

A TALE OF

SELF-DRIVING CARS...

AMAN AGARWAL

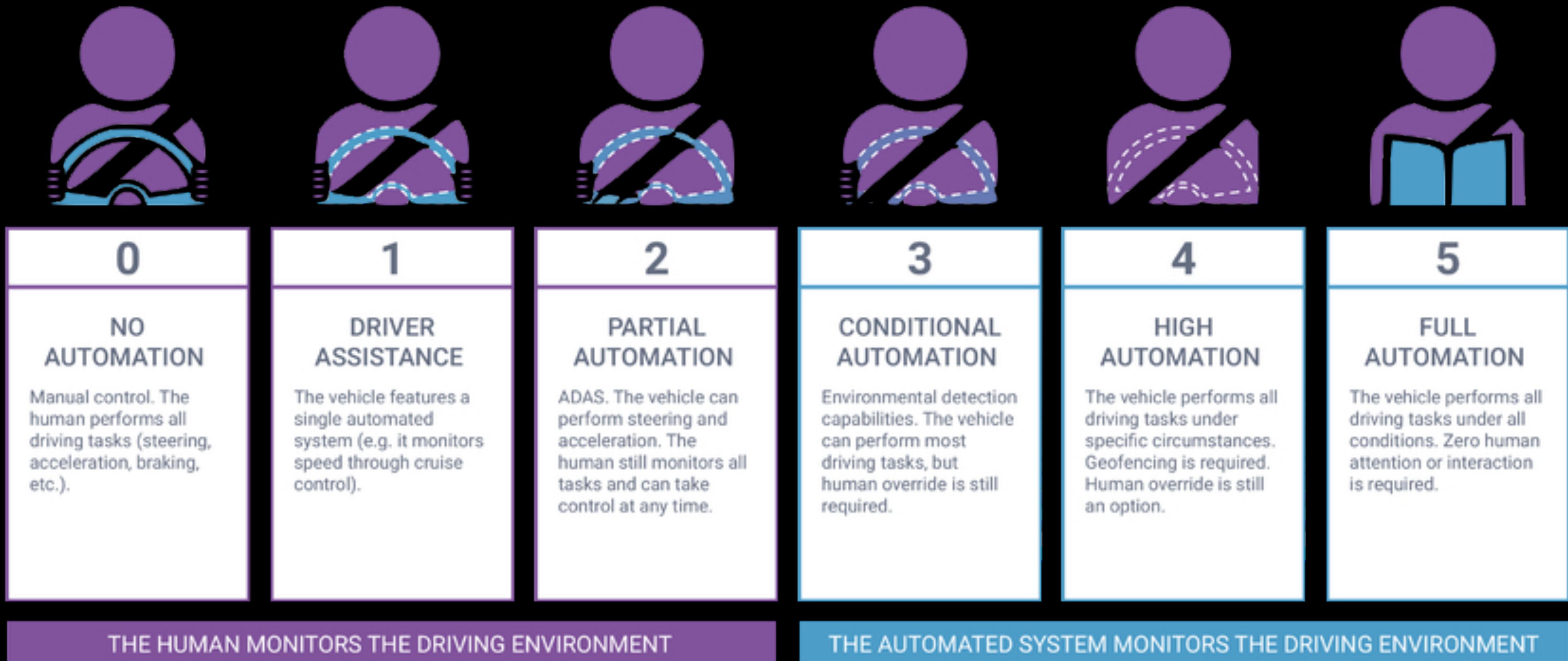




WHAT IS AN AUTONOMOUS VEHICLE?

ANY VEHICLE CAPABLE OF SENSING ITS
ENVIRONMENT AND OPERATING WITHOUT
HUMAN INVOLVEMENT_[1].

LEVELS OF DRIVING AUTOMATION [1]



GOD LEVEL AUTOMATION



EXAMPLE OF SELF-DRIVING VEHICLES



Tesla's Autopilot



Google's Waymo



Uber ATG



nuTonomy

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PROS [5]

- Fewer accidents
- More productive commutes
- Fewer traffic jams*
- Benefit to the visually impaired, disabled , underaged , drunk .

