Enhancing Micromobility with Object Detection

Ivy Chen

Anthony Santiago

Lopen Zuo

E.N.G. Engineering the Next Generation

NSF

CENTER FOR SMART STREETSCAPES

What is Micromobility?

Electric Bikes

Bikes with battery assisted propulsion. Limited to 20mph in NYC

Bikes

Good ol' manual powered bikes

Scooters/Escooters

Standard or motorized devices powered by kicking feet

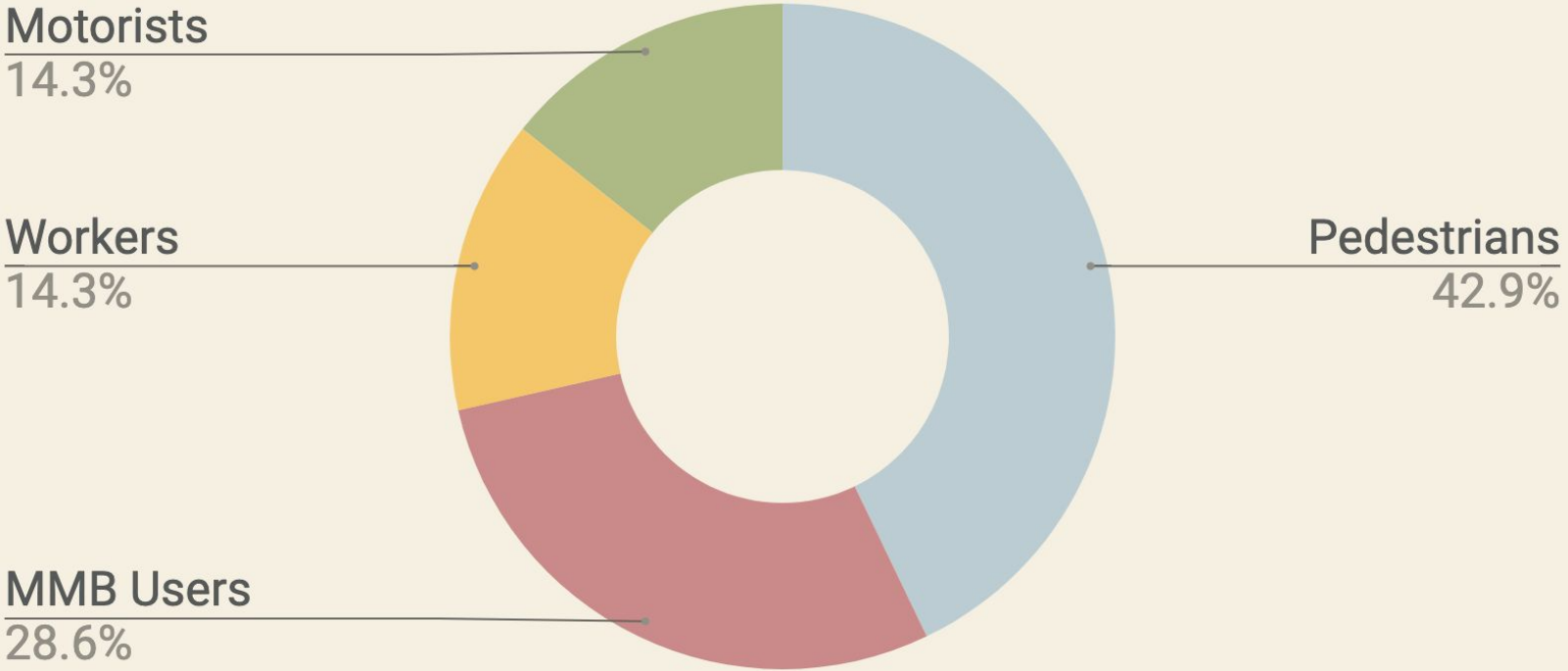
Mopeds

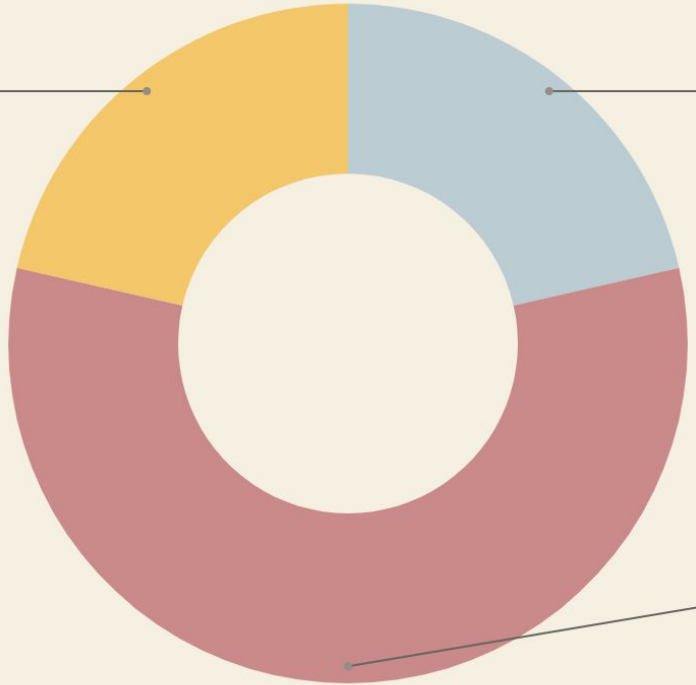
Heavier duty ebikes that go over 20mph. Also includes motorcycles

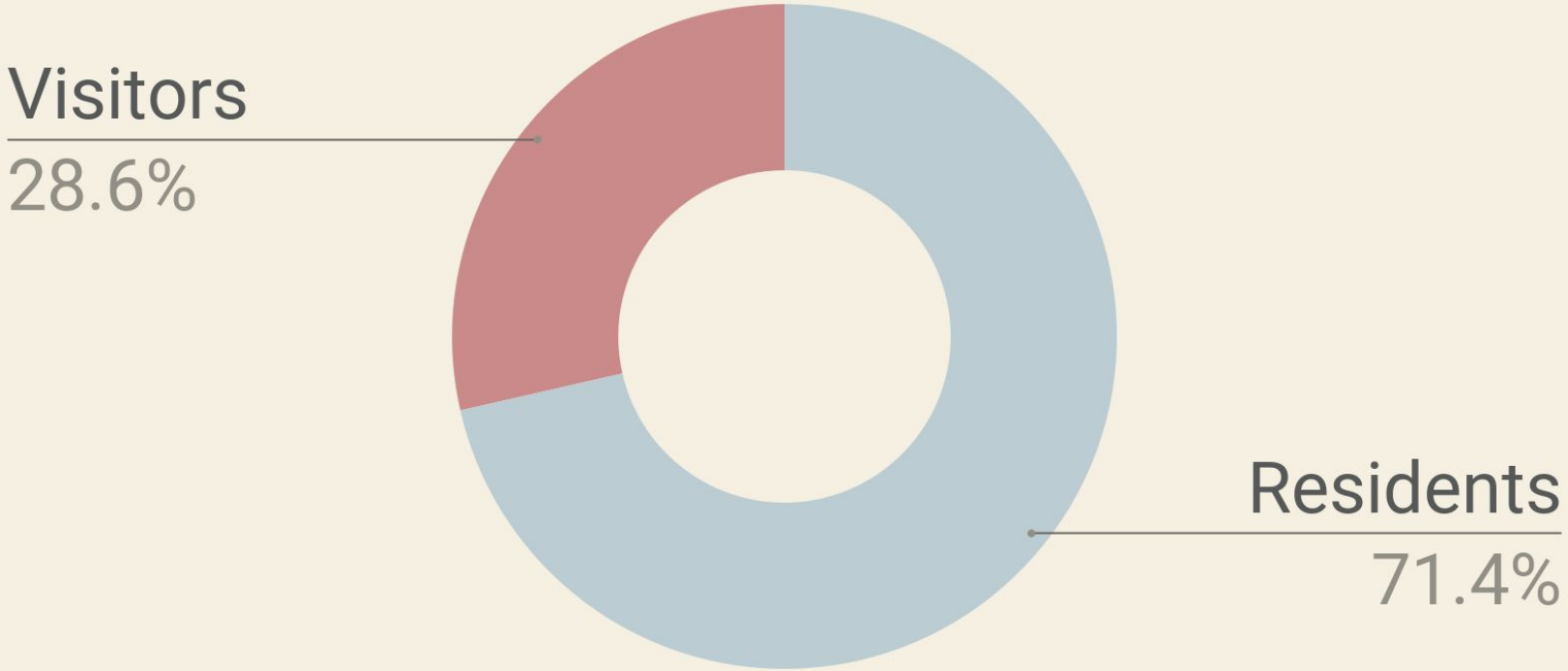
How can we use
AI to improve safety
for micromobility users?

