", "model": "YOLO 2", "imageHash": "QmfYwexLfgLxfBNw2up83c2tp7CHMz3hT3rpocYESzcFQ"}, {"metadataHash": "QmcKSAcZvBQecb2DnhxJnY7CHGrNwHuETK8GP6UFiFEWFs", "object": "boat", "timestamp": "2018-06-01 17:40:35", "camera": "Statue of Liberty - NYC, US", "model": "Tiny YOLO", "imageHash": "QmYqGhpXGgyj1M3HHFho6aujanBmitrwobpRmvscch9FA"}, {"metadataHash": "QmaZQ3nlWpFV9pSNHquqhmnraDE8ud55jsHcjrlFLwnrZcX", "object": "boat", "timestamp": "2018-06-01 17:27:42", "camera": "Florida Marina - Fort Lauderdale, US", "model": "YOLO 2", "imageHash": "QmPyCj7stXKcXvhRlcaAamp4ionwd6vtFgdPq4LQx14TTg"}]
```

<https://ipfs.infura.io/ipfs/QmNxLUgXXs7KifBtADJa1LcvL411fiHkqKKrwgU5z4qXDw>

Alarms serialized in json format.

# Ethereum Smart Contract Receipt

Blockchain - Ethereum smart contract transaction receipt

<https://rinkeby.etherscan.io/tx/0xebe718e7a6554639a451a488ff42a96ae60acc5faa0ec43929158987e6da7aa>

# Requirement and Usage of Funds

Title	Activity	Timeline	Cost (INR)
Preliminary research & study	<ul style="list-style-type: none"> <li>▪ Patent Search</li> <li>▪ Prototype feature list finalization</li> </ul>	3 weeks	1,00,000 (1200 CHF)
SKETCHING & CONCEPTUALIZATION	<ul style="list-style-type: none"> <li>▪ File for provisional Patent</li> <li>▪ Design configuration per Concept</li> <li>▪ Design hardware Mock-ups</li> <li>▪ Analyze the requirements and identify components of major units</li> <li>▪ Processor, PMU, Cameras, GPS, LTE, OBD reader etc</li> <li>▪ Explore technology options and perform cost/benefit analysis for each</li> <li>▪ High level design and solution</li> </ul>	5 weeks	5,50,000 (7000 CHF)
PoC Creation	<ul style="list-style-type: none"> <li>▪ Create PoC based on designed specification</li> <li>▪ Design a web interface</li> </ul>	5 weeks	4,50,000 (5000 CHF)
Testing and	<ul style="list-style-type: none"> <li>▪ Initial user testing, and POC refinement</li> <li>▪ Prototype Release</li> </ul>	4 weeks	3,00,000 (3600 CHF)
Prototype Manufacturing	<ul style="list-style-type: none"> <li>▪ At the Vendors location</li> </ul>	2 weeks	
Prototype validation and assembly	<ul style="list-style-type: none"> <li>▪ Final Prototype assembly and validation</li> <li>▪ Refinements based on the mechanical prototype</li> <li>▪ Final Engineering CAD release.</li> </ul>	2 weeks	1,00,000 (1200 CHF)
<b>TOTAL</b>			<b>15,00,000 (18000 CHF)</b>

# Business Plan



## Questions

