Ethical Use of Autonomous vehicles in Healthcare AI

Agenda

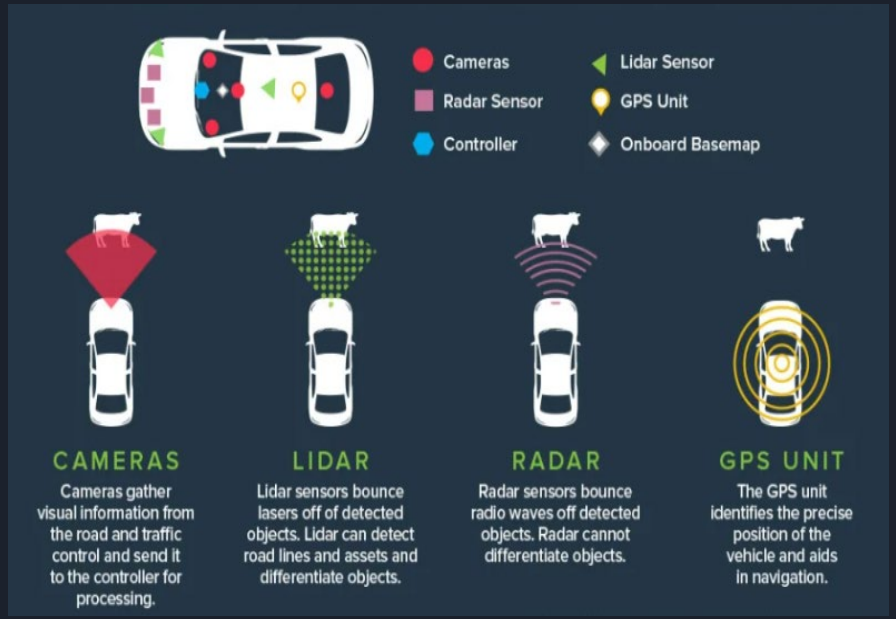
- Acknowledgment of ongoing technological advancements
- Significant Impacts
- Challenges
- Ethical Considerations

Goals

- Evolution & Significance of autonomous vehicles
- Healthcare?
- Impact

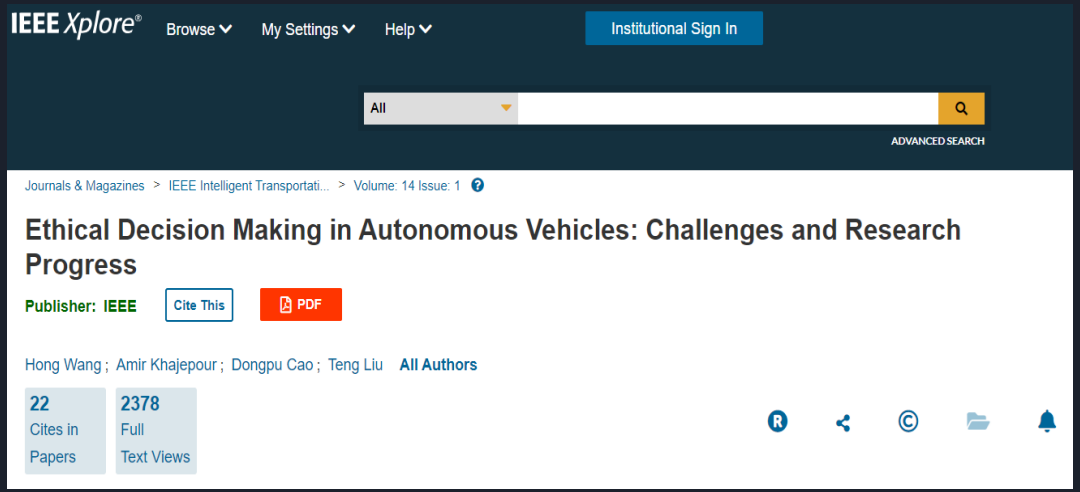
1. Autonomous vehicles - Glimpse

Combination of advanced sensors and Machine learning algorithms.



