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Building a Scaled-Down Intersection Testbed: Autonomous Driving Algorithm Testing

August 15, 2024

Introductions

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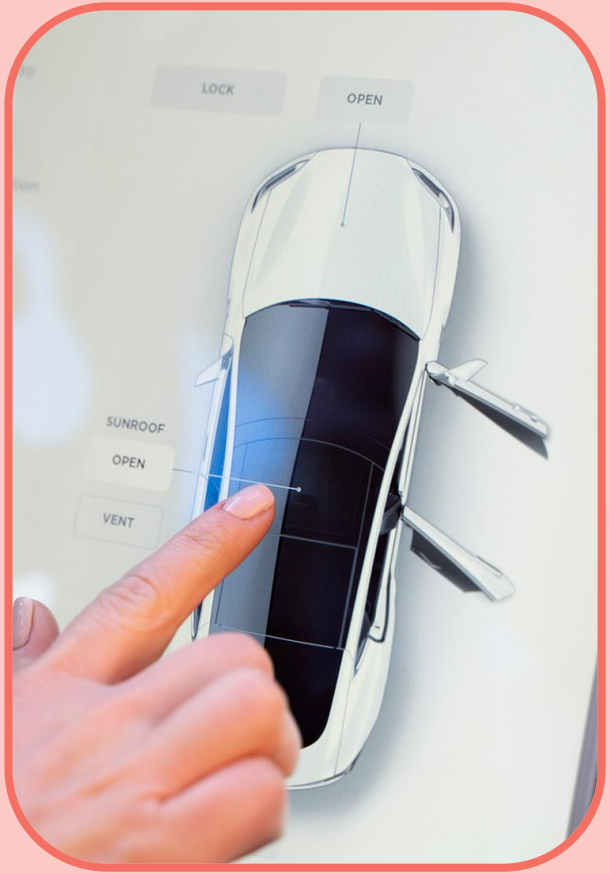
01
Social
Science

Social Science Issue

Our project addresses the lack of an efficient way to test autonomous driving algorithms in an urban environment.



Our Research Methods

Method Used:

- Surveys
  - Pros
    - Helped us get data in a high population and fast moving city.
    - Simple to conduct and ask
  - Cons
    - Data are not detailed

Why surveys?

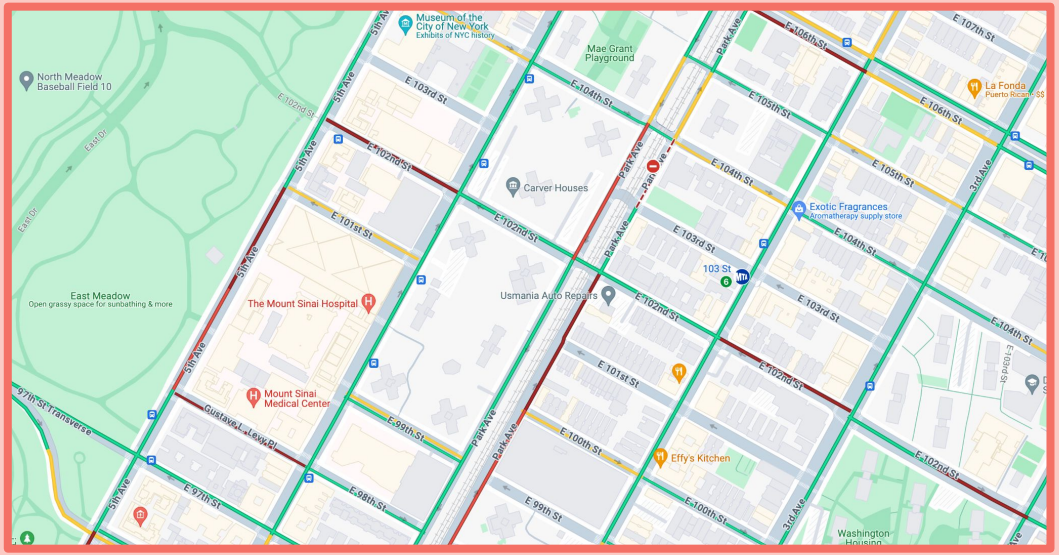
- Quick
- Easy to understand
- Interactive

- Interviews
  - Pros
    - Helped us gather more detailed data
  - Cons
    - Time consuming
    - Wouldn't get more participants

Why interviews?

