

# 지능형자동차 연구실

❖ 지도교수: 서승우

❖ 구성원

- 박사과정: 15 명
- 석사과정: 1 명



❖ 연구분야

- Environment Adaptive Navigation Method with Camera & LiDAR
- Precise 3D Map Building
- Localization based on 3D Map
- Reinforcement Learning for human-like decision making

❖ 대표적인 프로젝트

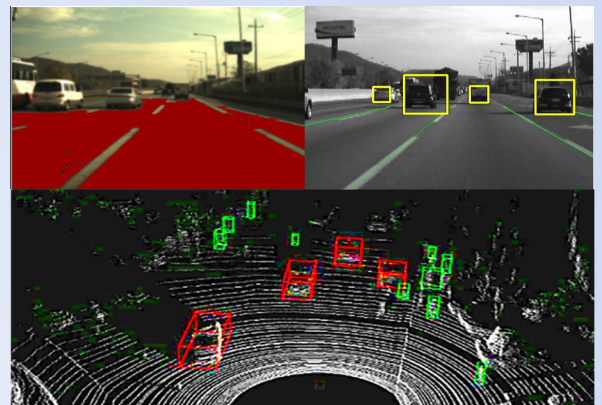
- 무인기기의 지능형 자율주행을 위한 인간 수준의 주행지능에 대한 연구 (국가 전략과제)
- 학습기반주행경로 생성 및 측위 기술(토르드라이브)
- 딥러닝 기반 야지환경 영상인식 기술 (한화디펜스)
- 험지 임무수행용 오프로드 자율주행기술 개발

❖ 최근 연구 성과물

- Unsupervised Skill Discovery for Learning Shared Structures across Changing Environments (ICML, 2023)
- Long-Tailed Recognition by Mutual Information Maximization between Latent Features and Ground-Truth Labels (ICML, 2023)
- SeRO: Self-Supervised Reinforcement Learning for Recovery from Out-of-Distribution Situations (IJCAI, 2023)
- Learning Multi-Task Transferable Rewards via Variational Inverse Reinforcement Learning (ICRA, 2022)

❖ 연구 업적

- 국제 저널 논문 : 60편+
- 국제 학회 논문 : 90편+
- 국제·국내 특허 : 30건+



Environment Perception



Off-road navigation



Automated Vehicles

# 지능형자동차 연구실

## ❖ Environment Perception

- Vehicle Vision for Detection
- Vehicular Laser Scanner Processing
- Sensor Fusion

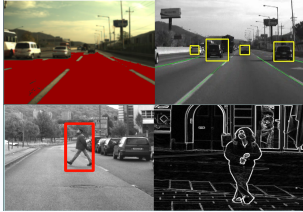
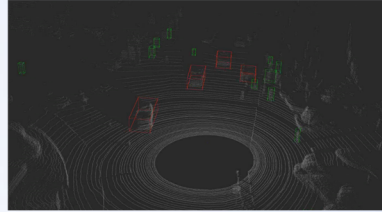


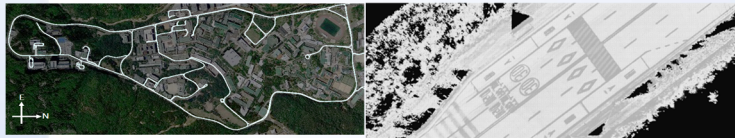
Image Processing



LIDAR Processing

## ❖ Localization and Map Building

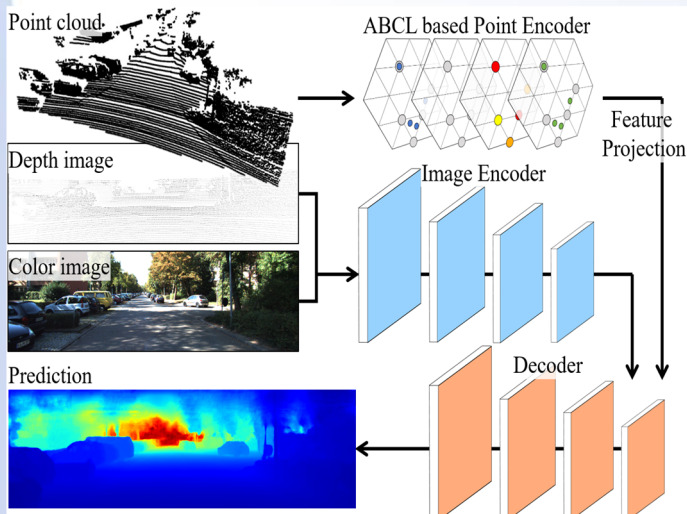
- Map Building: 3D digital map building based on point clouds
- Map Matching: Matching of sensed data with map



Precise 3D Map Building

## ❖ Attentive Bilateral Convolutional Network for Robust Depth Completion

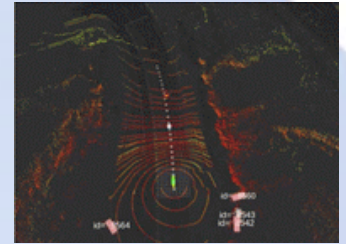
- Uses LiDAR and camera data to improve the resolution of the sparse depth information.
- Efficiently learns geometric characteristics and enhances the representation capability.



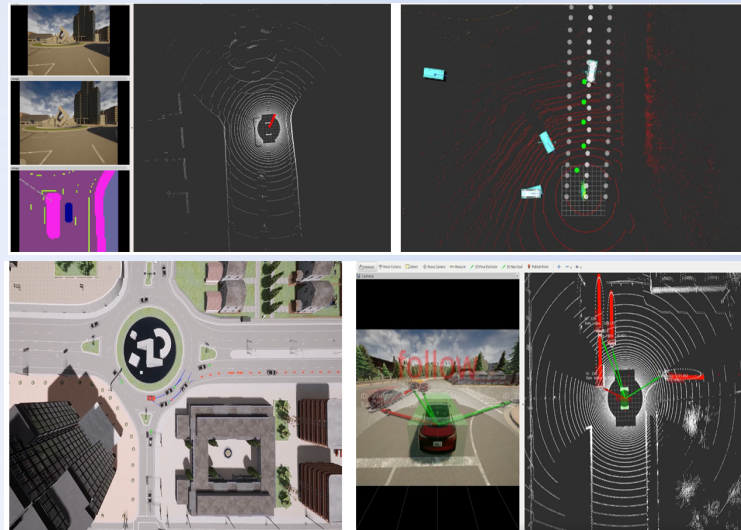
Framework of Depth Completion Method

## ❖ Planning framework with ROS

- SNUVI for real-world vehicle (left) and K-City experiment with SNUVI (right)

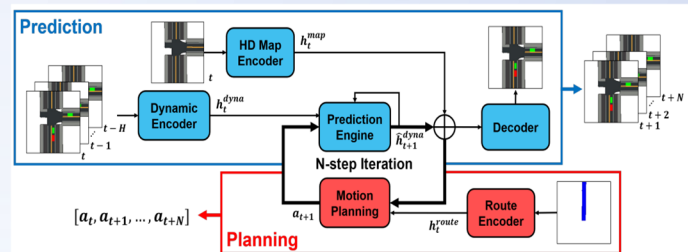


- Path planning methods with various scenarios in urban environments



## ❖ Learning-based Methods for Human-Level Driving Intelligence

- Bi-directional Forecasting and Planning Method with Self-feedbacks



Network Architecture (top) and visualization (down)