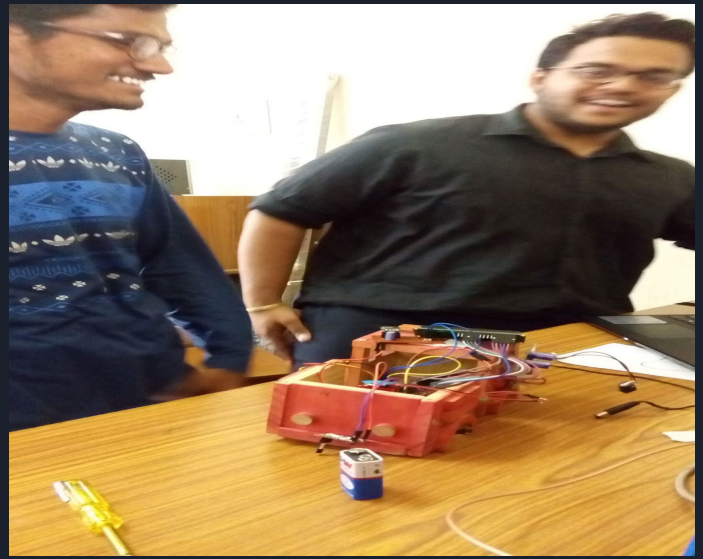
Ethical Considerations in Autonomous Vehicles

1. Decision-Making in Emergency Situations
2. Liability and Responsibility
3. Data Privacy and Security
4. Societal Impact and Accessibility



Autonomous vehicle prototype

1. Accident Detection and Vehicle condition monitoring - A project based on IOT.
2. Sensors like Arduino Uno, Accelerometer, Gyroscope, etc,.
3. Programming Language Embedded C and Python.
4. Cloud : Thingspeak



Autonomous Ambulance

1. Same prototype with additional features and sensors to make it automatic.
2. Needs vigorous testing of the source code to pass all possible test cases before finalizing.
3. Of course we do need a medical practitioner in the vehicle all the times except that its automatic.
4. Change the algorithm According to the sensors we do require.

Code base: https://github.com/arunmukkamla/Accident-Detection-and-Vehicle-Monitoring-IOT/blob/master/Main_code.ino

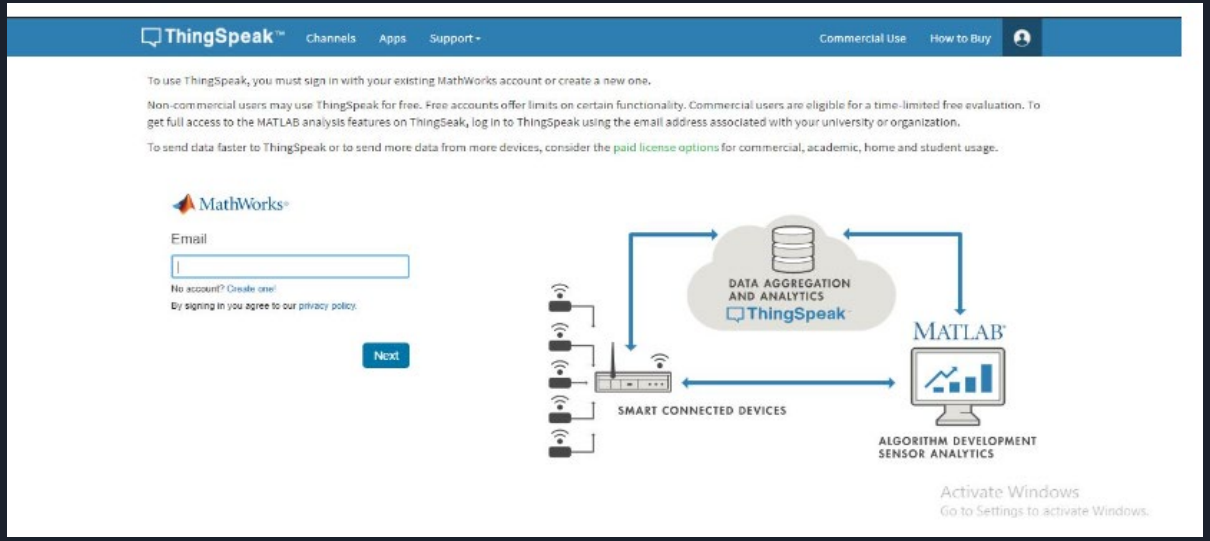
Code base explanation.