CONS

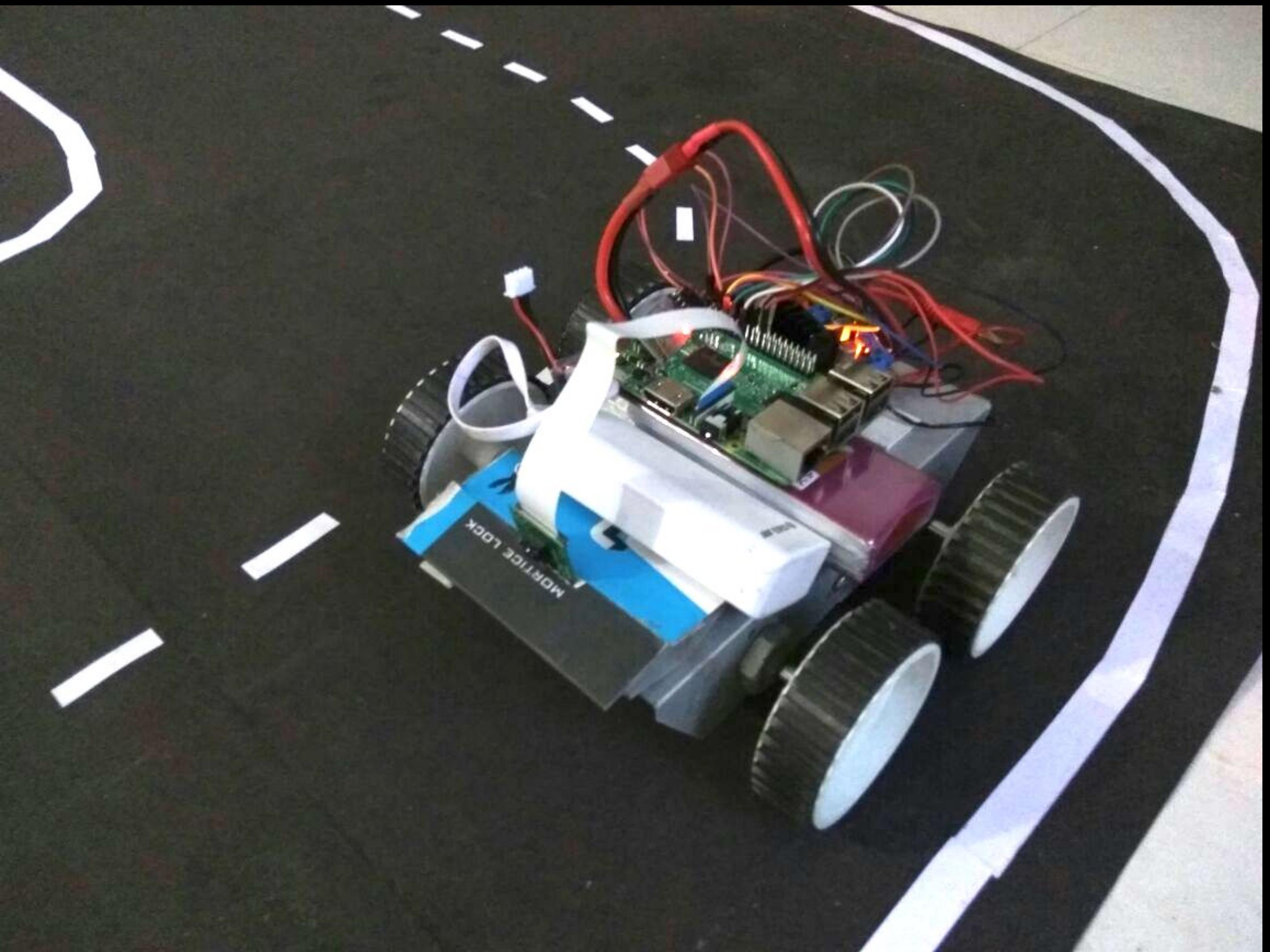
- Cyber security risks
- Legal liability 

