Milestone 5 Project Evaluation

Team Members:
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Client Name:
Dr. Phillip Chan –pkc@cs.fit.edu

Affiliation: Florida Tech

Meeting Dates:
10/17/2024
10/24/2024
Scheduled: Thursdays Bi-Weekly at 11am

Progress Milestone 5

Task	Austin	Jason	Jacqueline	Hunter	Comp %	To Do
Group Recommendation for 32 students, 8 east, 8 west, 8 north and 8 south	100%	0%	0%	0%	75%	Implement K means clustering
Develop and test a home page that displays the user's upcoming trips	0%	0%	100%	0%	60%	Needs to be better formatted

Develop and test a group management page. Add toggle to view system, personal recommendations and a more detailed view of group recommendations.	100%	0%	0%	0%	95%	Link this page on the home page so it's easily accessible
Integrate accept and deny group recommendations into the database; Once they decline show more recommendations if available	100%	0%	0%	0%	100%	N/A
Develop and test after trip page (comments and reports)	0%	100%	0%	0%	95%	Display users from previous trip

Discussion (at least a few sentences, ie a paragraph) of each accomplished task (and obstacles) for the current Milestone:

Task 1 (Carpool Group Recommendation Algorithm): To improve the efficiency of generating system recommendation groups and to improve the quality of generated groups our advisor recommended to use HAC and K means clustering. In order to test this algorithm we created a function that will generate a list of test users within a specified radius from the Florida Tech campus, this function takes in an integer parameter that is used to specify how many test users it should create. This is helpful as creating accounts manually can take quite a bit of time especially when creating 32 plus accounts. The algorithm in its current state takes a list of users, removes users that don't match the users gender preferences and generates a distance matrix which takes into account the users preferences and distances from each other to generate a score. After this matrix is created the HAC algorithm is then used to merge user groups continuously into each to create optimal groups of a specific size. This specific size is based on the number of functional seat belts for the driver's car. Due to the complexity and the time taken to ensure the HAC clustering is working and takes into account all aspects of the user profile we have not implemented K means clustering, this will be

important when the user base is larger as it will split the user base into direction clusters so that HAC doesn't have to run on the entire user base.

Task 2 (Home Page): The home page is mostly completed. The page has been modified to include upcoming scheduled rides with crucial information pertaining to the rider or driver. When clicked on, you will be redirected to the before the trip confirmation page. From the home page, you are also able to view your current list of friends from this page.

Task 3 (Group Management): The group management page is completed. Users have the ability to view their current groups, groups recommended by the system and current groups that are available to join. The page also allows users to view more details about groups they are currently in or looking to join. This additional information includes preferences, location and contact information if the user allows that information to be shared. In the future we may look to allow users to select users from this details page to add them as friends or just view their short profile to look at more information.

Task 4 (Carpool Group Database): The database and frontend communicate together to track carpool groups. The system tracks groups that were created, who is in the group, and who created the group. The system also tracks who the driver is. Additions that could be added to make the system more flexible is tracking when a user declines to join a group.

Task 5 (After Trip Page): The After Trip page is nearly complete, as it still needs to display members of the user's previous trip, once carpooling trips are fully implemented. The page now displays an average rating value for each user and stores each rating value in a separate database table. The Comments and Reports systems are also fully implemented, where comments are visible in a user's User Details page and reports about a user are visible in the admin tables.

Discussion (at least a few sentences, ie a paragraph) of contribution of each team member to the current Milestone:

Austin Phillips: For this milestone I worked mainly on the group management page and developing the group recommendation algorithm. For this milestone we were advised to integrate HAC and K means clustering to both improve the quality of groups that are created and to improve the efficiency of the algorithm as the user base for the application grows. I was able to get HAC working and generating user groups. I also finished advised improvements to the group management page, I added functionality for users to toggle between groups that are already created and groups that the system recommended.

Jason Smith: For this milestone I focused on integrating the Ratings, Reviews, and Reports system through development of the After Trip page. The user is directed to this page after a carpooling trip is completed, showing important post-trip information. All

three systems now correctly update separate tables in the database and display in users' profiles.

Jacqueline Torres: For milestone 5, I developed the rider confirmation page, added the Florida Tech safe application, and modified the home page and main layout. Editing the main layout allows mobile users friendlier access. For the rider confirmation page, a user is able to accept or decline a ride and view crucial information regarding their trip. For the Florida Tech Safe application, users are now able to download the app and have access to safety tools that Florida Tech provides. Lastly for the home page, users are able to see pre trip information such as when the scheduled ride is to who your driver is and other passengers. The home page also displays the user's current friends list.

Hunter Smith: For milestone 5, I continued to work on unfinished tasks from milestone 4, like the friends list database integration and testing. I created a system which allows for users to send each other friend requests. The system checks to prevent a user from sending a friend request to someone already friended, and if a user tries to send a friend request to someone who has already sent a friend request to them it will just automatically add them as a friend as well. Additionally, I worked to change the location metric of our group scoring system from a traveling salesman algorithm to a tree algorithm, however it will now no longer be used and will be replaced by the HAC algorithm.

