Computer Vision for Visual Perception

HydraNets

Learning Objectives

AUGMENTED STARTUPS
Computer Vision | AI | Robotics

- **HydraNet**
  - Introduction
  - Definition
  - Background
- **Tesla HydraNet**
- **HydraNet for Self-Driving Cars**
- **Data Augmentation for Regression Neural Networks**
- **Summary**
- **References**

HydraNet – Introduction

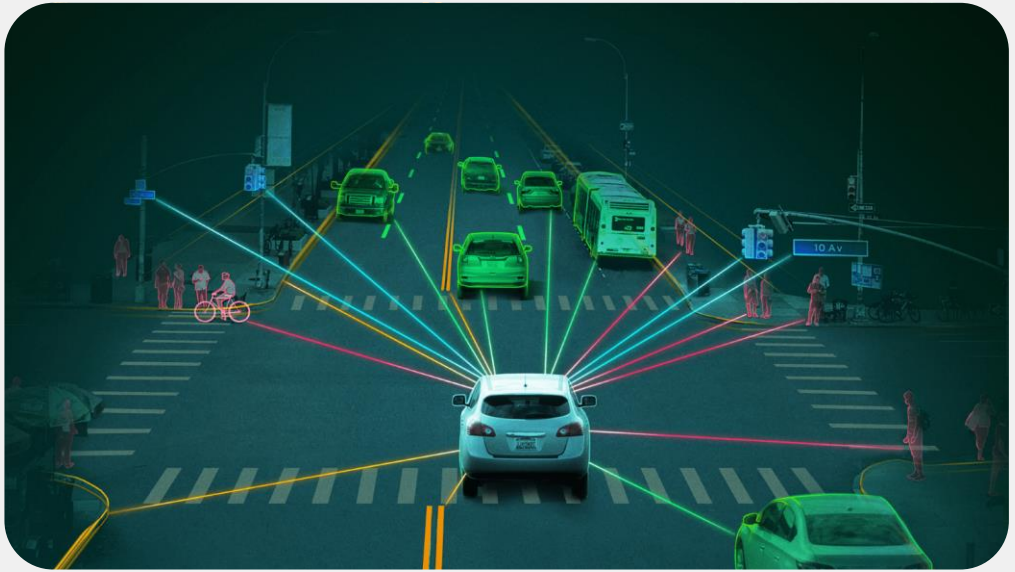
AUGMENTED STARTUPS
Computer Vision | AI | Robotics

- Introduced by Ravi et al. in 2018
- Developed for Semantic Segmentation, for improving computational efficiency during inference time.

HydraNet – Definition

AUGMENTED STARTUPS
Computer Vision | AI | Robotics

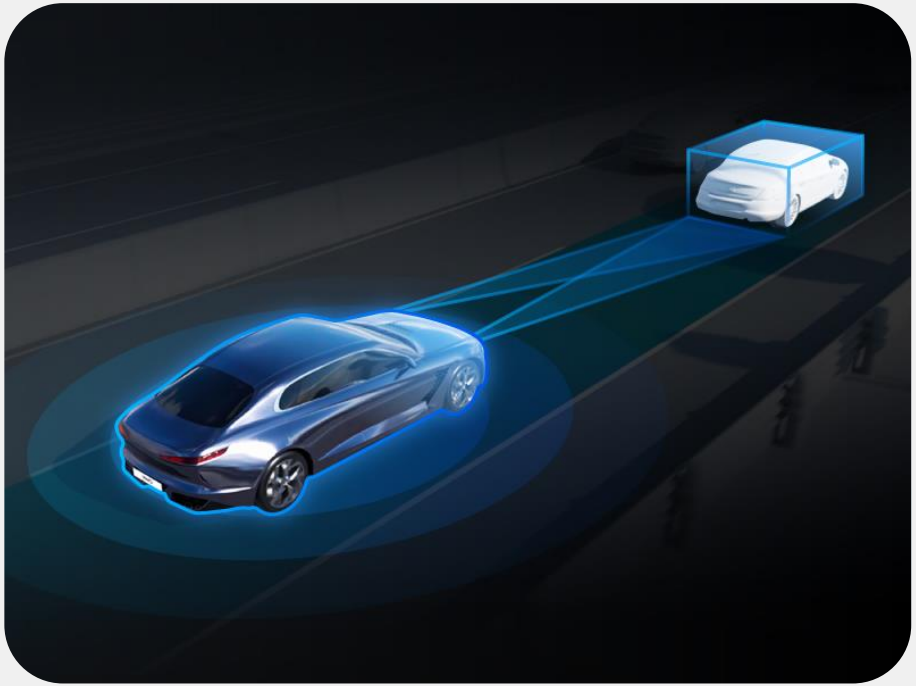
- Dynamic Architecture
- Different CNN
- Various Inputs