TESLA SMART SUMMON



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NAÏVE APPROACH

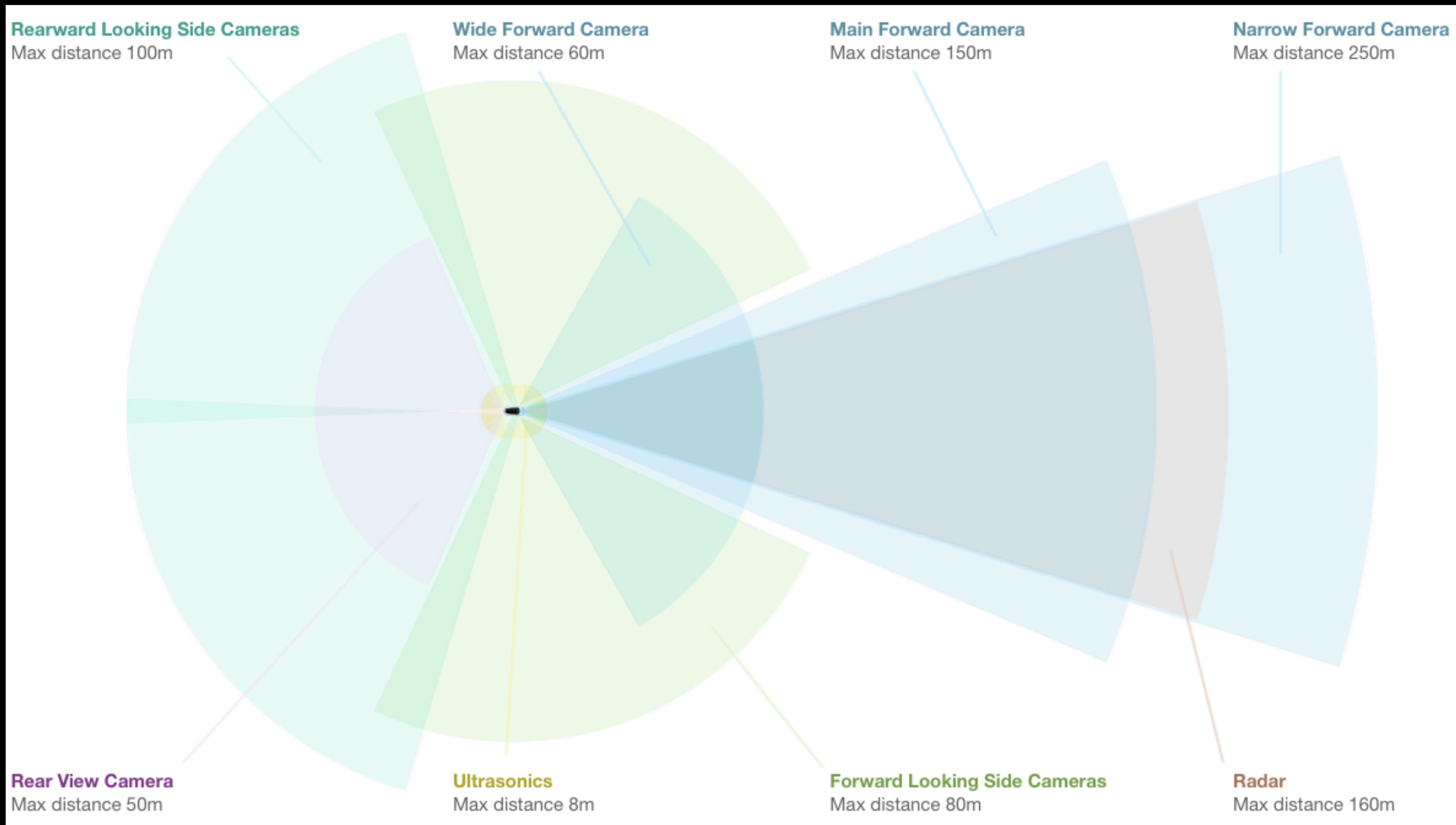


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COMPLEX (REAL-WORLD) APPROACH

