



HD Maps: Fine-grained Road Segmentation by Parsing Ground and Aerial Images



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Outline

- Introduction
- Related Work Limitations
- Fine Grained Semantic Parsing of Roads
- Experiments
- Conclusions

Introduction

Aerial Imagery vs. Ground Image:



Introduction

OpenStreetMap (OSM):

Launched by Steve Coast in 2004.



Introduction

Road Segmentation:



Limitations and Challenges

- Aerial images have low resolution.
- Ground images have limited coverage.
- Current work is semi-automatic.

Fine-grained Semantic Parsing of Roads

- The model encodes each street segment with 15 variables.
- Variables encode all possible combinations of background (B), sidewalk (S), road lanes (L) and parking (P):

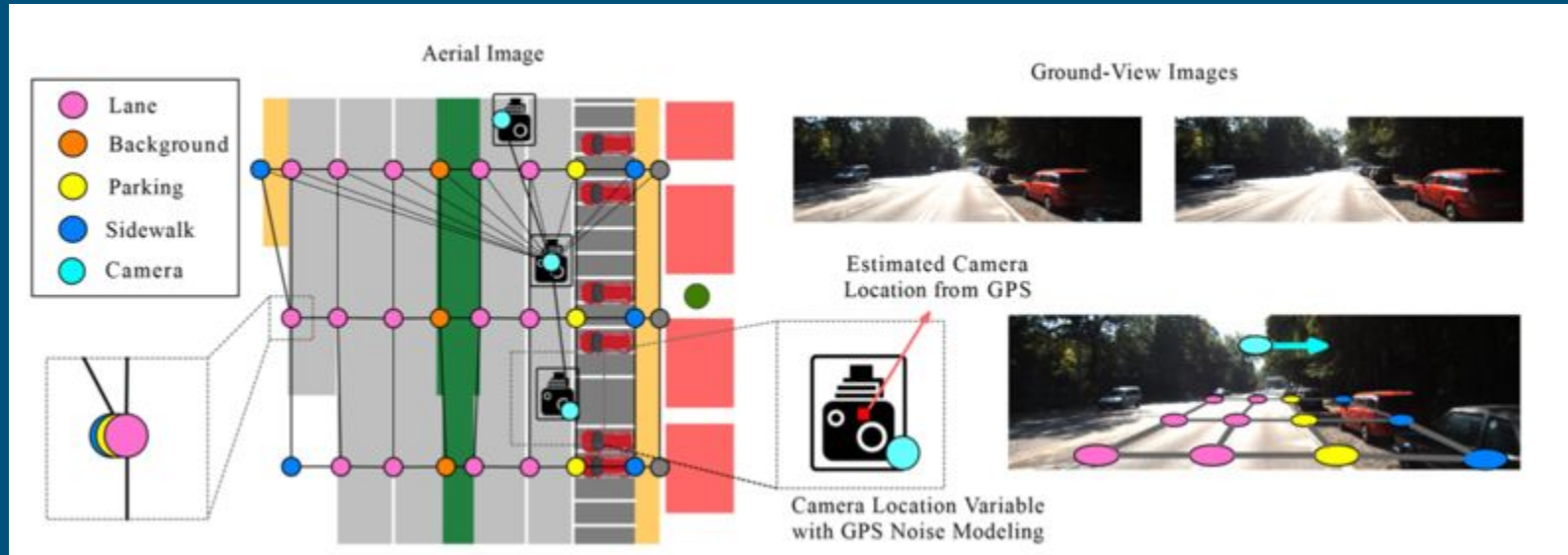
(B1, S1, B2, S2, P1, L, P2, S3, B3, S4, B4)



(L1, L2, L3, L4, L5, L6)