HydraNet – Background

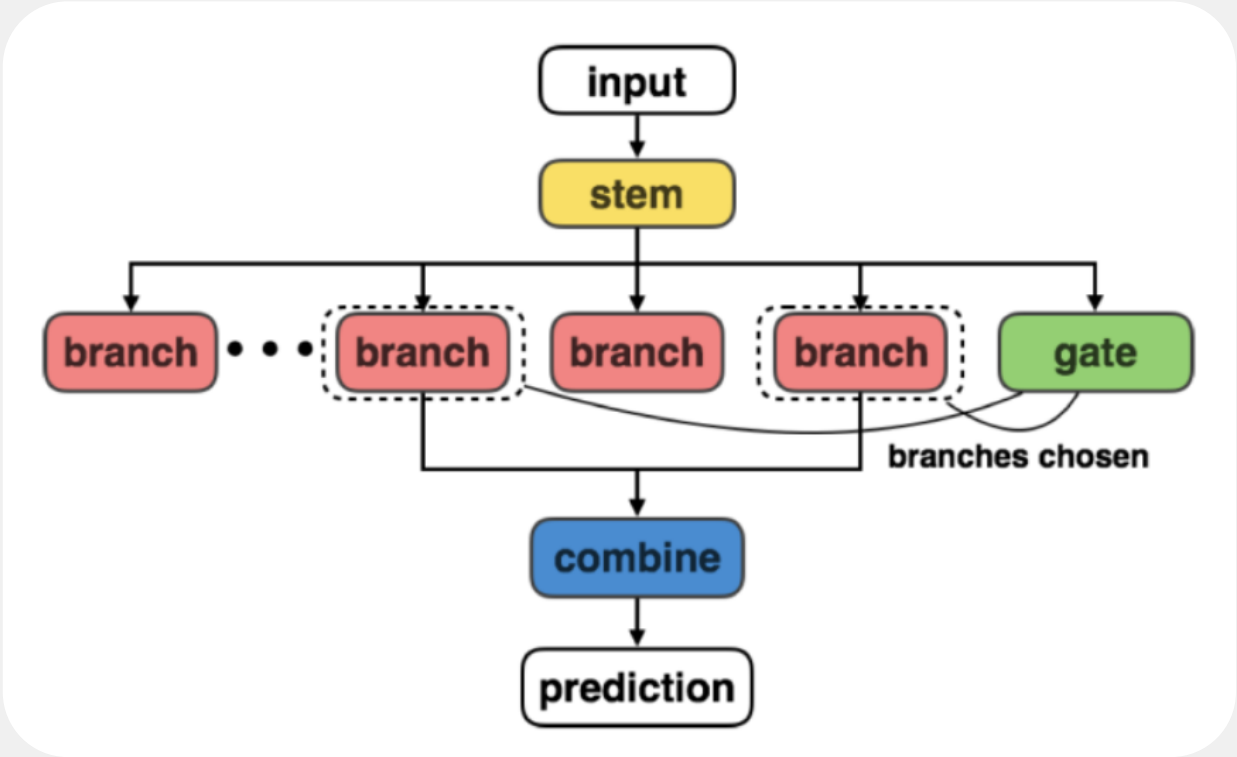
AUGMENTED STARTUPS
Computer Vision | AI | Robotics

- Input from Static Environments
- Input from Road and Lanes
- Input from Traffic Lights



