Domain Generalization for Multi-View 3D Object Detection in Co-operative Perception

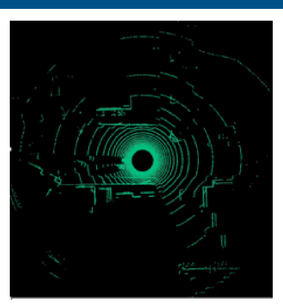
Abhishek Dinkar Jagtap, Email: abhishekdinkar.jagtap@thi.de
Technische Hochschule Ingolstadt (THI), CARISSMA Institute for Electric, COnnected, and Secure Mobility (C-ECOS),
Supervisor: Prof.Dr-Ing. Andreas Festag

Technische Hochschule Ingolstadt

Motivation

- New use cases for V2X communication support co-operative perception
- Co-operative perception can effectively alleviate occlusion and long-distance sensing problems
- State-of-the-art methods use feature sharing for object detection in Birds Eye View (BEV)
- Transmitted features will have a large **domain gap** when statistics of data differ

BEV:



Objectives

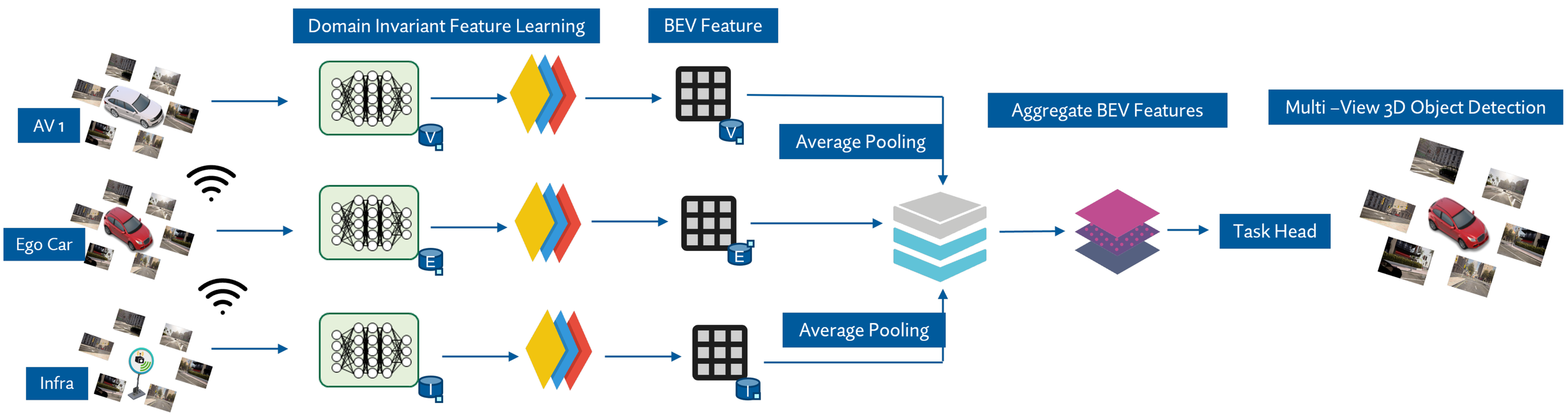
- Investigate causes of domain gap in multi-view 3d detection (MV3D-Det)
- Achieve high performance across diverse range of environments using domain generalization methods
- Enable domain invariant feature sharing for robust collaboration

State-Of-The-Art

Hu, Yue, et al. "Collaboration Helps Camera Overtake LiDAR in 3D Detection"
Wang, Shuo, et al. "Towards Domain Generalization for Multi-View 3D Object Detection in Bird-Eye-View"

Methodology

- Domain generalization is accomplished using dynamic perspective augmentation and domain agnostic feature learning
- Intermediate BEV features are fused using average pooling and aggregated features are decoded by specific task head
- Model trained on V2X DeepAccident dataset `https://deepaccident.github.io`



Baseline Results – Multi-view 3D Camera Detections

- Baseline using just ego vehicle perception
- Next steps: intermediate domain invariant feature fusion for co-operative perception