- Informative
- The ability to gain deep insight into our interviewee's thoughts and opinions.

Limitations



- The world of AI vehicles is still a new concept
- Getting the perfect location

Social Science Research

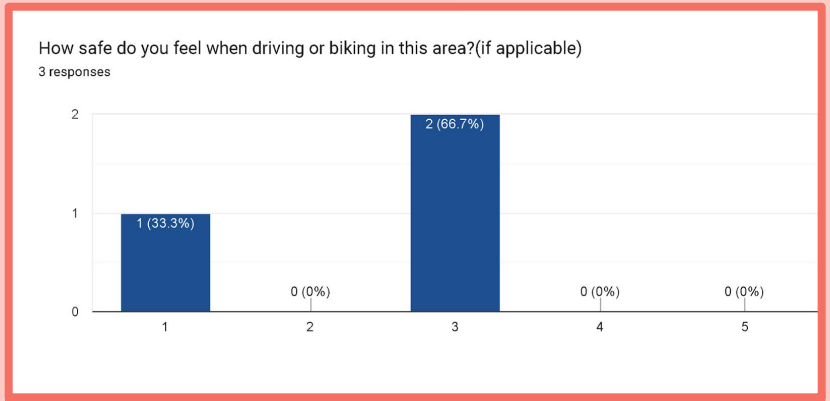
- First Field Trip:
  - 110th street and Lexington Ave
    - Citi Bike station
    - Fish Shop
- Second Field Trip:
  - Central Park North
    - Citi Bike station
    - Apartment Building
    - CVS Pharmacy