Task Matrix for Milestone 6

Task	Austin	Jason	Jacqueline	Hunter
Test Group Match Algorithm for 64 test users	100%	0%	0%	0%
Add tables to group view page for users to view how much of a match that group is	100%	0%	0%	0%
Modify the home page to display upcoming user trips	0%	0%	100%	0%
Modify users rating to display numerical value (IE half stars) and After Trip page to display trip members	0%	100%	0%	0%
one demo video for the main features: group recommendations, pre-trip, during trip, post-trip	25%	25%	25%	25%
Evaluation of Group recommendation algorithm accuracy	50%	20%	20%	30%

Discussion of each planned task for the next Milestone:

Task 1: For this task the goal is to ensure the HAC algorithm is creating groups based on user location and preferences. To test this algorithm we will first modify how we are generating test users by modifying the test user's first to be their location in relation to campus. For example a user north of campus will be named North TestUser. The first step we will take with testing the algorithm is creating the distance matrix just based on the users physical distance from each other, then adding into the distance matrix calculation how well the users preferences match. This will allow us to test that all aspects of the user profile are being used in group formation.

Task 2: We were advised to make some modifications to the view that users are given for the group they are recommended. The modification we will make is removing duplicate information and replacing it with links to other users' short profiles. In addition to this to give users more insight into how well they match with the group they are viewing, this will be done by having a table with users preferences and how they match the other users in the group.
Task 3: The focus of this task is to continue developing the home page for a more user friendly approach. The current homepage needs more information displayed for the user and easier access to other pages.
Task 4: A user's rating is stored as a double value in the database, but only a rounded-up whole value is reflected back to the user in the application. The After Trip page and User Details pages need to more accurately reflect the rating value, such as displaying half stars. The After Trip page also needs to pull and display other members of the user's carpooling trip. It currently only displays three test users.
Task 5: A demo video will be created to showcase two example groups, demonstrating the user's journey through pre-trip, during the trip, and post-trip phases.
Task 6: In order to evaluate our group matching algorithm, we will evaluate whether groups created by the algorithm properly take into account users preferences and location. To test preferences we will run the group matching algorithm just using preferences and ensure the top groups provided by the algorithm match closer to the users preferences then the bottom groups provided. This will be visible to users via the group details page. In order to evaluate the distance scoring of the HAC algorithm we will modify the test user generator to make the names of users their cardinal direction, this will allow us to evaluate if the group algorithm is putting users in groups that are close in geographic location.

Date(s) of meeting(s) with Client during the current milestone:

- 10/17/2024
- 10/24/2024

Client feedback on the current milestone

- See Faculty Advisor Feedback below

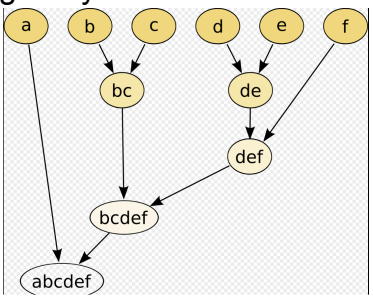
Meeting 10/17/2024

Milestone 4

1. Search/ Add/ Remove Friends
    a. Update if friend request was approved or declined
        i. Ex. sender receives notification if declined
    b. Test multiple friends
2. Ratings and Review
    a. Update average ratings

3. Group Recommendation
    a. Once joined a group, be able to access who is in your group
    b. Integrate with recommended group
4. Rider Confirmation
    a. Integrate data

Milestone 5

1. Group Recommendation -
    a. Test 64 riders
    b. HAC - greedy
        i. 

        ii. Each address starts as its own cluster (4 groups/clusters)
        iii. One each group/cluster close together
        iv. Each person starts in own cluster
        v. Ex start w 16 ppl - 16 clusters and end with 4
        vi. Pair of clusters are merged (closest in distance)
        vii. Take into account the amt of groups and people in group
        viii. 2 add in de find distance between fe and de and avg between
        ix. Input distance matrix, output group formation
    c. K Clustering
        i. K num of cluster, find the closest centroid, create a mean positions of all in cluster, repeat, stop when max group is reached
        ii. Better because it is not greedy and step 3 optimizes and allows changes if needed. Disadvantage - no max seat belts without modification

Meeting 10/24/2024

1. Ratings & Reviews
    a. Display numerical value
2. Group Dialog View
    a. Get rid of duplicate information
        i. Link to user profile
    b. Table to show preferences
    c. Create a table that shows match or not match in the group view dialog
        i. Distance matrix table as well
    d. Display average distance from each other
    e. Display google maps page with layout of where users are
3. Group Recommendation Algo

    a. Try with just distances
        i. Generate usernames as UserSouth, UserNorth
    b. Next add in gender filtering
    c. A,B,C have mixed gender preferences and D have same gender
    d. Important to add one constraint at a time to ensure the algorithm is working correctly at different states
4. Home Page
    a. Change Direction wording
    b. Time/Date (dy of week is not specific)
    c. Display Rider or Driver
    d. Ability to start trip as driver or view trip details
    e. Post trip details
    f. Pre - During - Post
    g. Main area with summary info:
        i. current trip (driver vs rider views when clicked),
        ii. upcoming trips (pre-trip driver/rider confirmation)
        iii. previous trips (post-trip reviews/reports)
    h. tabs/Drop-down menu:
        i. profile/settings/preferences
        ii. Schedule/calendar (to and from school, confirmed trips)
        iii. Group recommendations/creation/...
        iv. Friend lists
5. Whole System demo with 64 users
    a. Demo of pre-trip for two groups
    b. Two Groups for during trip
    c. Two Groups for post trip
6. Group recommendations match users preferences, location
    a. Use driver names and tables to show why they are in the group

Faculty Advisor Signature: _____ Date: _____