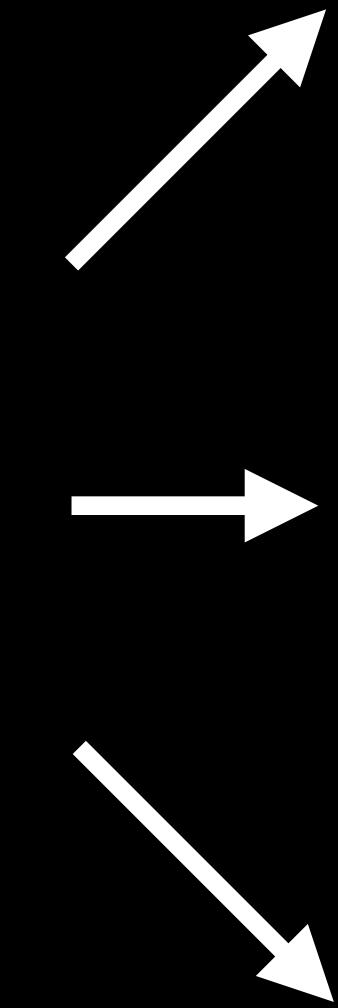
PROCESS [2]

IMAGE/
RADAR/
LIDAR

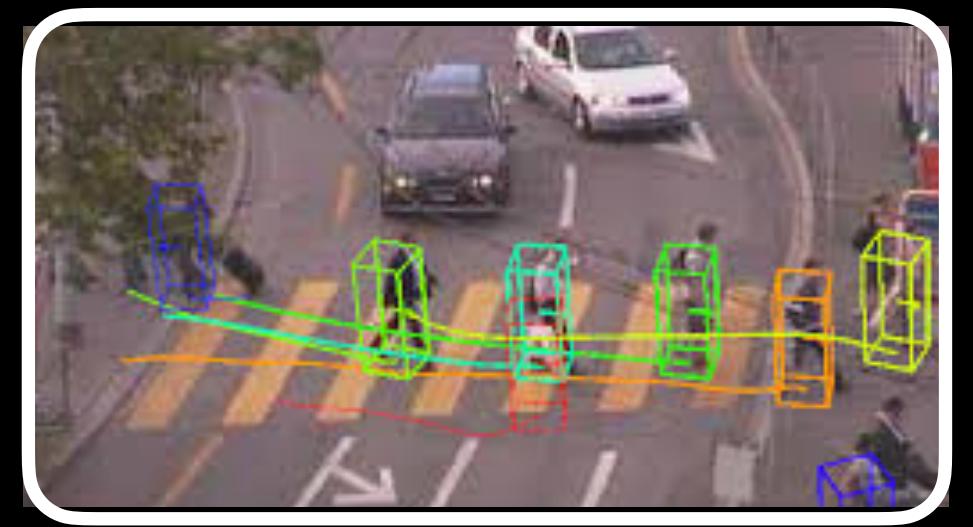


PROCESS [2]