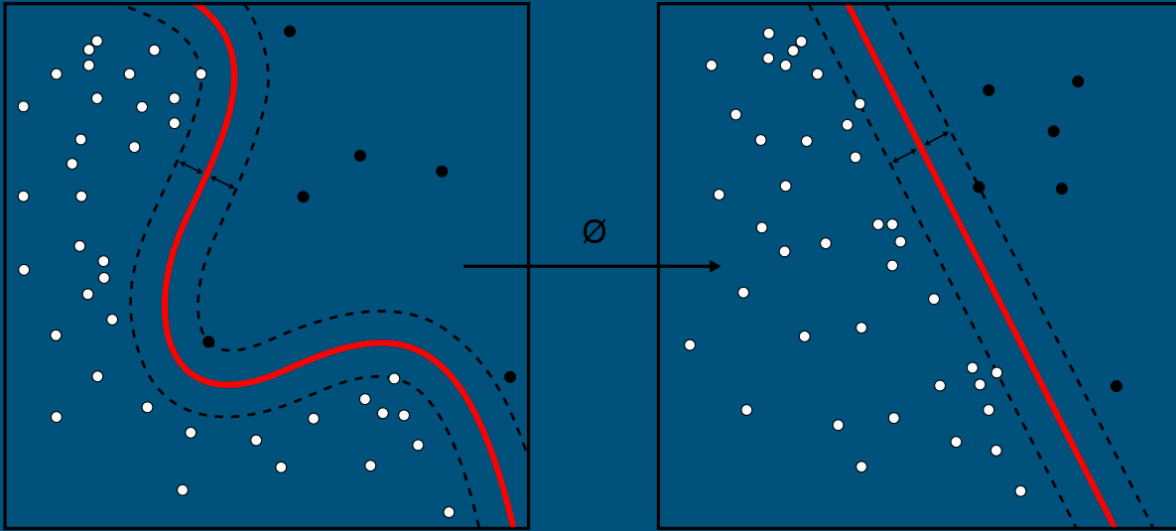
- The state of each variable is defined to be between $[-15, 15]$ m.