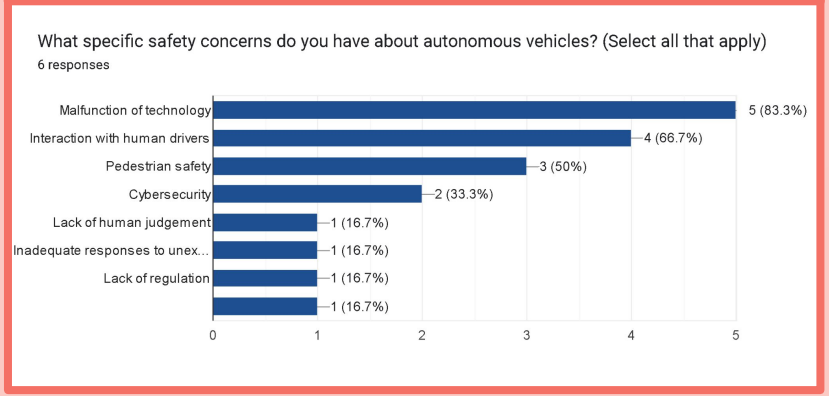
Our Findings

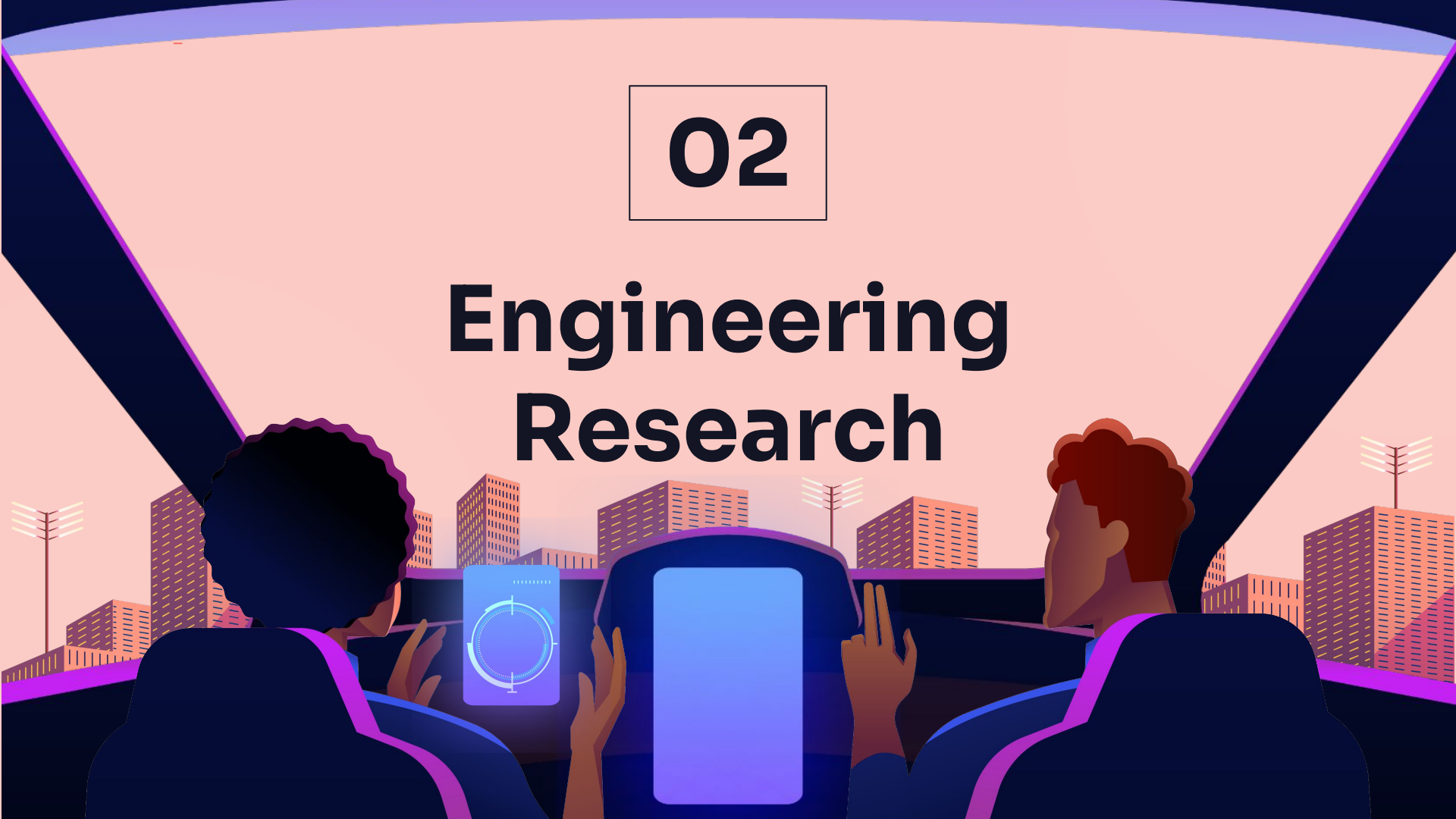
The Results From Our Surveys and Interviews:

- E-bikes are a very dangerous hazard for the drivers and traffic, in general, in the streets

- Autonomous driving vehicles are not yet trusted by the public
  - “We already have people killing people, I don’t think we need AI to kill people now.” (Survey 10)






