Bon Voyage - A Trip Recommendation System

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INTRODUCTION

TRAVEL - a respite for people from their exhausting jobs; an adrenaline rush to those stuck in a cycle of monotony. *You need it*. But not all places are ideal destinations for all types of people. Preferences vary for us and so does our idea of an *ideal vacation*. While travel advisors and trip planners, provide a suite of suggestions for places to visit, they do not recommend modest yet reliable accommodations. On the other hand, companies like Airbnb, provide such suggestions but restrict the options to a particular city. In our project, we give a unique solution addressing both issues.

OBJECTIVES

- *Recommend prospective travel destinations, not yet visited by user, based on his/her vacation history.*
- *Suggest viable accommodation within those destination cities which are congruent with user's living style.*

PHASE I

User-based Collaborative Filtering

- Prior history consists of multiple *Vacation vectors* for each user.
- Extract tags from vacations and create *User Vector* from weighted sum of tags.
- Use Cosine similarity score to determine similar users.
- Create a suggestion pool of cities from the history of the similar users, which were not visited by target user.
- Return top 5 cities to target user.

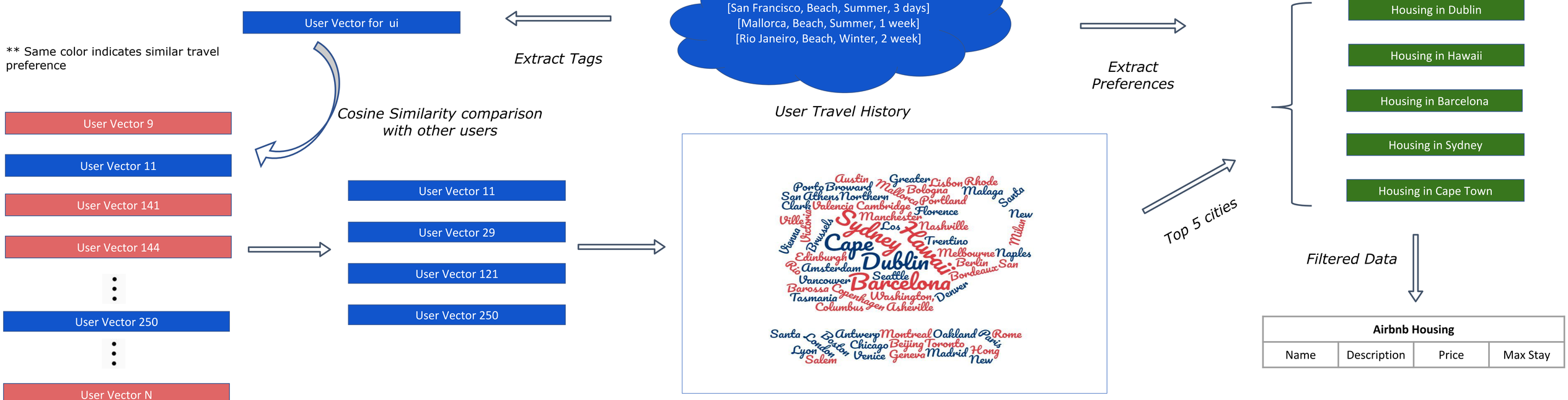
SIMULATED HISTORY

- Randomly populate vacations and extract thematic users from the random pool
- *Vacation vector* denotes a single vacation for a specific user.
- *Travel History* for user u_i is a collection of vacation vectors $v_1, v_2 \ldots v_n$

PHASE II

TfidfVectorizer + Cosine Similarity

- Extract preferences (*Expense_category* and *StayLength*) from user history and filter Airbnb housings w.r.t. those preferences
- Choose a random housing from filtered list.
- "Summary" or *"Description"* for each housing contains descriptive text. Remove stopwords from text and use Tf-Idf to vectorize this text.
- Use Cosine similarity score on this vector representation to find similar housings - Return top four.