IMAGE/
RADAR/
LIDAR



Car/object detection

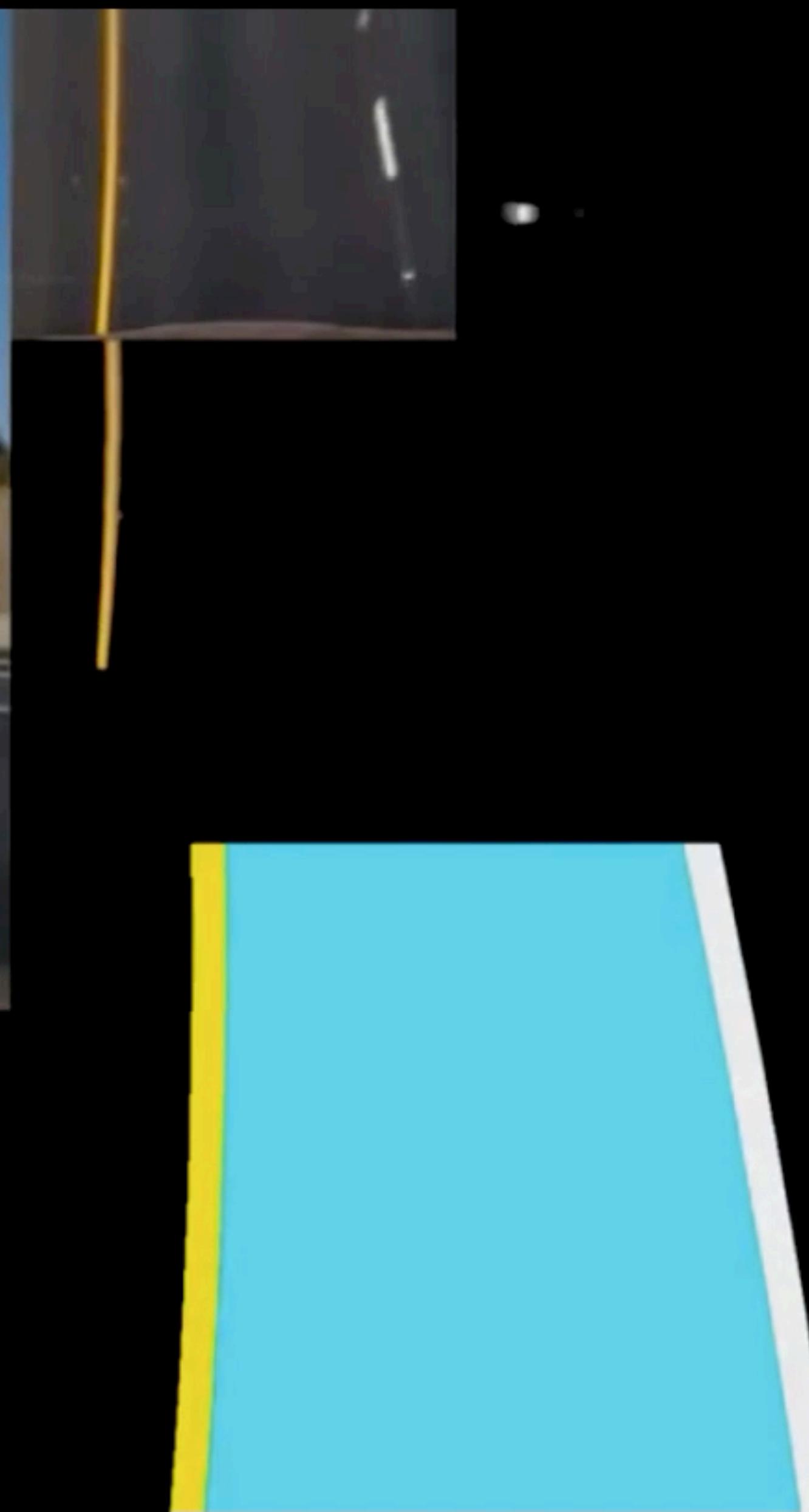


Trajectory prediction



Lane detection

-
-
-

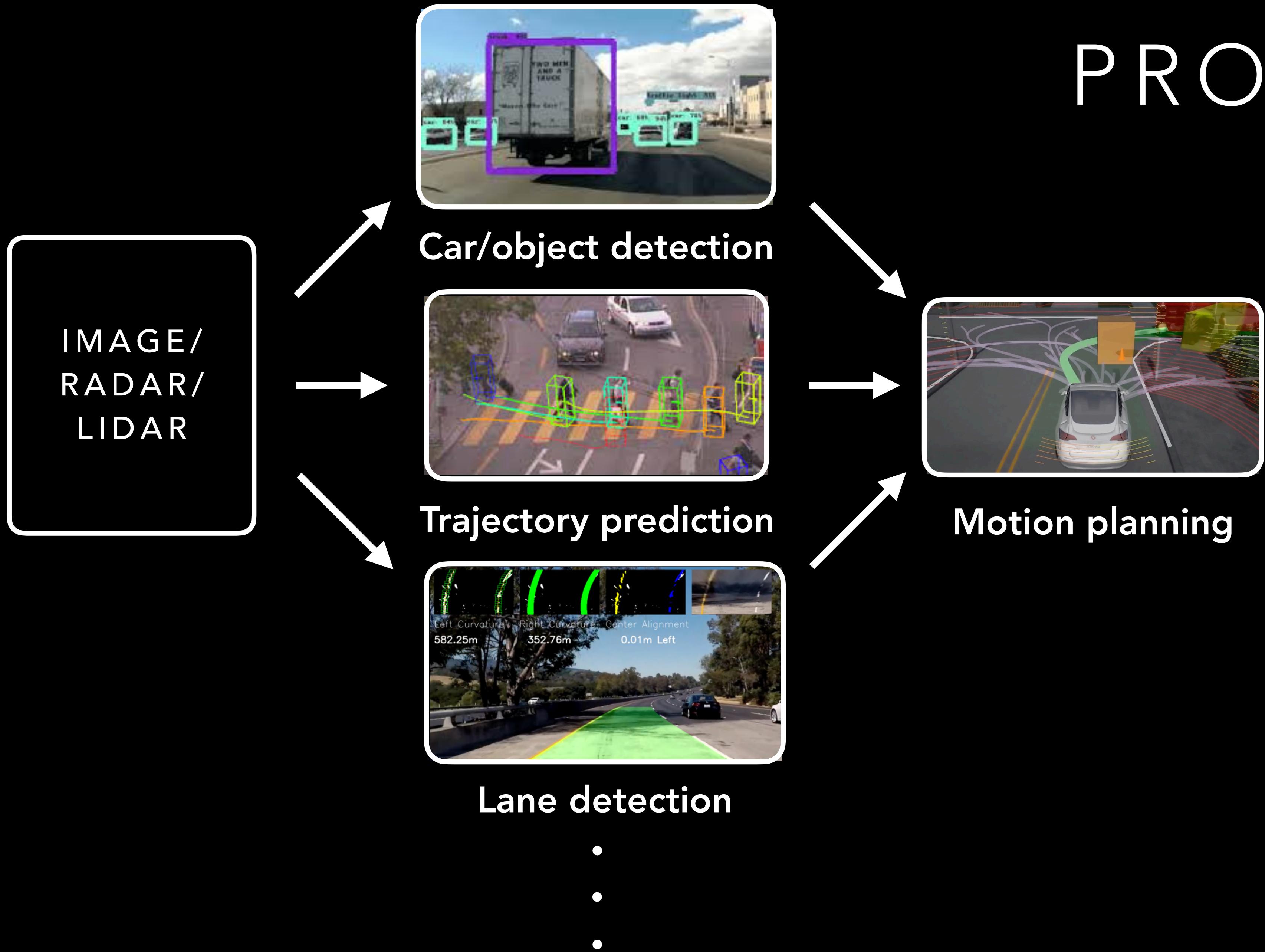


Curvature: Right = -9274.18, Left = -6027.42
Lane deviation: 23.87 cm.



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PROCESS [2]