02
Engineering
Research

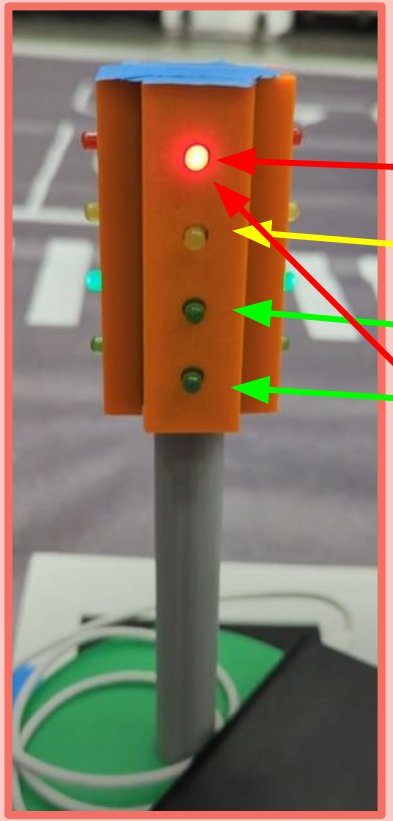
Engineering Research

3D Modeling a human pedestrian

Completed intersection

Painting our buildings

Engineering Research



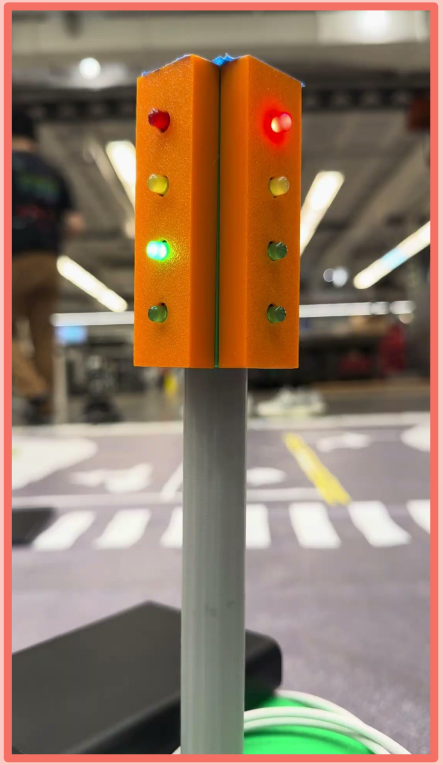
Traffic Light System Explained:

Red light - Vehicles all stop

Yellow light - Vehicles slow down

Green light - Vehicles Go

Red and Green - Only vehicles turning left can go



Traffic light in action

Engineering Research

This is the intended use of the testbed:

- The “autonomous” vehicle accelerates as soon as the light turns green
- It stopped when it detected the pedestrian.
- It accelerated after the pedestrian is out of the way.

The pedestrian can be interchanged with an e-biker

Connection Between Social Science and Engineering:

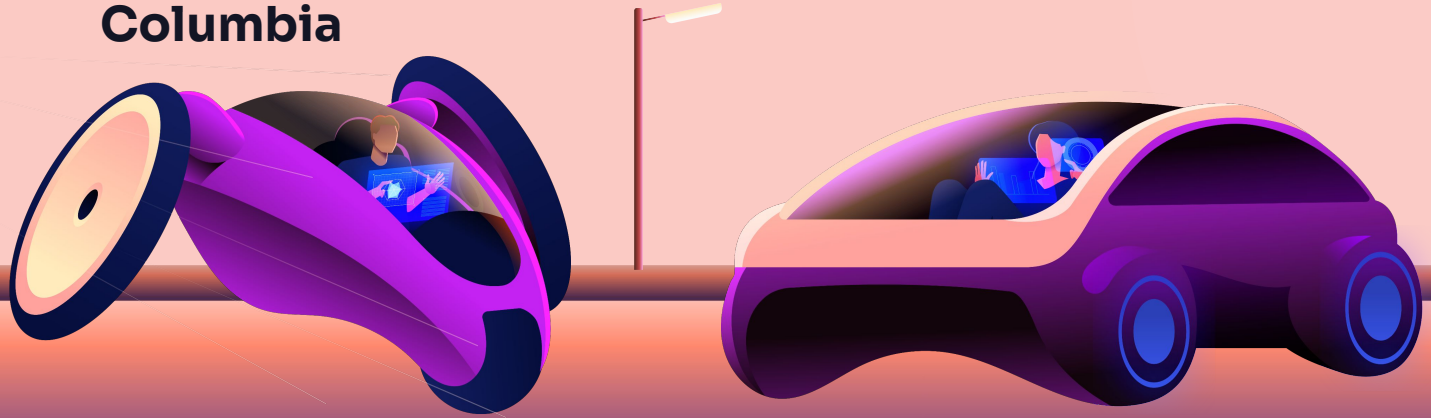
- Aimed to understand traffic concerns in Harlem.
- Respondents viewed e-bikers, as the biggest hazards to traffic safety.
- Both e-bikes and Teslas are undetectables in traffic
- Our findings highlight the critical need for autonomous vehicles.

Key Takeaways

- E-bikes are a major concern
- Autonomous vehicles should be more accessible
- Autonomous vehicles require more rigorous testing

Acknowledgements

- Qi Gao
- William Bill Miller
- Cristian Capotescu
- Dr. Sharon Di
- Brady Kennedy
- Fernanda Martinez
- Carleton Lab @ Columbia
- Miguel Beltran
- Trey Greene
- Residents of Harlem
- CS3 (Center for Smart Streetscapes)
- Makerspace @ Columbia



Thank You

Are there any questions?