EVALUATION- PHASE I

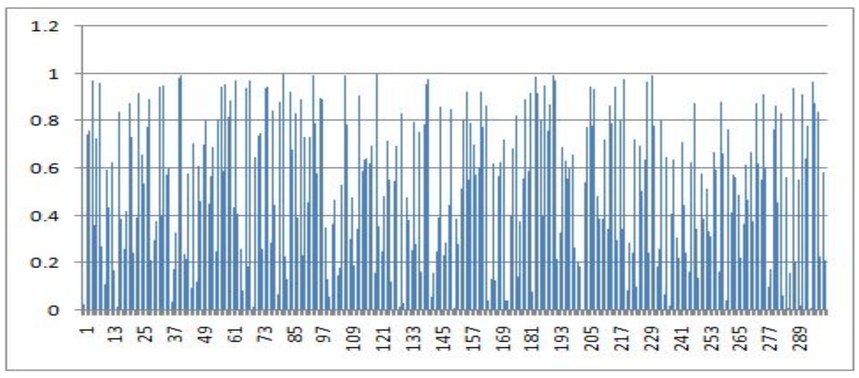


FIG 1: Similarity score between selected user and all other users in the Database

Target user history
['Vienna', 'San Francisco', 'Berlin','Vancouver']

Recommended user's histories

['Vienna','Geneva','Dublin','Melbourne']
['Copenhagen','Dublin','Brisbane','Paris']
['Sydney','Mallorca','Berlin','San Francisco']
['Sydney','Hawaii','Mallorca','Dublin']
['Tasmania','Dublin','Cape Town','Milan']
['Hawaii','Cape Town','Berlin','Canberra','Dublin']

Programmatic results : Suggestion pool contains multiple occurrences of Dublin

Programmatic results : Dublin is fed to Phase Two , which yields top 4 housings in that city

EVALUATION- PHASE II

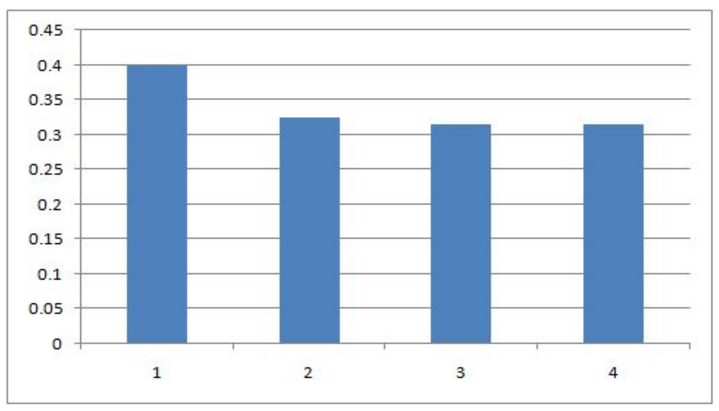


FIG 2: The above barplot shows the recommended score for top 4 housing

Dublin
Recommending 4 products similar to Spacious City Centre Apartment
Description: Ideally located in one of Dublins most popular areas, this home is a pleasant stroll into the main streets. The neighbourhood is perfectly located to provide you wit...

Recommended: Georgian Luxury
Description: Georgian Period 3 bed home in central zone of Dublin..walk everywhere. Nestled on a historical leafy street in Dublin, this traditional Georgian home is a pleasant s...
(score:0.3995059096180262)

Recommended: Central Penthouse Apartment along the River Liffey
Description: Our apartment is in a great location as the city centre is on your door step, and is only a few minutes walk to all the major sights including Guinness Storehouse, T...
(score:0.32391805845147104)

Recommended: Stylish and Modern Two Bedroom Dublin Apartment
Description: My lovely and modern 2 bedroom apartment in Fitzwilliam Quay, Dublin 4, is the perfect place for a group of between 2 and 4 to stay whilst visiting this beautiful c...
(score:0.31491069768084357)

Recommended: Central location next to St. Stephen's Green
Description: The neighbourhood is perfectly located to provide you with all you need particularly those great "local" feels that many of us seek while abroad. It's the ideal plac...
(score:0.3141840138813951)

LINKS

Github:
https://github.tamu.edu/razorvine/bon_voyage

Dataset:
http://insideairbnb.com/get-the-data.html

Kaggle:
https://www.kaggle.com/rdaldian/airbnb-content-based-recommendation-system

CONCLUSION

- Our primary objective to design a one stop recommender for both destinations and accommodation for novice travel planners was *successfully accomplished*.
- Fruitful attempts were made to simulate Vacation history for 300 users with emerging theme for each user. Thematically similar users for a suggestion pool of cities
- Airbnb dataset was available for 66 cities. But the conjoined code implementation is generic and scalable for any number of cities and users

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FUTURE WORK

- Include factors such as Circumambience, family size, gender etc while recommending Housing
- Cold start problem in Phase 1 can be fixed by implementing Item based CF. But this would increase tags
- Include GIS data to provide location of the housing and its distance from Airport