1. Its a portion of the code where it shows the sensors connected to the board. We can modify the code base here and make changes accordingly.
2. We can also monitor the Autonomous vehicles condition with the help of the cloud data which we'll be sending to ThingSpeak.com

```
 sen1 = analogRead(A0);
sen2 = analogRead(A1);
sen3 = analogRead(A2);



 delay(3000);
 serialFlush();

 st:
 digitalWrite(led,LOW);
 Serial.println("ATE0");
 ret = check((char*)"OK",50);
 Serial.println("AT");
 ret = check((char*)"OK",50);
```

Vehicles Condition - Cloud Platform

ThingSpeak cloud



Vehicle Condition - Key Challenge

Good Condition

Location: XYZ Street

Speed: 60 km/h

Heart Rate: 80 bpm

Oxygen Level: 98%

Patient Status: Stable

Defibrillator: Ready

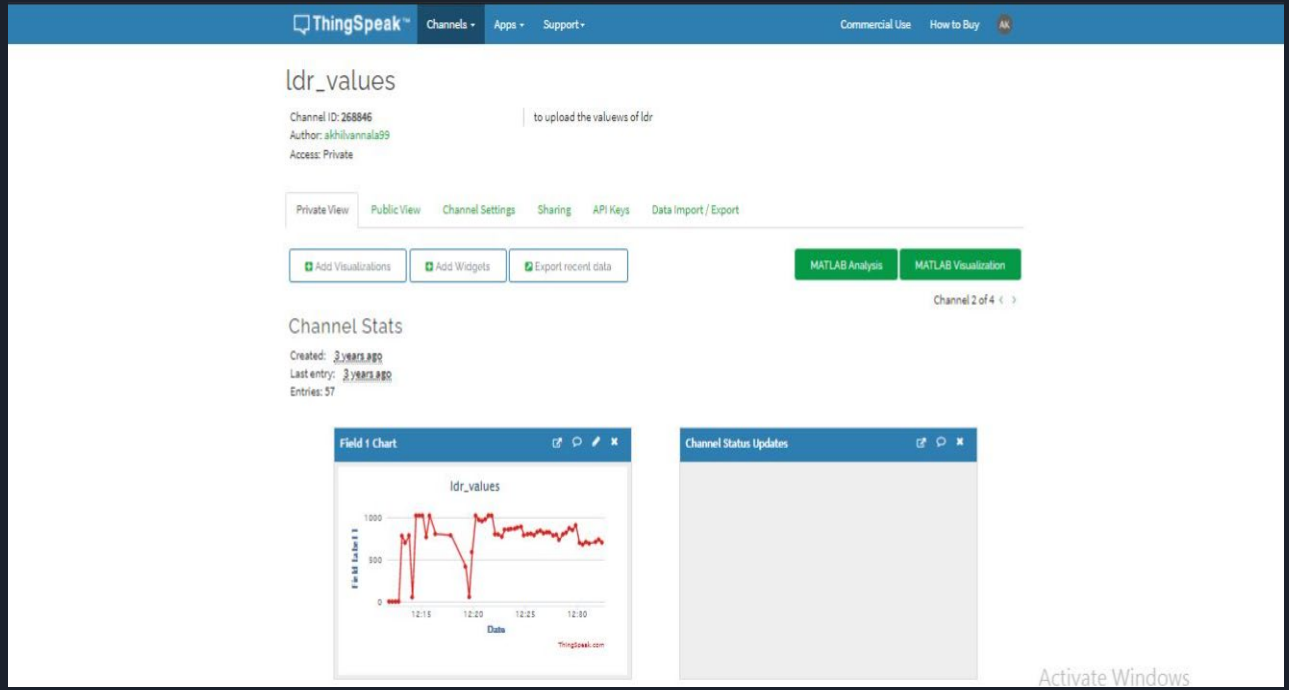
Bias Breakout: The criticality of issues, regardless of the geographic location or demographic information.

Clarity Crisis: Comprehensive but clear report highlighting critical issues.

