



Location Prediction

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Team and background

Amirabbas Jalali

- Recommendation Systems

Mina Mousavifar

- Persuasive Systems



Goal and Motivation

- **Motivation**

- **Security Issues:** Predicting users' future location based on their location history
- **Privacy Issues:** Manipulating user's decisions by providing personalized recommendations based on their predicted location

- **Goal**

- Investigating the possibility of predicting user locations based on his/her location history

General Approach

- **Filtering** Filter users with more than 50% battery records
- **Stratify and Aggregate**
 - Extract weekday, duty cycle for records
 - Group location records in duty cycles and convert locations to UTM
- **Model**
 - **Objective:** Predict user next destination from history on a weekly or daily basis
 - Use “*Matrix Factorization*” technique
 - Create interaction matrix for each user and X and Y coordinate separately, 30×288
 - Can be expanded for viewing weeks, 4×2016

Time, in duty cycle for 1 day

day number in study	Y grid	Y grid	Y grid	
	Y grid	Y grid	Y grid	
	Y grid	?	?	



General Approach

- **Filtering** Filter users with more than 50% battery records
- **Stratify and Aggregate**
 - Extract weekday, duty cycle for records
 - Group location records in duty cycles, and find grids
 - Extract trajectories in each day or week and convert it to string with run-length encoding
 - Find top destinations for each user
- **Model**
 - **Objective:** Predict user next trajectory or destination from history on a weekly or daily basis
 - Use “*Sequence to Sequence Prediction*” technique, LSTM
 - General approach for all users

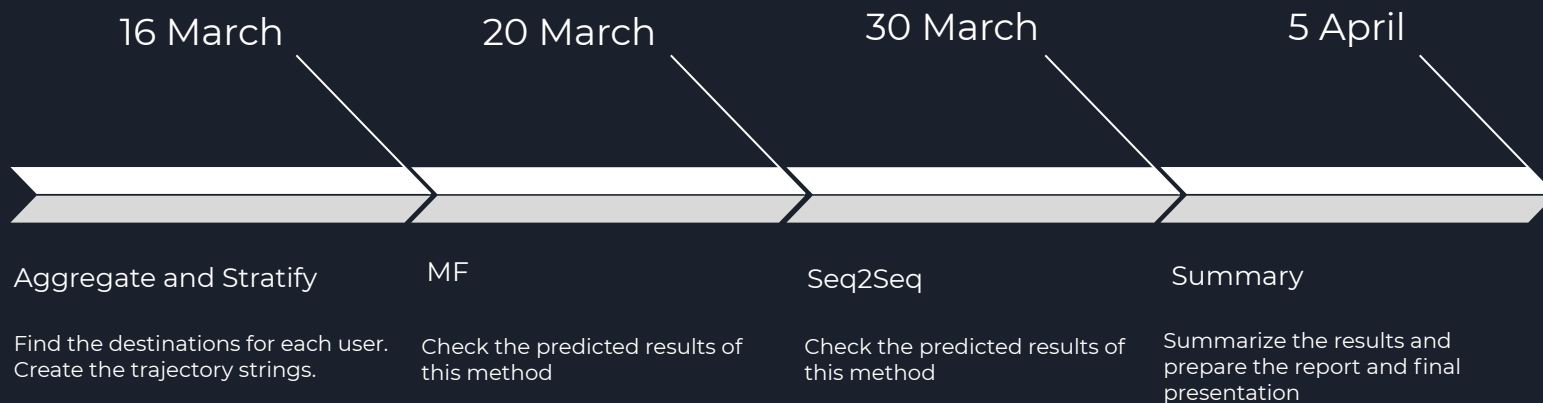


General Validation Approach

- **Dataset Split**
 - Randomly split the dataset to test and train-set
- **Metrics**
 - Checking the predicted results to the actual result
 - Evaluation metrics, Accuracy, Precision, Recall, and ...



Project timeline





Thank you!