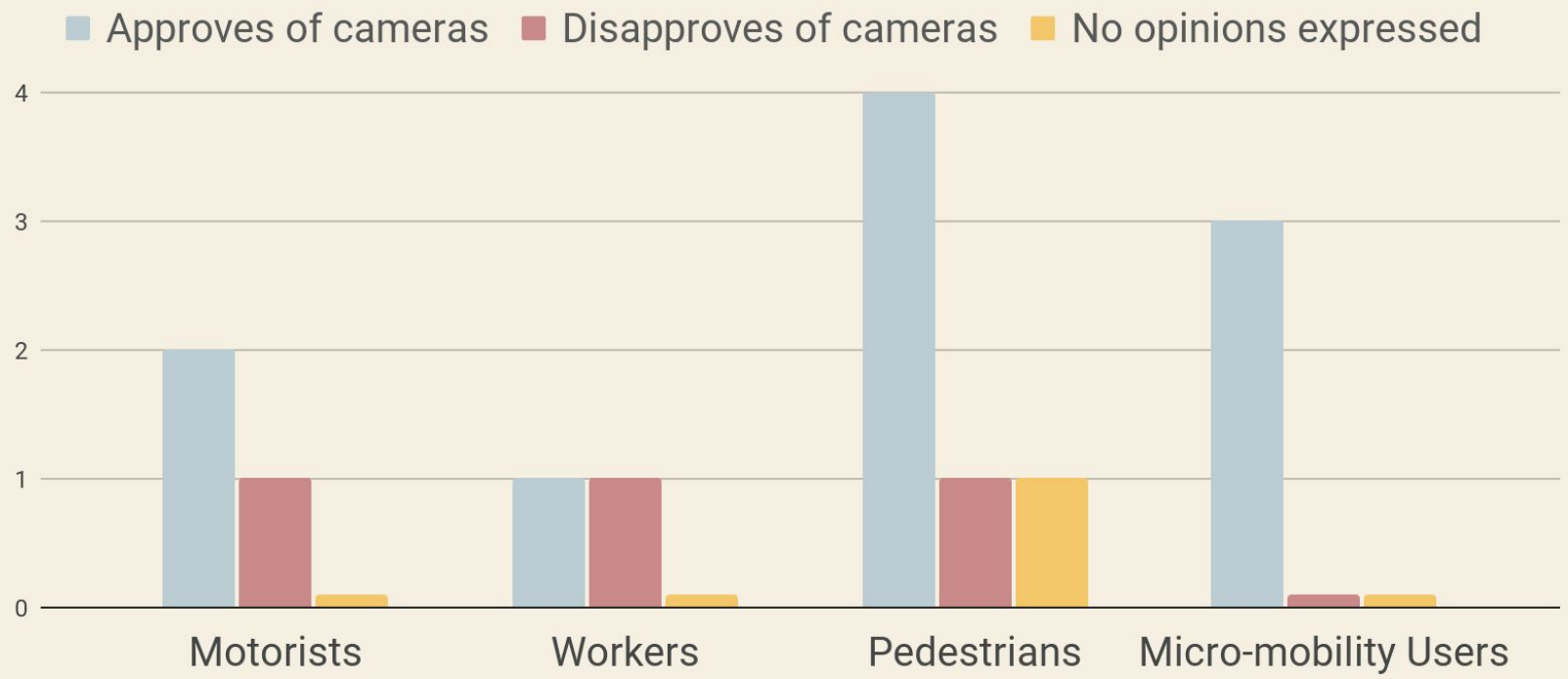
How does the
community feel about
possible AI solutions?