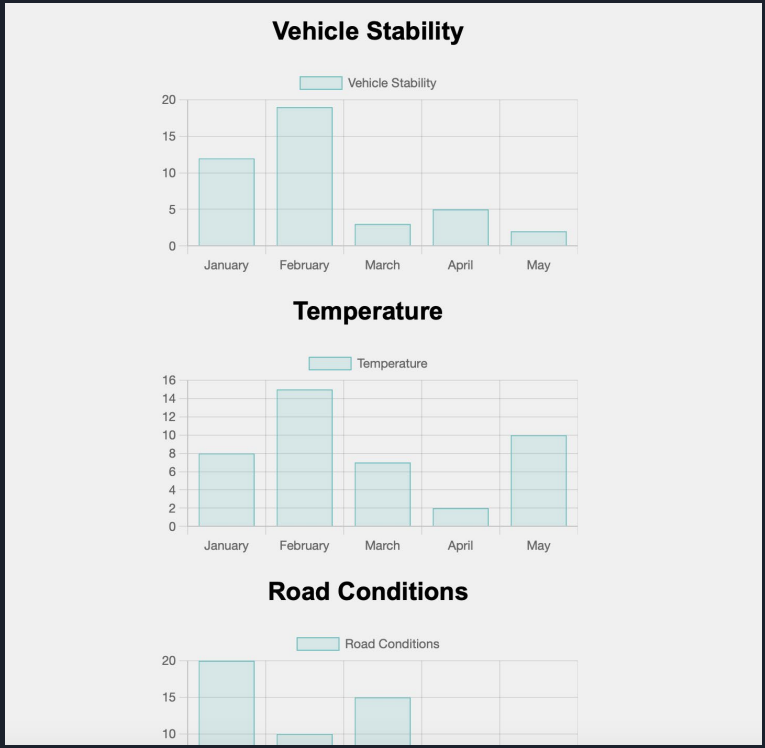
Privacy Pursuit: Vehicle data is encrypted → limited to authenticated user.

Graphs.

One sensor data: Here it is Temperature sensor data (accelerometer, gyroscope etc,..)



Graphs - Key Guiding Questions



Does it show a diverse range of scenarios ?: routine and challenging conditions

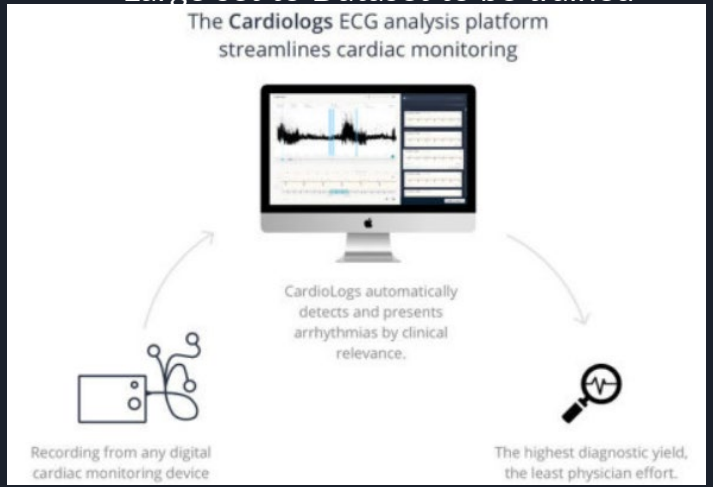
Does it cover all Categories?: weather, road complexity, and traffic density

Is it Transparent? : successful scenarios and instances requiring human intervention

What IF - EMS Equipments are integrated AI??

Cardiac Monitoring -

- Detect early cardiac abnormalities
- Oxford University - AI in Cardiology saves thousands of lives.
- Large set to Dataset to be trained



Automated External Defibrillator -

- Machine Learning models - identifies the heart rhythm
- In future - possible to give the patient condition.

