III Workshop 2024 - EMBM-VD

Sensor Fusion Proposal

CONTEXT:

- Develop/perform “Airborne Detect and Avoid” (ABDAA) functions integrated with the Sensor Fusion

- Situational awareness with the environment must be considered for decision-making for each unique aircraft/drone/UAV

GOALS OF THIS PRESENTATION

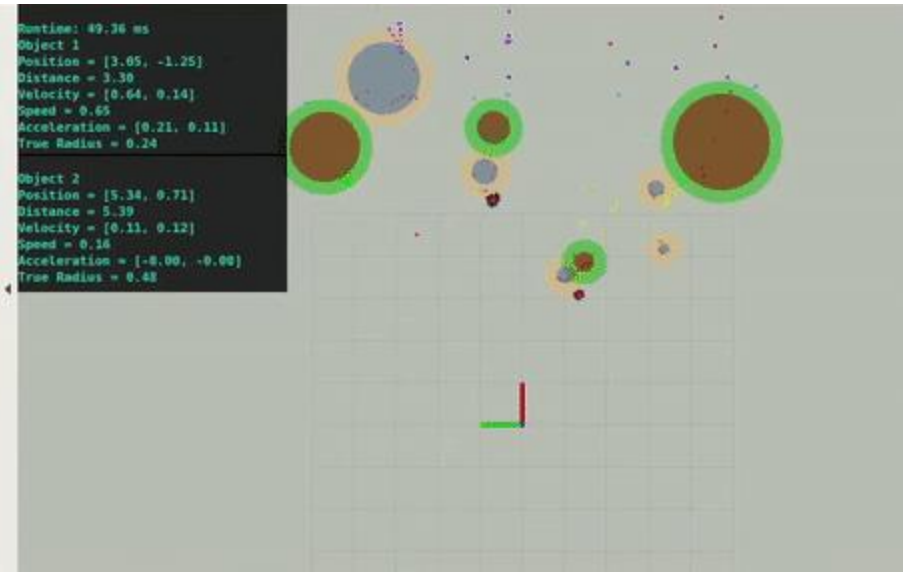
- Present the equipment and sensors we are going to use for integration between SIMUA system's core and ABDAA functions

- Present the obstacle detection BEV method

EQUIPMENT

PREVIOUS EQUIPMENT

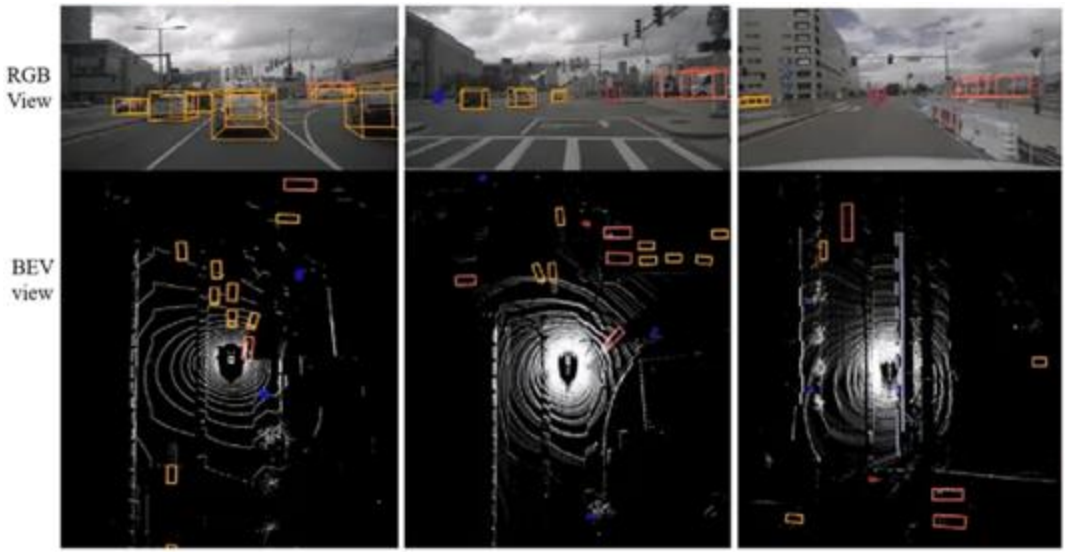
- AWS Deepracer robot car
- Sensors:
  - Intel Realsense d4 d435i
  - LiDAR 2d