■ Manual Mode

Distance Without Incident

Best: 4.39 Miles

Curr: 4.39 Miles

Timer: 0:05:38

AccT: 0 m/s²

AccN: 3 m/s²

AccTotal: 3 m/s²

Jerk: -1 m/s³

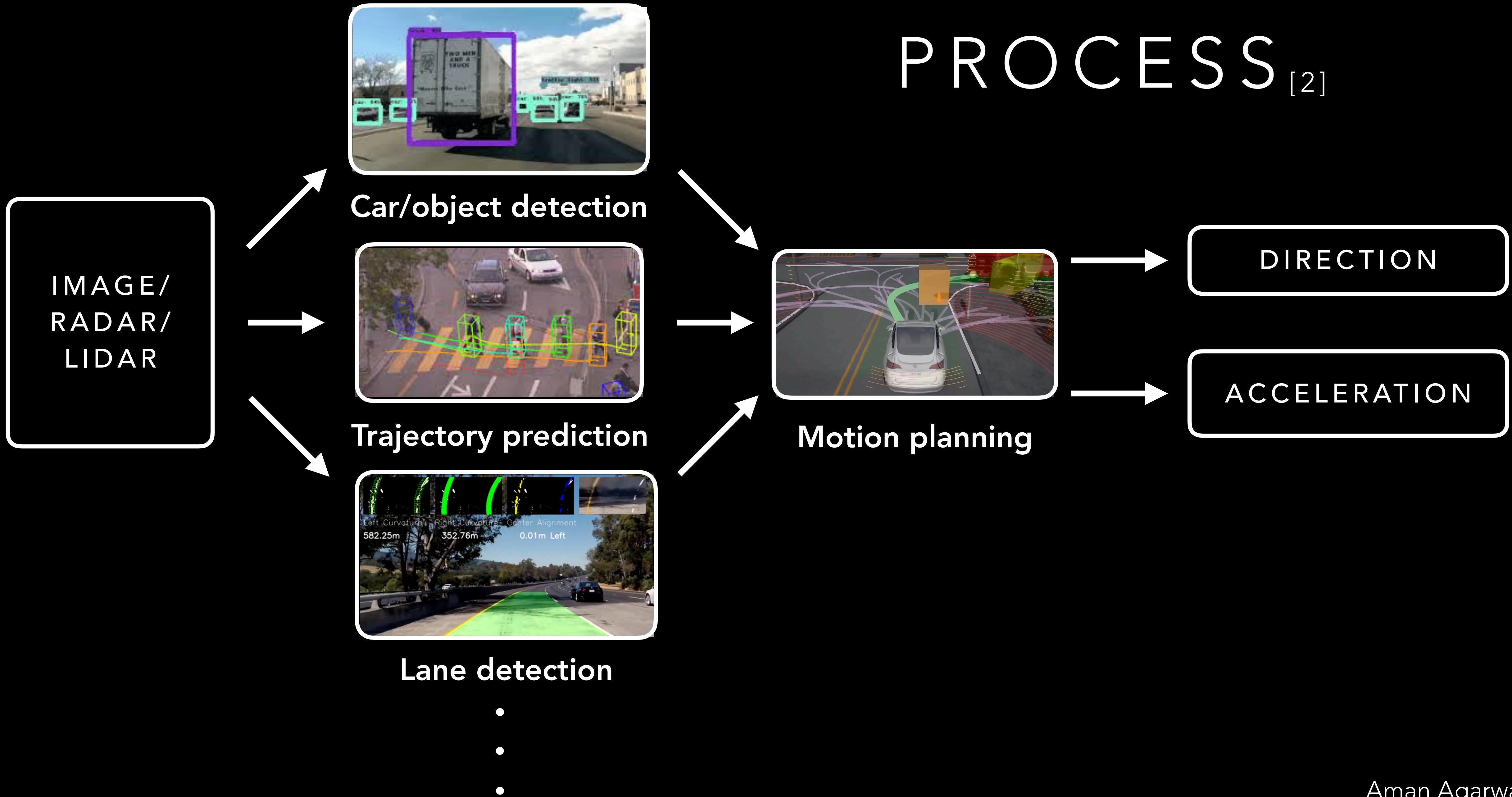


ESC

MENU

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PROCESS [2]



KEY DETAILS [3]...

- LOCALIZATION AND MAPPING

Where am I?

- SCENE UNDERSTANDING

Where is everyone else?