What IF - EMS Equipments are integrated AI? - Contd

Glucose Monitoring Equipment -

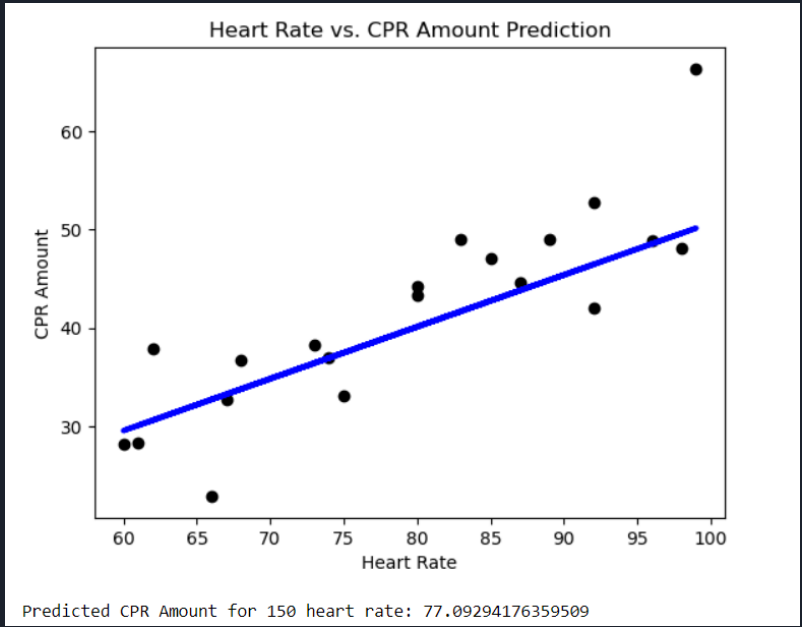
- With AI - Better Blood Sugar Management.
- Association of Diabetes care and education Specialists - no need to bother about what they are eating

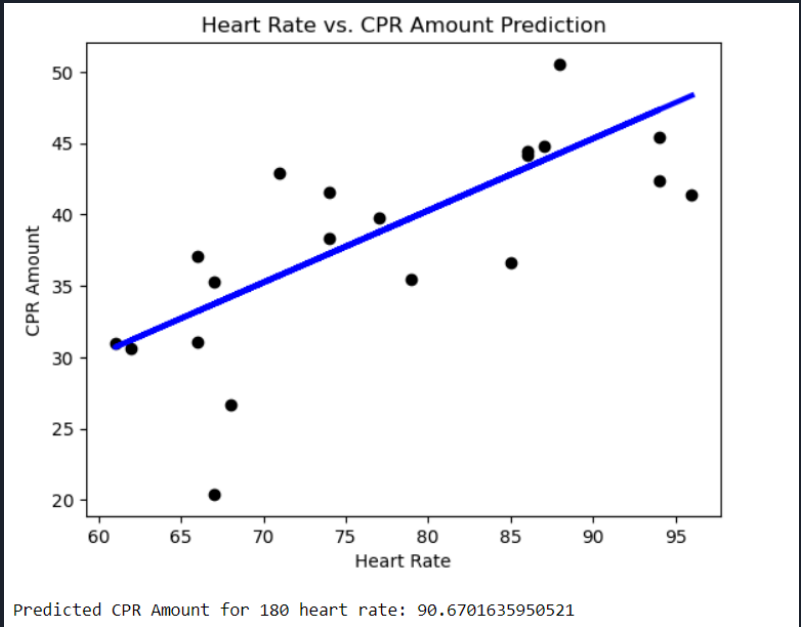
Portable Lab Equipments -

- Blood Tests lab and other Diagnostic Labs
- Doctors can get reports of patient before reaching hospital.