HydraNet – Background

AUGMENTED STARTUPS
Computer Vision | AI | Robotics

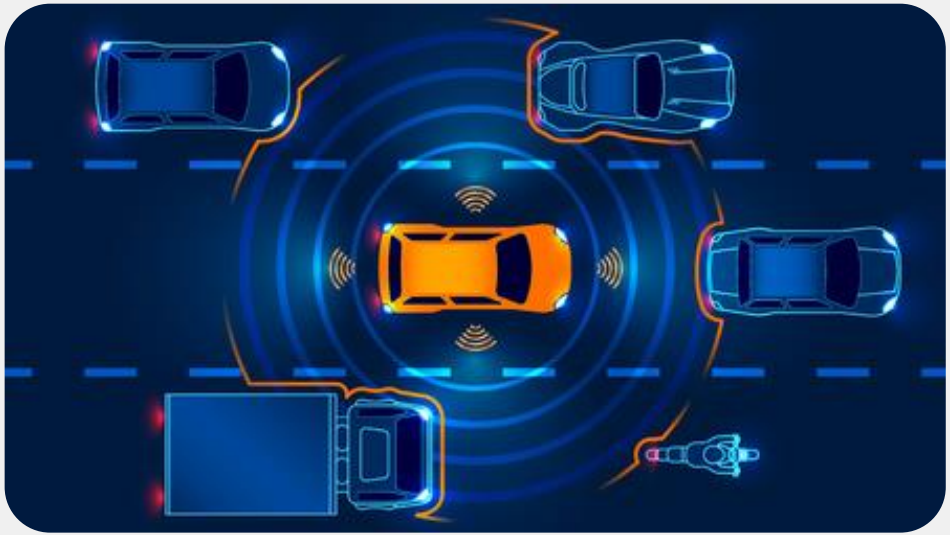


HydraNet Workflow Diagram

HydraNet – Tesla

AUGMENTED STARTUPS
Computer Vision | AI | Robotics

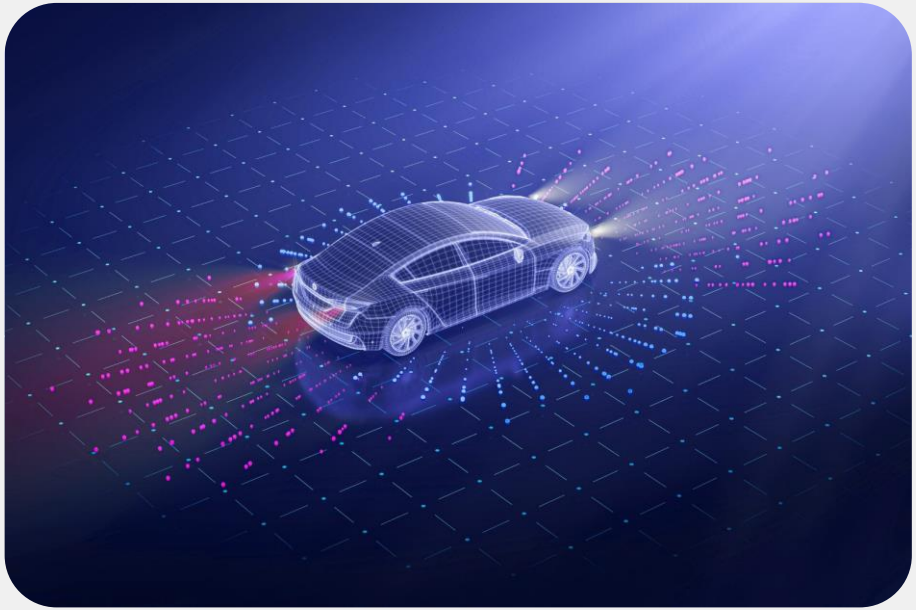
- **Auto-Pilot**
- **Smart Summons**
- **8 Cameras and Sensors Data**



HydraNet – Tesla

AUGMENTED STARTUPS
Computer Vision | AI | Robotics

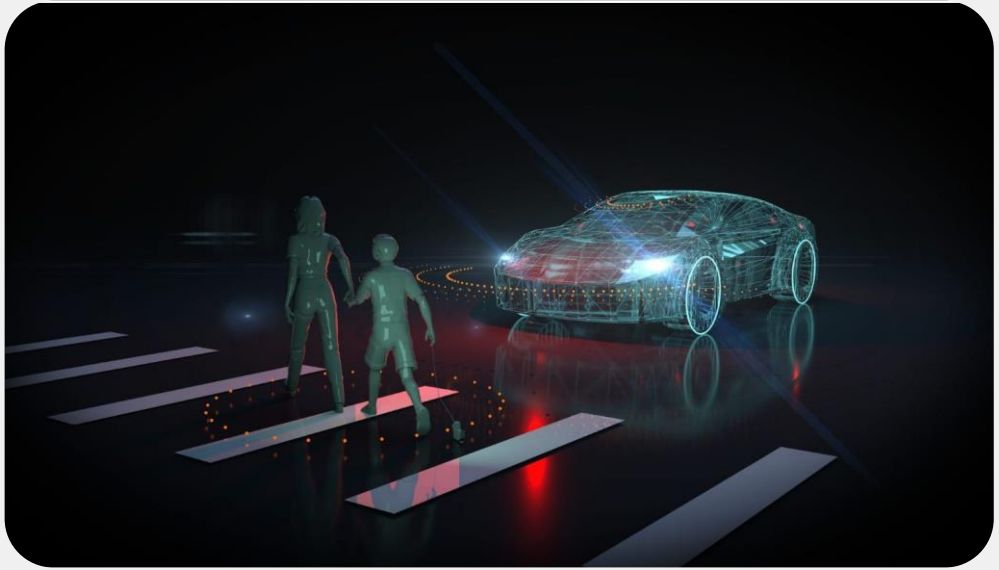
- Create 3D View
- Don’t Use LiDAR
- Uses Camera & Radar
- Efficient



Data Augmentation for Regression Neural Networks

AUGMENTED STARTUPS
Computer Vision | AI | Robotics

- **Problem with large quantity of labeled data**
- **Solution is – Creating a method by recombining existing ones.**



Summary

AUGMENTED STARTUPS
Computer Vision | AI | Robotics

- **HydraNet**
  - Introduction
  - Definition
  - Background
- **Tesla HydraNet**
- **HydraNet for Self-Driving Cars**
- **Data Augmentation for Regression Neural Networks**

References

AUGMENTED STARTUPS
Computer Vision | AI | Robotics

1. https://saneryee-studio.medium.com/deep-understanding-tesla-fsd-part-1-hydranet-1b46106d57

2. https://asiliconvalleyinsider.com/2020/03/08/waymo-chauffeurnet-versus-telsa-hydranet/

3. https://neptune.ai/blog/self-driving-cars-with-convolutional-neural-networks-cnn

Thanks