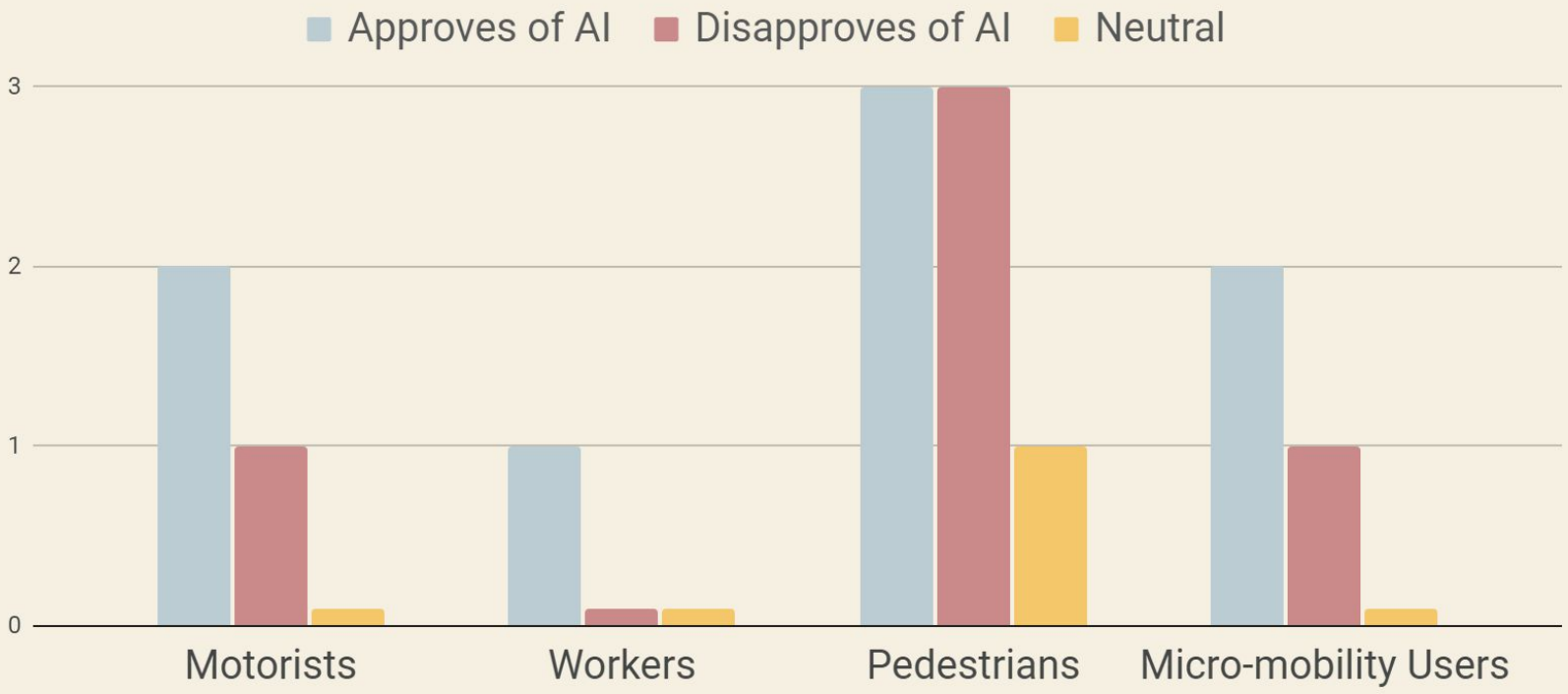
01. Social Science Research


Motorists
14.3%
Workers
14.3%
MMB Users
28.6%
Pedestrians
42.9%


Youth
21.4%
Elderly
21.4%
Middle Aged
57.1%

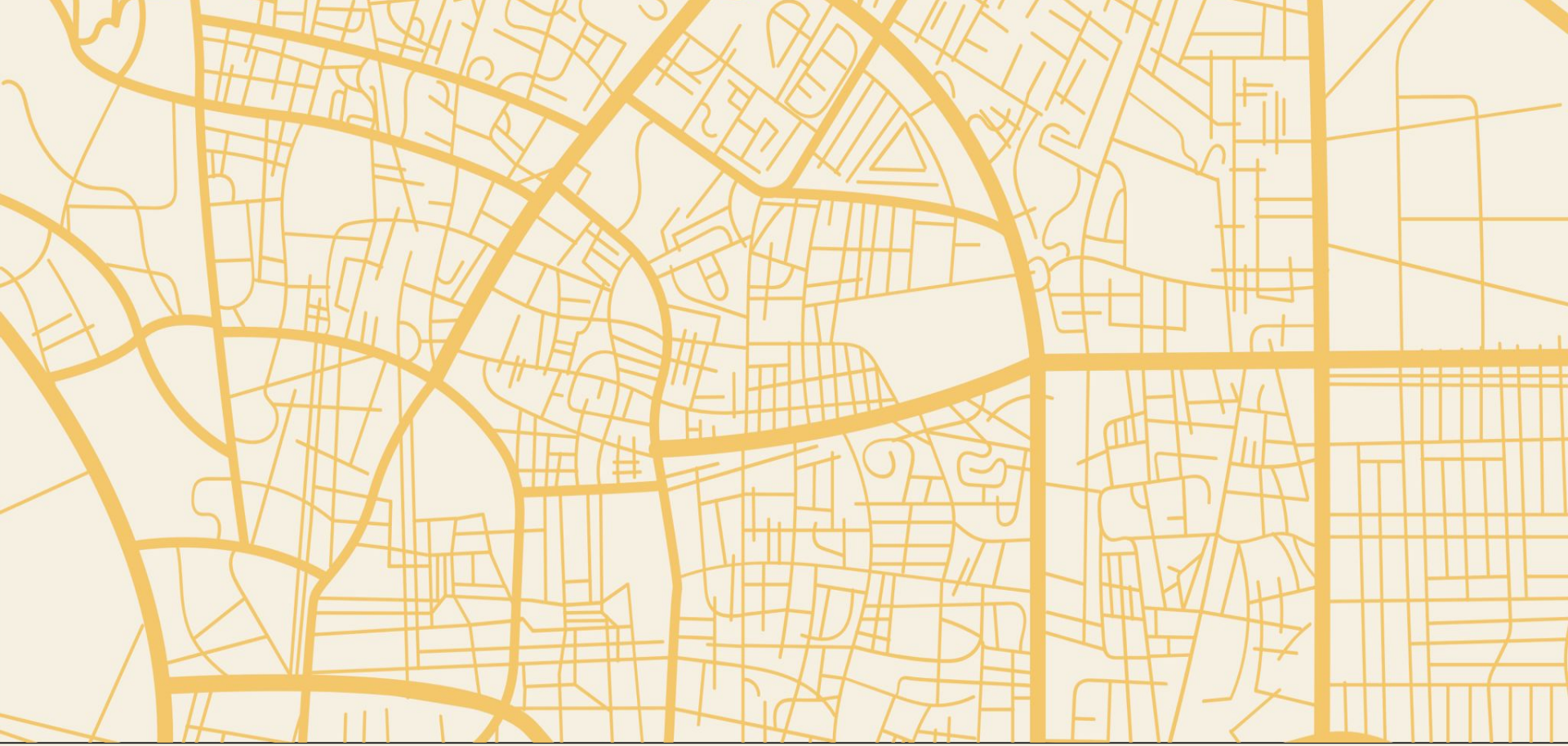

Visitors
28.6%
Residents
71.4%


Approves of cameras
Disapproves of cameras
No opinions expressed
4
3
2
1
0
Motorists
Workers
Pedestrians
Micro-mobility Users


Approves of AI
Disapproves of AI
Neutral
3
2
1
0
Motorists
Workers
Pedestrians
Micro-mobility Users