- PATH PLANNING

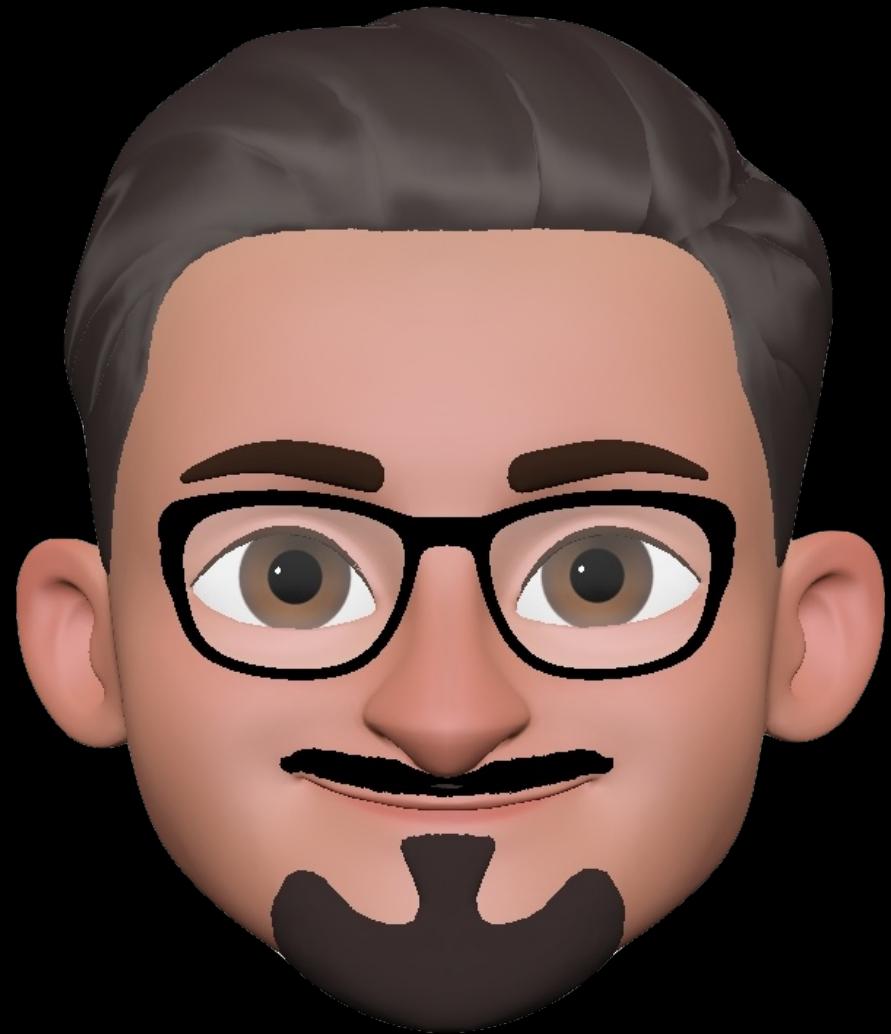
How do I get from point A to B?

- CONTROL

How to move the car?

REFERENCES

1. Synopsis article
2. Self-driving car case study: Coursera
3. Lex Fridman MIT 6.S094
4. Waymo TED talk
5. Self-driving cars case study
6. David Silver TED talk



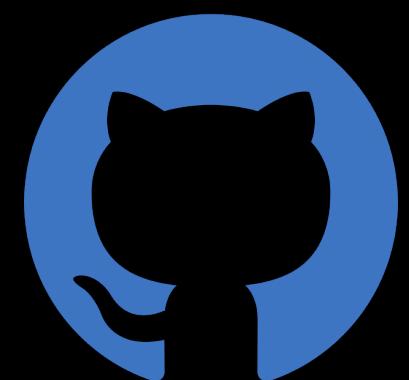
AMAN AGARWAL

Software Developer @ HSBC | Intel Software Innovator of AI

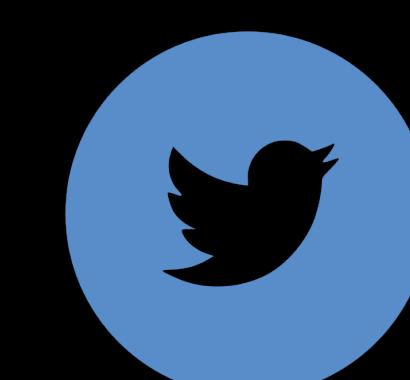
+91 75740 14476 | amanag.11@gmail.com | amanbasu.github.io/portfolio/



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amanbasu



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