ACTUAL EQUIPMENT

- MATRICE 350 RTK

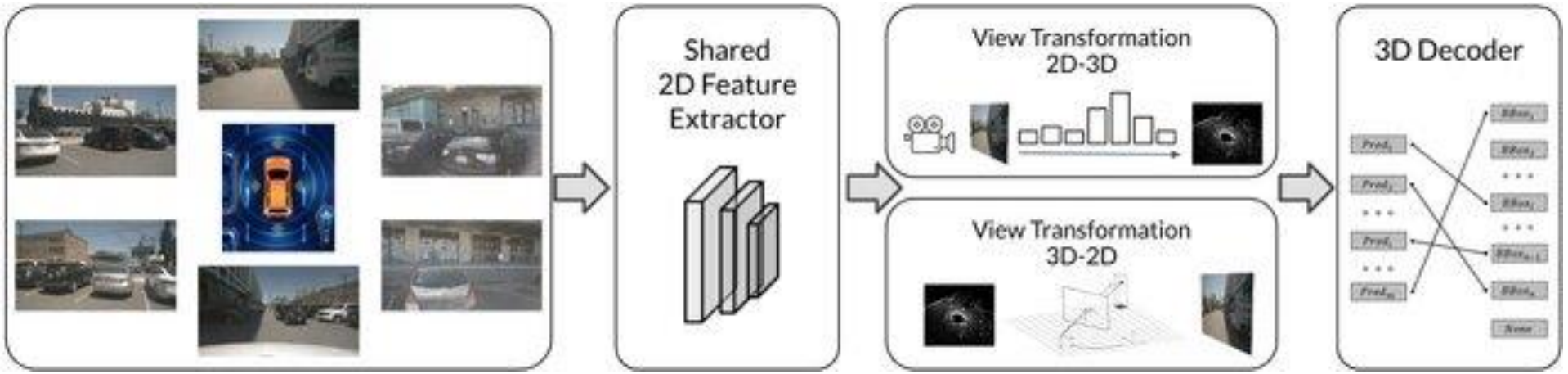
- Sensors:
  - Multi cameras
  - LiDAR 3D Velodyne Puck Lite

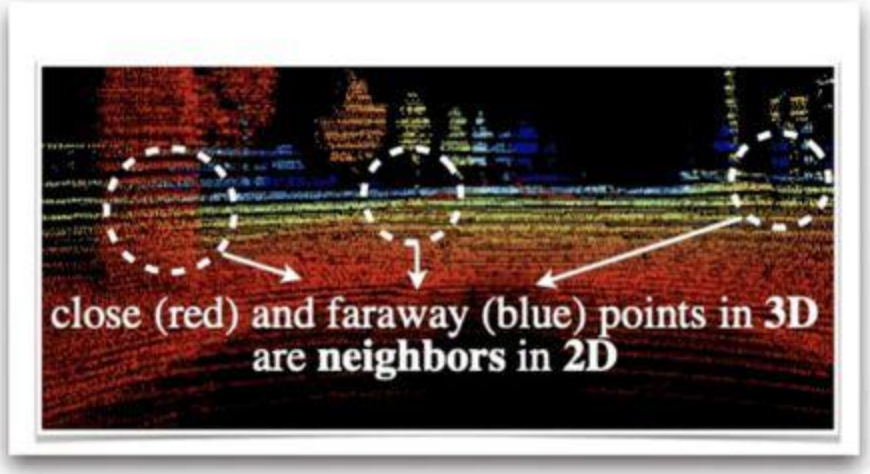


BEV and BEVFusion

BEV Multi Cameras

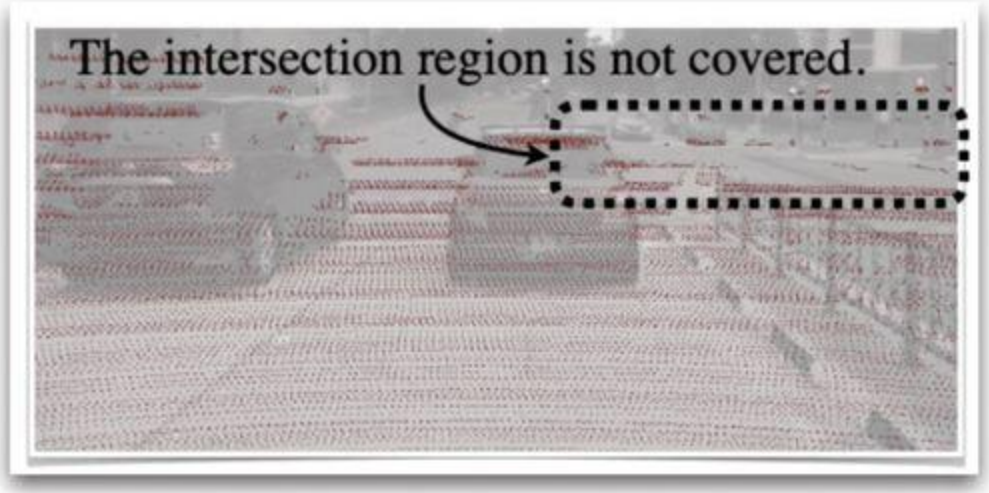
- Great research interest from the Autonomous Vehicles community
- Camera based pipeline can recognize long-range distance objects
- LiDAR high cost