Fine-grained Semantic Parsing of Roads

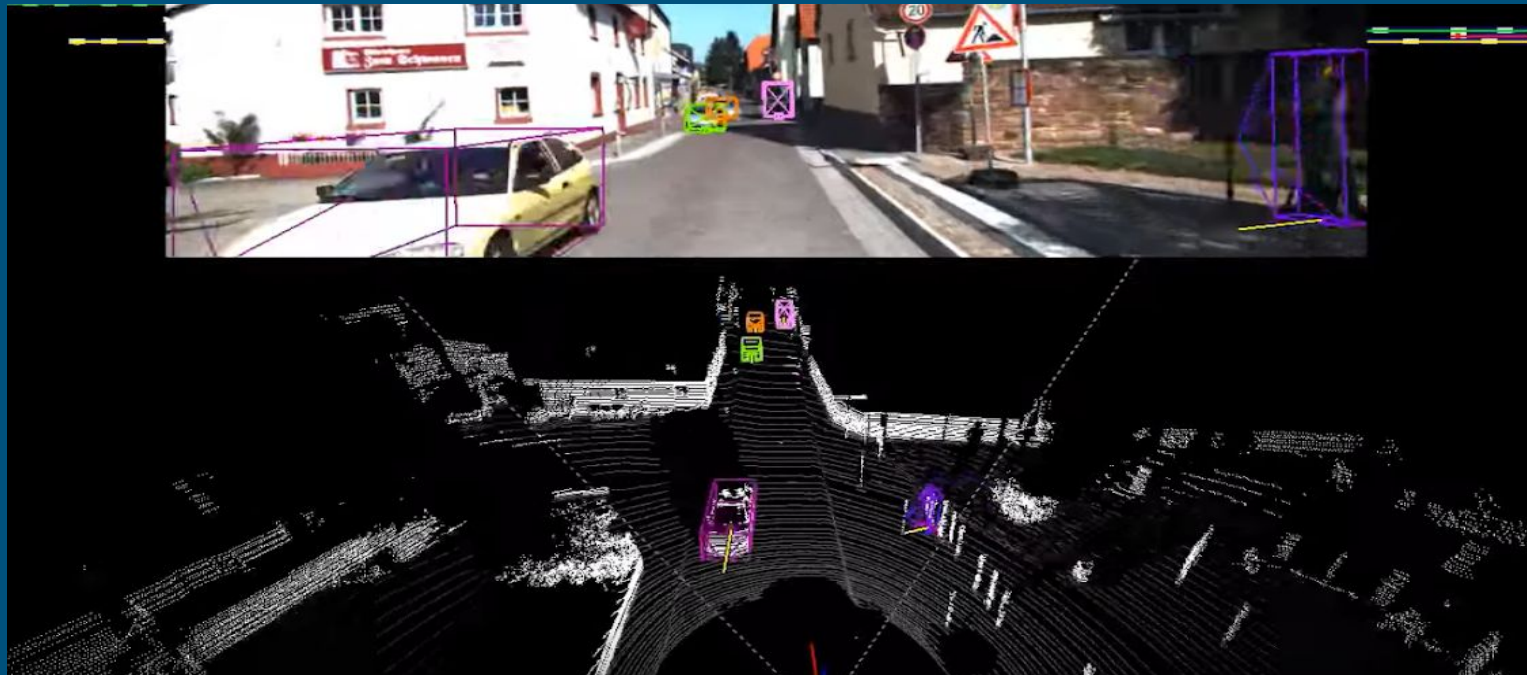


Parsing of Roads...

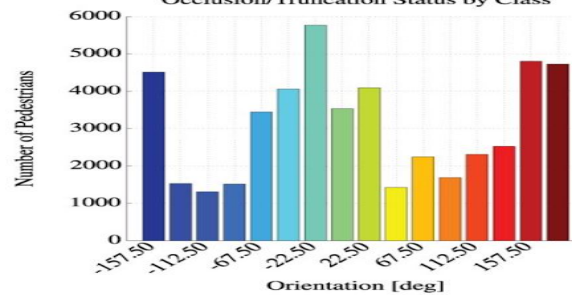
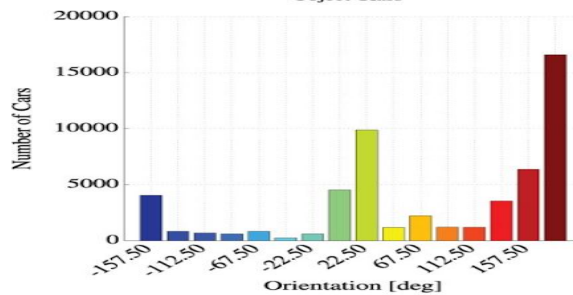
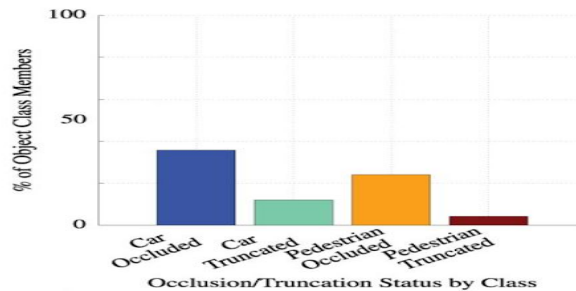
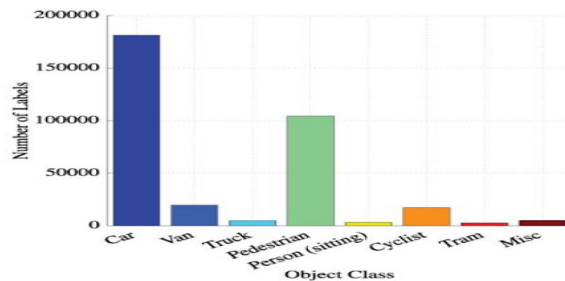
Structured Support Vector Machines



Experiments



Experiments...



Limitation

- Difficult to mark lanes if incomplete information.
- Doesn't use 3D Point Cloud.
- Costly mapping.
- Less number of areas visible for aerial mapping.
- Doesn't account for all details

Conclusion

The approach proposes to enhance the existing maps by incorporating fine grained segments such as parking spots and sidewalk, as well as the number and location of road lanes.

The estimates were accurate since it performed joint inference of both aerial and ground images.

The effectiveness of new Air-Ground-KITTI model is undoubtable.

Also the paper presents a lot of scope to future enhancements like, incorporating traffic signal data etc.



Thank You