YIELD
TO
SHARED
ZONE

MEDRITE
MEDRITE
Nelson CLEANERS

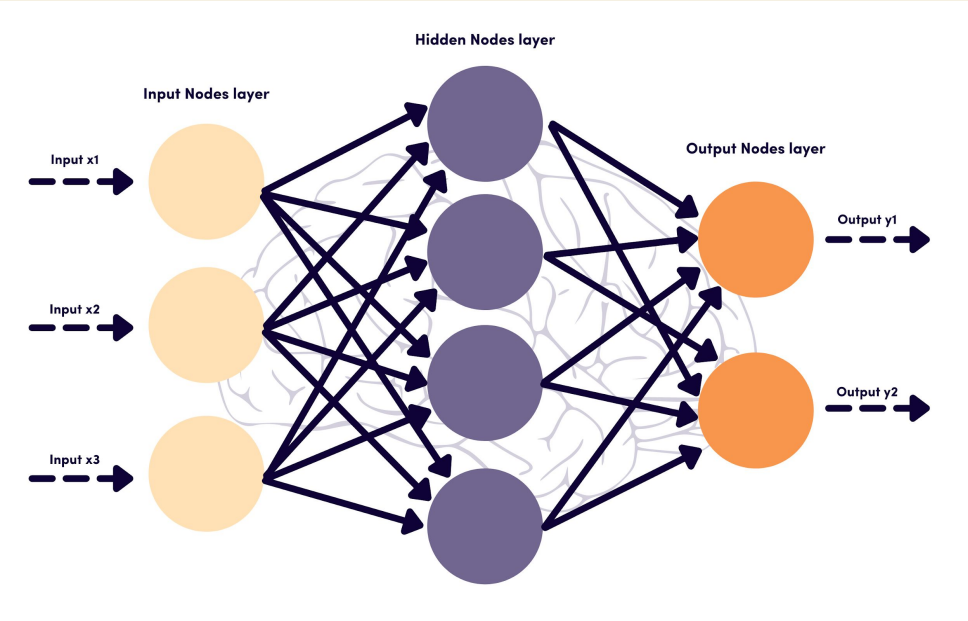


02. Engineering Research

Deep learning & Yolo Models

Deep Learning : subset of artificial intelligence where computers learn to recognize patterns and make decisions by processing large amounts of data through layers of simple decision-making steps.

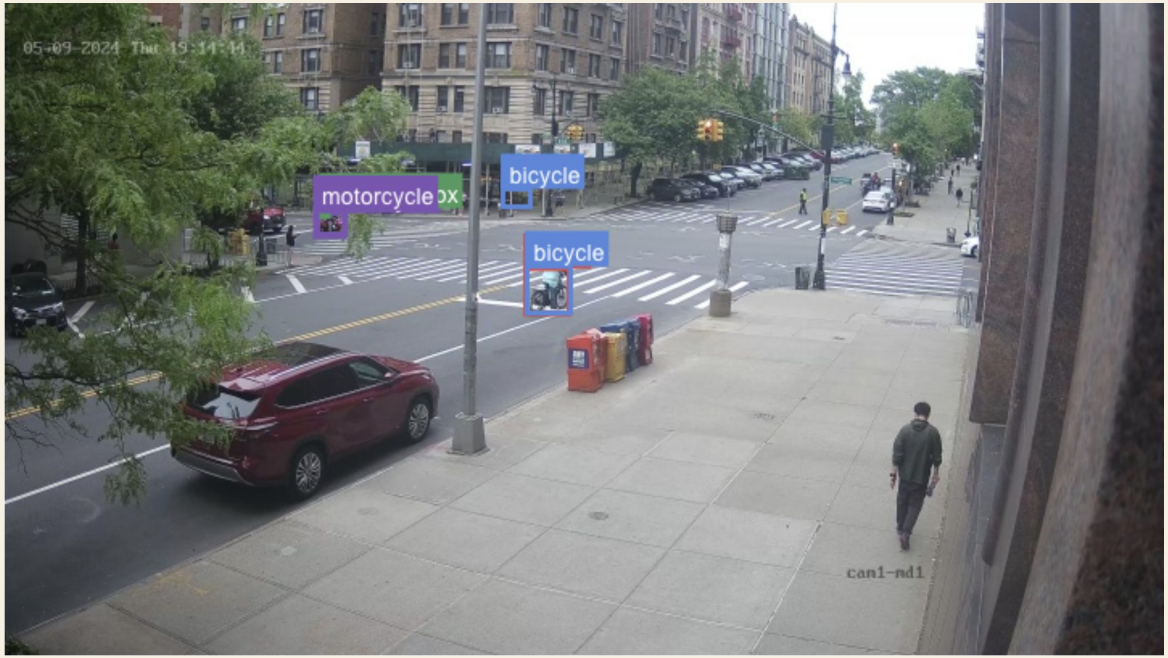
YOLO: a real-time object detection algorithm that uses a convolutional neural network (CNN) to predict bounding boxes and class probabilities for objects in an image.



