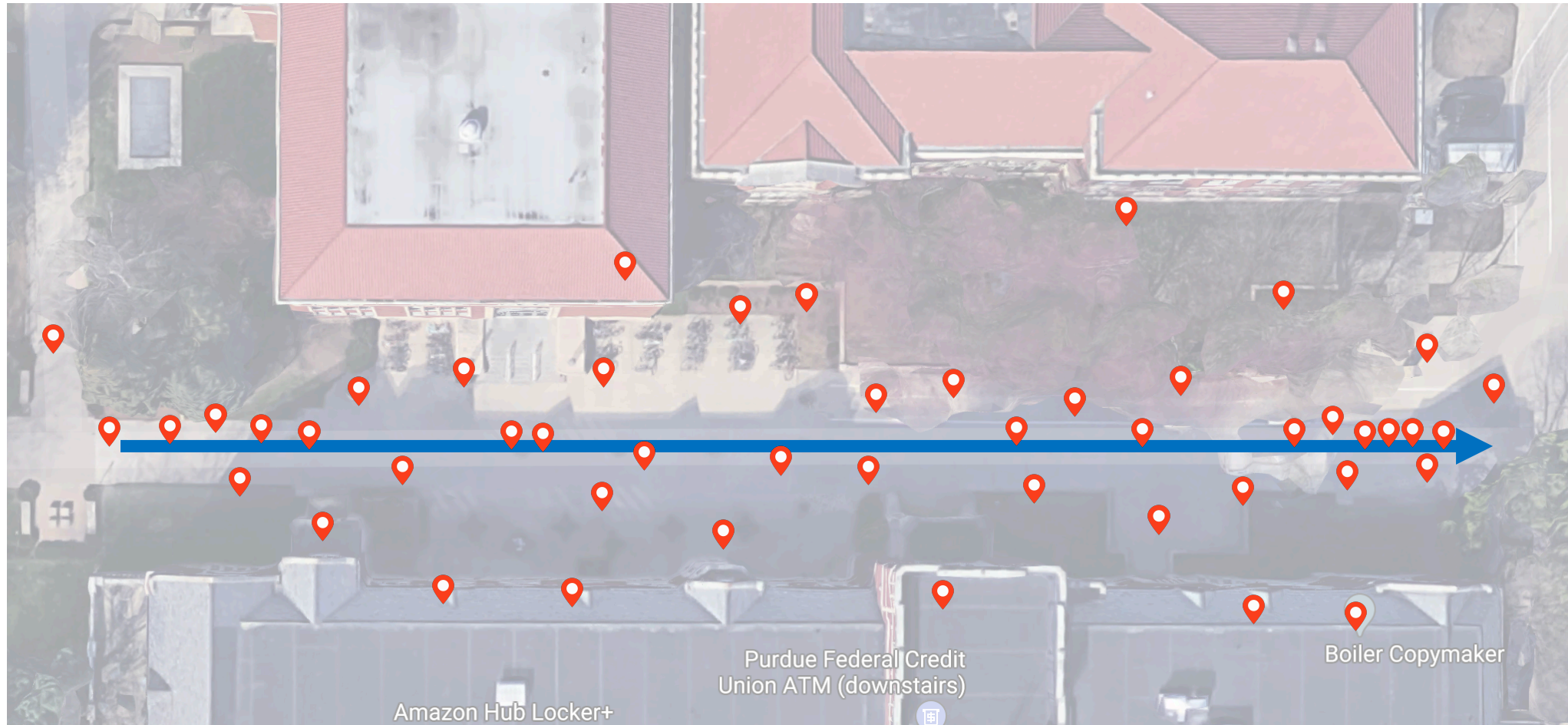


Visual Localization for Autonomous Driving: Mapping the Accurate Location in the City Maze

Dongfang Liu*, Yiming Cui*, Yiming Cui, Wei Ding, Baijian Yang, and Yingjie Chen

Limit of GPS Signal :