LiDAR to Camera

We lose geometry



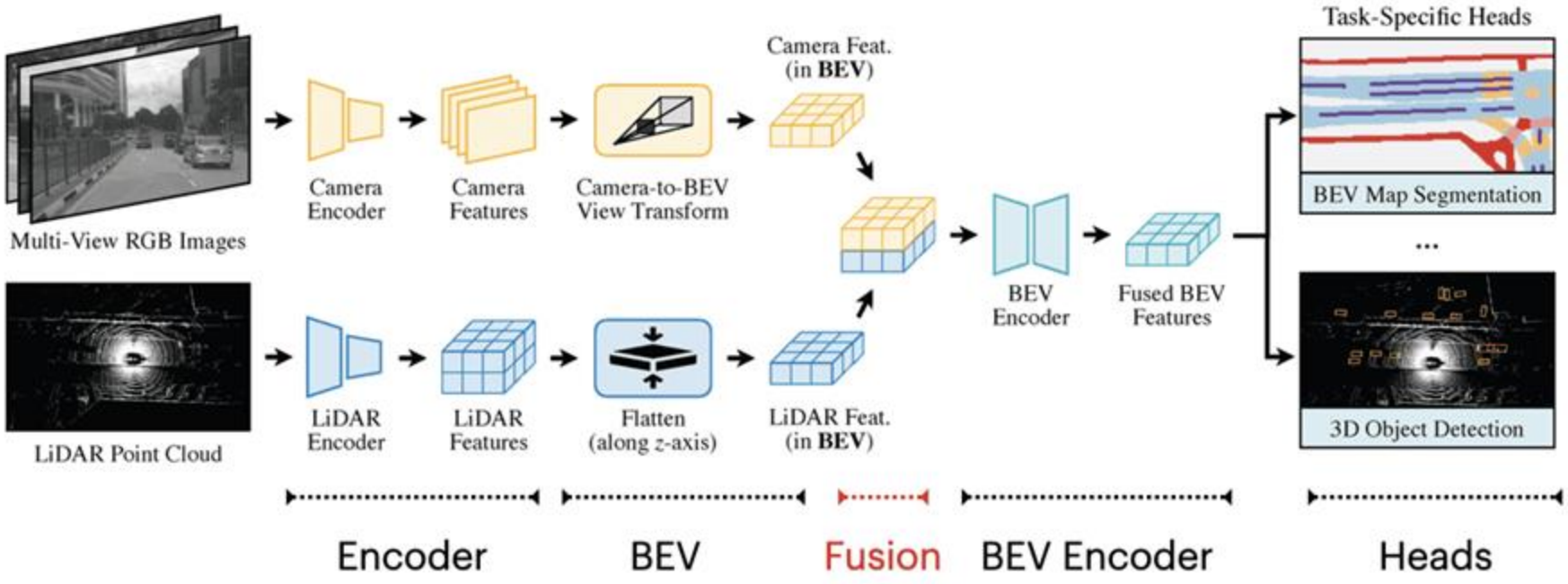
Camera to LiDAR

We lose semantics

- Camera data contains dense color and texture information but fails to capture depth information.
- LiDAR provides accurate depth and structure information but suffers from limited range and sparsity

BEVFusion

- Tremendous performance gap between camera or vision based solutions over LiDAR or fusion based



Final considerations

CONCLUSION

- Implementation of both BEV camera only and BEVFusion existing algorithms
- Evaluate the performance of both methods and their viability in real time detections
- Future works
  - Evaluate the possibility of developing/adapting the codes for ours specific application

Questions/Comments?!

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