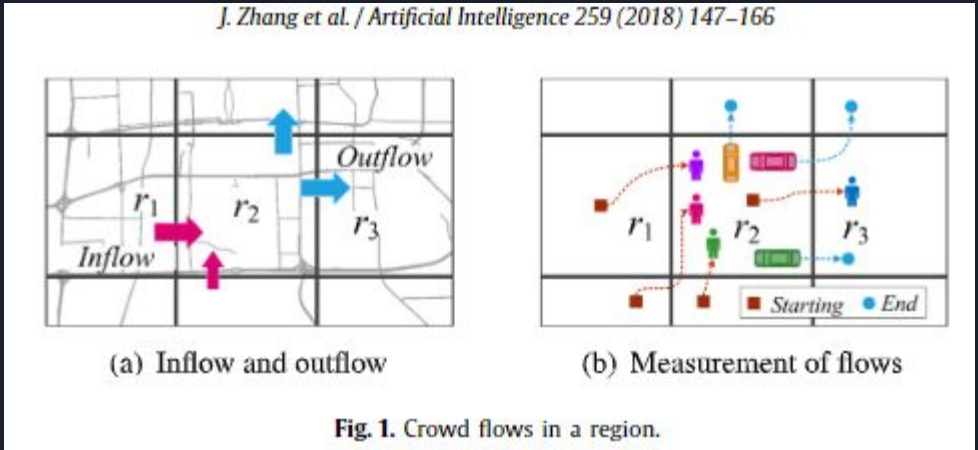
Crowd Flow Prediction

Yashveer Bika, Vishnu Ravichandran

What is crowd flow prediction?

Predict the number of vehicles/bikes/pedestrians that enter or exit a region through each time interval.



Why this matters?

Crowd flow data informs

- Road maintenance
- Safety
- Architectural design
- Disaster management

Dataset

NYC Bike Data (CitiBike)

NYC Taxi Data

- Start Time, End Time, Start Location, End Location (best seen in last slide)

Holiday Data

Approaches

- Traditional
  - Historical average (HA)
  - ARIMA
  - VAR
- Deep Learning
  - ATFM
  - ST-ResNet
  - DeepST
- Evaluation
  - RMSE, MAE, model size (number of parameters)

Sources

Ho, Siu Lau, and Min Xie. "The use of ARIMA models for reliability forecasting and analysis." *Computers & industrial engineering* 35.1-2 (1998): 213-216.

J. Zhang, Y. Zheng, D. Qi, R. Li, and X. Yi, “Dnn-based prediction model for spatio-temporal data,” in SIGSPATIAL. ACM, 2016, p. 92.

Liu, Lingbo, et al. "Dynamic spatial-temporal representation learning for traffic flow prediction." *IEEE Transactions on Intelligent Transportation Systems* 22.11 (2020): 7169-7183.

Toda, Hiroyuki. *Vector autoregression and causality*. Diss. Yale University, 1991.

Zhang, Junbo, Yu Zheng, and Dekang Qi. "Deep spatio-temporal residual networks for citywide crowd flows prediction." *Thirty-first AAAI conference on artificial intelligence*. 2017.