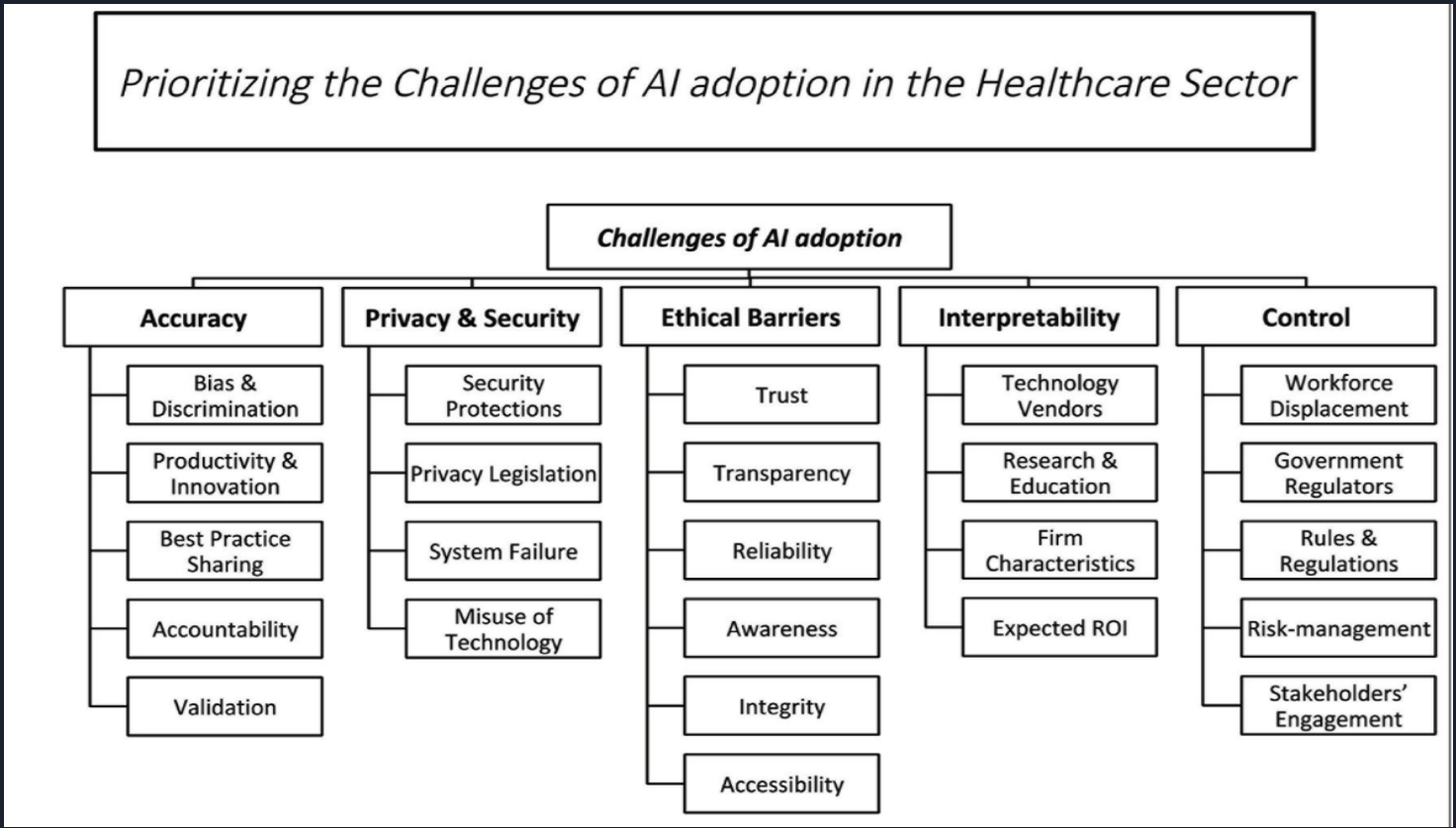
Health Care - POC

Python code - Model is simple linear regression to predict Cardiopulmonary Resuscitation (CPR) amounts based on heart rate data.

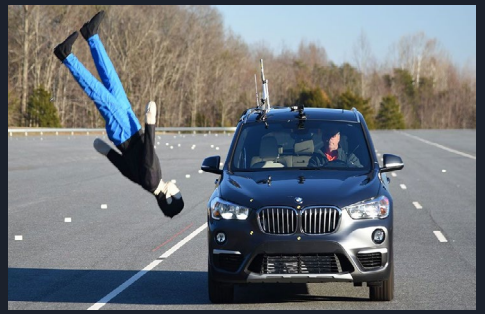




Challenges of AI adoption in Healthcare.



Crucial Advancements and Healthcare impacts of AV's :



AV's as

- Ambulance ,Trucks , Ridesharing cars, mobility pods, Mobile medical vehicles and cargo vehicles .

Direct and Indirect Impacts

- Traffic Safety
- During attack of illness
- Substance Abuse
- Road Rage or hijacks control
- Stress

& more

Waymo -Googles investment

SoCal Lab Autonomous Air Ambulance

Richmond Marketing and Design

Ford and VW's investment in ArgoAI in 2017

Tesla self driving test

Thank you!

Any Questions ?