GPS signal under dense building and vegetation zones is not reliable

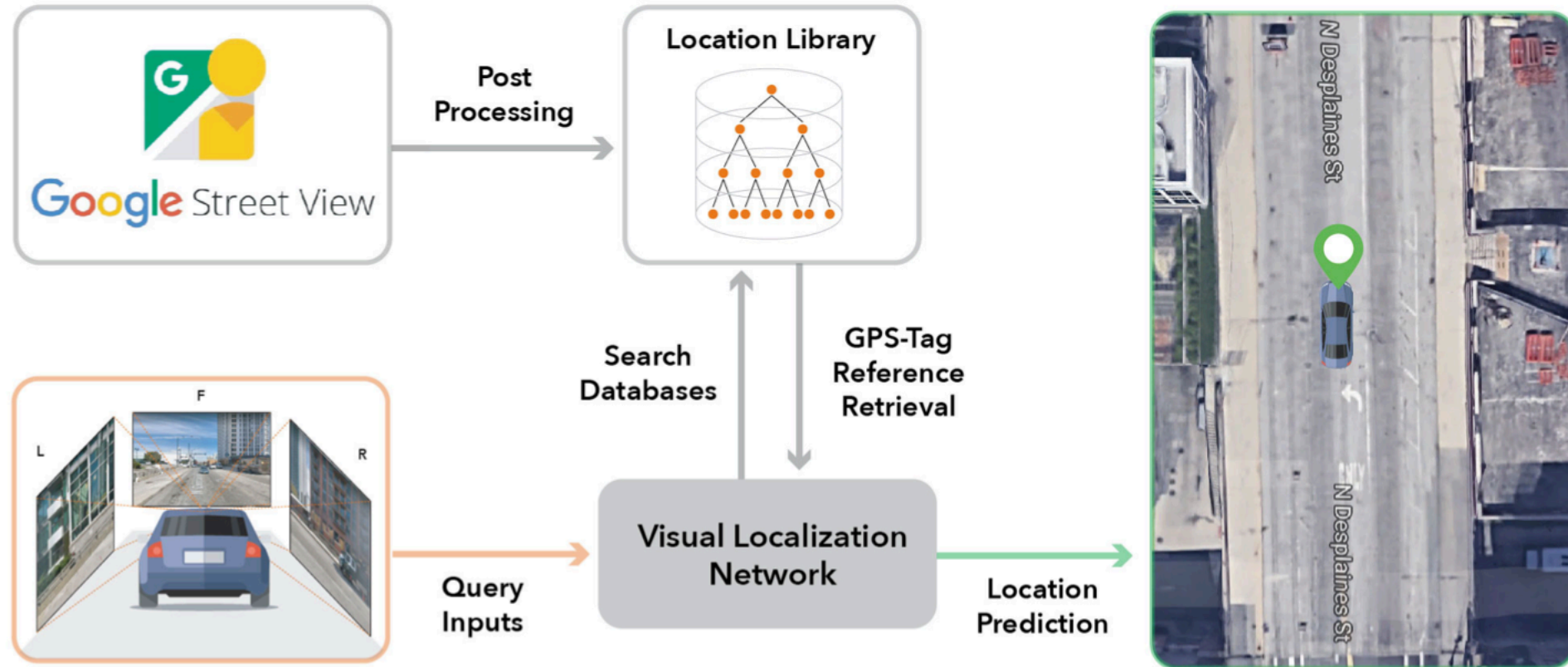


GPS
Signal



Vehicle
Trajectory

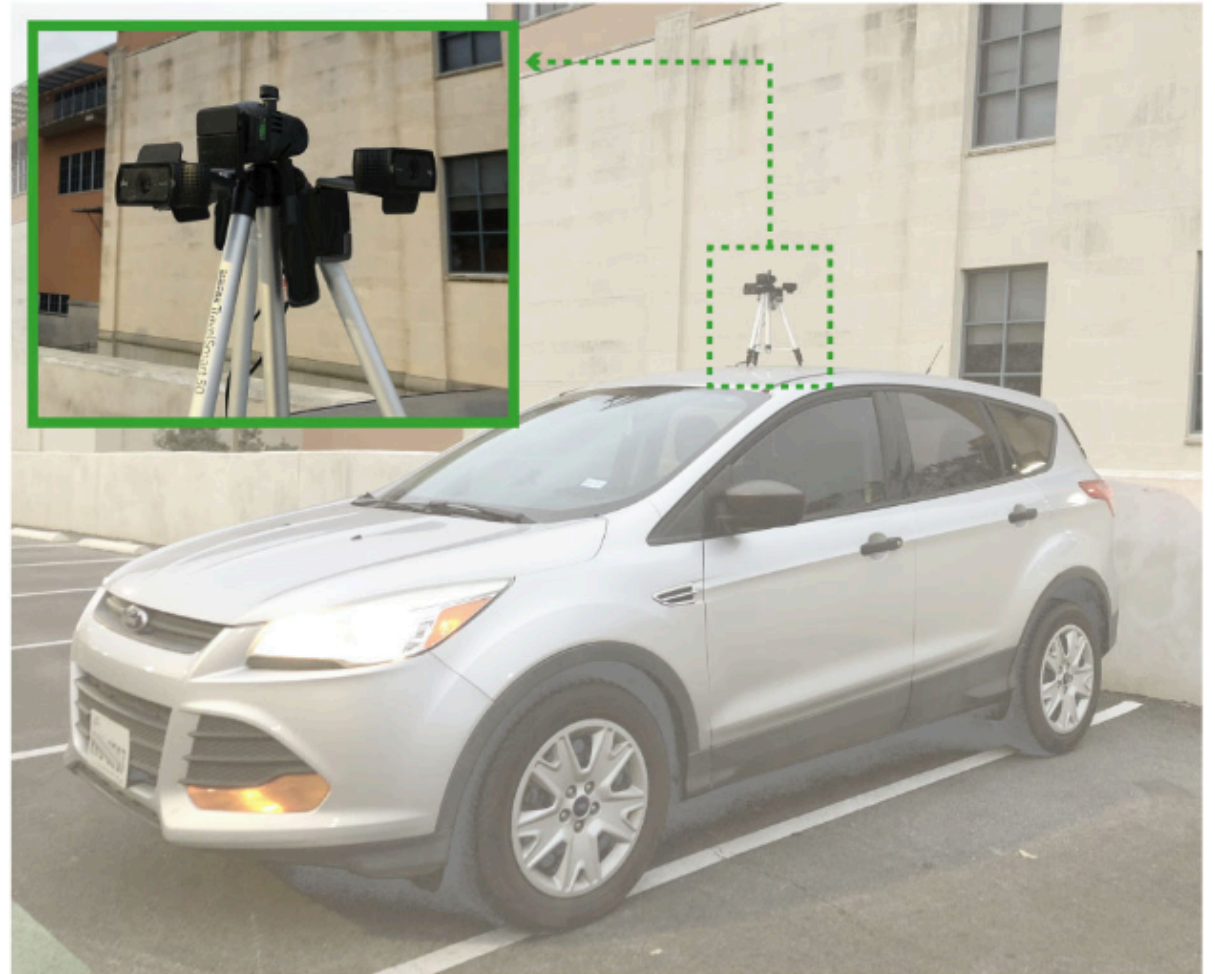
Visual Localization Framework:



Data Source



Implementation Setting



Quantitative Results

Inference AP and speed for the different methods

| Method | | Runtime (f/ms) | mAP | | |
|---------|-------------------------|-------------------|-------------|-------------|-------------|
| | | | 10(m) | 15(m) | 20(m) |
| D2-Net | Three Dimensions | 42.6 | 91.4 | 95.1 | 98.3 |
| | Front View | 38.2 | 64.9 | 70..8 | 77.2 |
| NetVLAD | Three Dimensions | 48.5 | 88.8 | 92.6 | 93.6 |
| | Front View | 40.9 | 47.8 | 55.5 | 68.9 |
| SARE | Three Dimensions | 40.6 | 90.2 | 93.2 | 94.2 |
| | Front View | 34.8 | 50.1 | 59.8 | 70.3 |
| GPS | - | - | 86.9 | 92.4 | 94.6 |

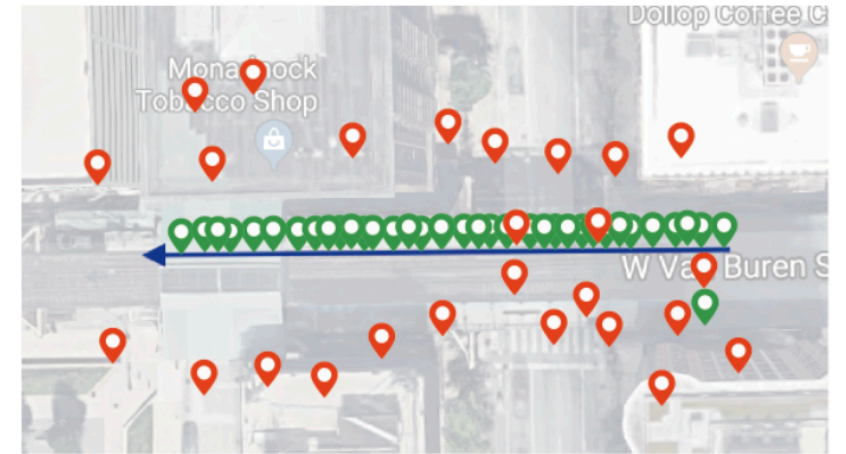
Recall@N retrieval for the different methods

| Method | | Recall@5 | Recall@10 | Recall@20 |
|---------|-------------------------|-------------|-------------|-------------|
| D2-Net | Front View | 58.2 | 68.1 | 70.2 |
| | Three Dimensions | 94.6 | 96.9 | 98.2 |
| NetVLAD | Front View | 50.9 | 56.8 | 60.8 |
| | Three Dimensions | 92.5 | 94.5 | 96.1 |
| SARE | Front View | 54.7 | 60.8 | 62.3 |
| | Three Dimensions | 93.6 | 95.5 | 96.9 |

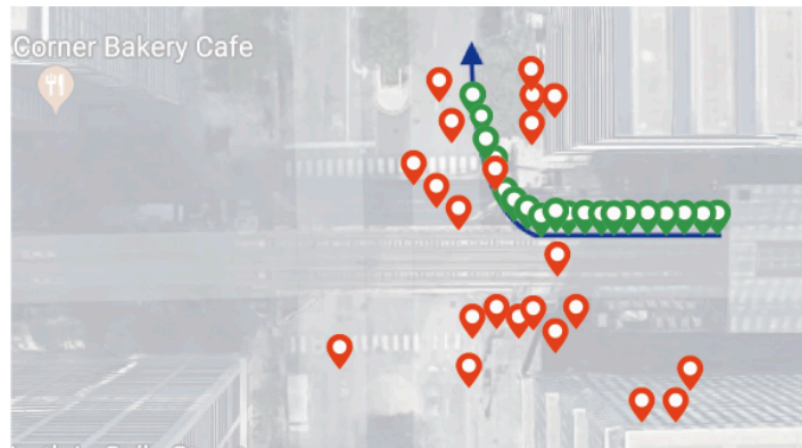
Qualitative Results



(a)



(b)



(c)



(d)

Thanks for watching