

fahrRAD

RADAR based Traffic Analysis for a Smarter, Safer, Greener City











PROBLEM

ie., opportunity

- RADAR data as Doppler Maps
- Computer Vision for interpreting as image
 - Custom Model for locating,

classifying and counting pedestrians, cars and trucks

OPPORTUNITY

AKA, What We Do!

- Traffic Analysis
- Live Applications
- Databases for future applications



THE REST VS. RADAR

Radar for the win!

LIDAR 🗙

- Adverse Weather!
- Expensive!



- Range!

RADAR

- + Long Range Detection
- + Immunity to Adverse Weather and
 - Lighting Conditions
- + No Data Privacy Concerns
- + Cheaper than LIDAR

METHODOLOGY *What's the secret?*



MODEL USED





Single Shot Detector (SSD 300)[1]

Advantages:

- High frame rate
- Limited computing power required

[1] Vehicle detection with automatic radar using deep learning on range-azimuth-doppler tensors **Bence Major et. al**

TACKLING THE CHALLENGE OF SMALL DATASETS



PROGRESS

Ta-da!

- Extracted relevant data from raw data
- Initial Model
- Training the Model
- Evaluation Metric: mAP (mean Average Precision)
- Plot of Training Loss vs Training Time V
- Proof of Concept
- Model is continuously learning!
- Convergence issues X





CURRENT RESULTS

ie., Done, done and done!

- Plot of Training Loss vs Training Time
- Decreasing Evaluation Loss
- Evaluation Metric: MAP
- Model is continuously learning!
- Scaling



OPTIMISING

ie., To-Do List

- Solving Convergence Issue
- Hyper Parameter Optimisation using Ray Tune
 - Learning Rate Scheduler
 - Optimiser
- Copy and Paste Augmentation
- Representation Learning
- Contrastive Learning



GETTING TO MARKET

AKA, Potential Customers

Data as a service (DaaS) Model

B2C

... and to scale to

- B2G
- B2B

B2C

Never forget the end user!

- Occupancy Tracker
- Real Estate Benchmarking



B2C: OCCUPANCY TRACKER

Stay Safe!

- Real time data about occupancy
- Stay safe during the Pandemic
- Better decision making



B2C: REAL ESTATE BENCHMARKING

Find your spot!

- Classify areas into High, Medium, Low traffic areas
- Find type and frequency of traffic pedestrians, trucks, timings!
- Can be integrated into existing real estate websites and apps



B2C: REAL ESTATE BENCHMARKING

Using fahrRAD ratings



Chef Geller found the best spot for her restaurant

B2C: REAL ESTATE BENCHMARKING

Using fahrRAD ratings



Mitch and Cam landed in a neighborhood they dreamt of!

B2G

Making smart cities smarter!

- City planning
- Smart Traffic Control
- Intelligent Street Lighting (Eluminocity – Infineon)
- Parking Management Systems
- Occupancy counter





B2G:OCCUPANCY DISPLAY

We cater to cities

- Live occupancy display in public locations
- Social distancing measures & monitoring



B2B

We cater to companies

Data for autonomous driving

- Addition into HD maps
- Privacy integrated
- Centralized traffic stats collection

THANK YOU

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Follow our work:

Github

Demo Video

Key Partners

(infineon

- Hardware supplier
- Raw data in the form of doppler images