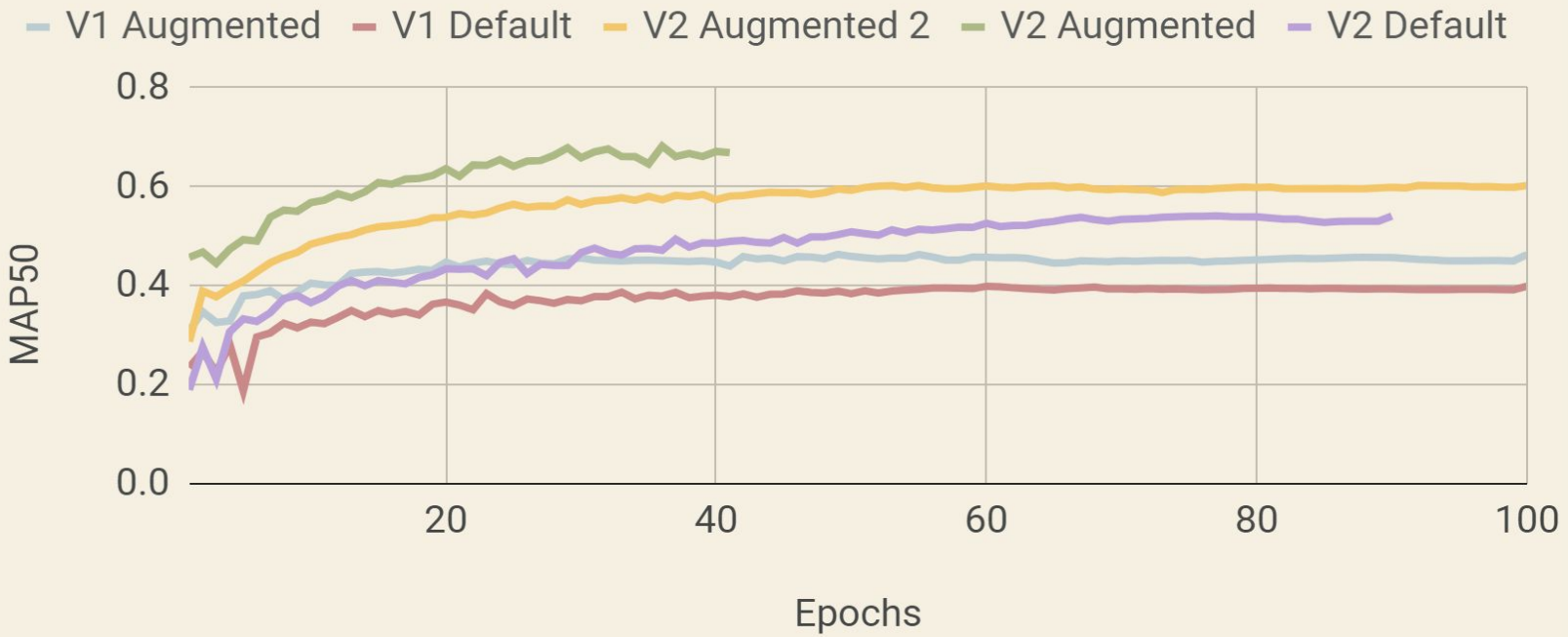
The Dataset

13,000 annotated images sourced from the intersection of 120th Street and Amsterdam

- ❏ Bicycles
- ❏ E-Bicycles
- ❏ Scooters
- ❏ E-Scooters
- ❏ Motorcycles



Weights & Biases



03. Connections and Applications

Amsterdam
© 2023 Google
Google

05-10-2024 Fri 16:53:24
cam1-md1

05-11-2024 Sat 17:16:20
cam1-nd1

05-09-2021 Thu 16:26:57
cam1-md1

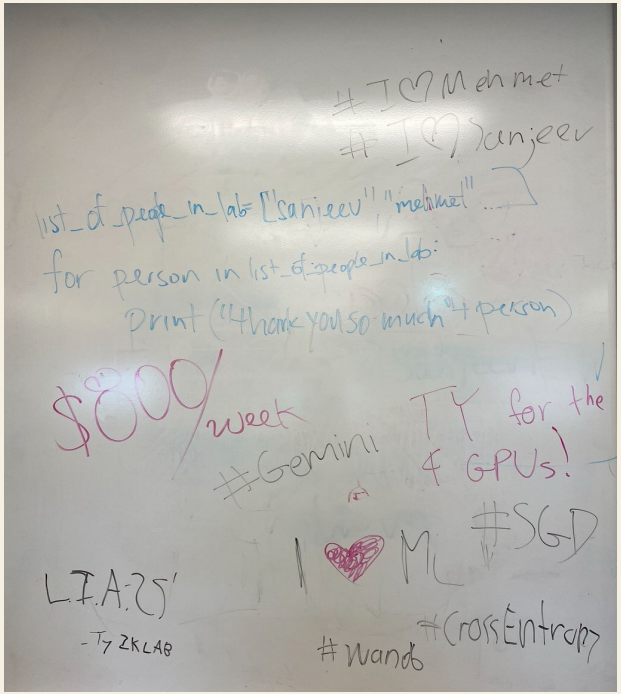
05-10-2024 Fri 19:55:30
cam1-md1

05-12-2024 Sun
cam-nd1

05-12-2024 Sun 11:36:13
cam1-md1

05-12-2024
cam1-nd1

Acknowledgements



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