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Criteria	TA/Grader	Instructor
Presentation		
Overall		

~ On Campus Matcher ~

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Requirement Report

(V2)

15 March 2022

1. Introduction

Even though university students take many courses with numerous students on our campus, they mostly suffer from establishing new social interactions. On-Campus Matcher is a mobile app that aims to make university students more social. Using our app, students can find new friends from their sections with similar interests. Thanks to our program design, the process is easy, fast, and reliable.

We face situations like these very often in our school. Moreover, our school's unofficial social media sites are full of posts that are about how hard it is to find friends, a feeling of loneliness, and social anxiety. For example, you may face hard times when finding friends in a particular course section, but maybe you are unaware that you are in the same section with a person you have met in another lesson's section. Our app matches you with people that are in the same sections in more than one lesson. So, if you feel lonely, you can find people you have previously met much easier. In the end, as a team, we believe that new friendships can give birth to new ideas that will change the world.

The section-based matching system mainly differentiates us from other similar apps. In addition compared to the others, our app is deeply specialized for the university students' all possible needs.

1.1 Sign up and Login

To use On Campus Matcher app, users have to input some personal information.

1.1.1 Student Information Input Page

The users input their name, surname and mail.

1.1.2 Schedule Input Page

On this page users can input their schedule information.

We have two different options to get the schedule data:

- Screenshot text recognition
- Manual section selection

Using web scraping, every section's syllabus data can be pulled from a website like Bilkent Offerings. This website provides us with syllabuses of different courses and sections. The app can pull this data from the web and let users select their courses and sections from an interface manually. In addition to that, it is planned to provide a second option that allows users to pass this step by just uploading their weekly schedule photos. Especially, the application will be designed to work on screenshots of weekly schedules because it is easier to apply image processing steps to them. Therefore, an optical character reading (OCR) service may be used. There are many different OCR services, such as Asprise, Tesseract (Tess4j), and ABBYY. Moreover, Google Docs API has an OCR feature to open images and pdf files. These different APIs will be tested during the development and decide which one gives us the most accurate results. Moreover, some basic level digital image processing techniques may be used in preprocessing step to get better results. Therefore, the OpenCV java library can be a prospective candidate because it provides many useful image processing methods like gray scaling, thresholding, morphological operations, blurring, etc. [1] If it is needed, a combination of these two methods can be used. For example, after the image processing, if the program cannot create the weekly schedule properly, the table can be created accurately by using plain text content of the photo and data taken from the offerings website.

1.1.3 Interest and Club Information Input Page

On this page users can select their interests and clubs from a list.

1.2 Matching Algorithm

On Campus Matcher App has a comprehensive matching algorithm. That matches users based on 4 features:

- ●Section Based Matching feature
- ●Schedule Based Matching feature
- ●Student Clubs Based Matching feature
- ●Interest Areas Based Matching feature

These four features are used to calculate Overall Relative Score of a match. Then, Overall Relative Score is calculated for every other user. Then we sort the users to show best matches to the user.

Section Based Matching feature: This matching feature increases relative scores based on the common course sections of users. The only condition for two users to increase to the point for section-based matching is being in the same section of the same class. The more they are in the same class, the more relative score they have.

The basis score for relative section-based score* is 0. For two users who are to be matched, the algorithm looks at if the two have any common lecture section in common. For any lecture hour, they are in the same section, their overall relative score* increases (X) amount. For example, if two users have four lecture sections in common, their overall relative score increases 4X.

Schedule Based Matching feature: This matching feature increases relative scores based on the blueprints of their schedule by looking at their lecture-free hours. Regardless of their classes and their section, the more lecture-free hour two users have in common, the more relative score they get from the schedule-based matching feature.

The basis score for relative schedule-based score* is 0. For two users who are to be matched, the algorithm looks at if the two have any lecture-free hours in common. For any lecture-free hour, they have in common, their overall relative score increases (Y) amount. For example, if two users have three lecture-free hours in common, their overall relative score increases 3Y.

Student Clubs Based Matching feature: This matching feature increases relative scores based on the student clubs that users are interested in. The more student clubs two users have in

common, the more Relative Student Clubs Score they get from the Student Clubs Based Matching feature.

The basis score for Relative Student Club Score is 0. For two users who are to be matched, the algorithm looks at if the two have any student clubs in common. For any student club, they have in common, their overall relative score increases (Z) amount. For example, if two users have two student clubs in common, their overall relative score increases 2Z.

Interest Areas Based Matching feature: This matching feature increases relative score based on the areas of interest of the users. The more the areas of interest the users have in common, the more Relative Interest Areas Score they get from the Interest Areas Based Matching feature.

The basis score for Relative Interest Areas Score is 0. For two users who are to be matched, the algorithm looks at if the two have interest areas in common. For any areas of interest, they have in common, their overall relative score increases (T) amount. For example, if two users have five areas of interest in common, their overall relative score increases 5T.
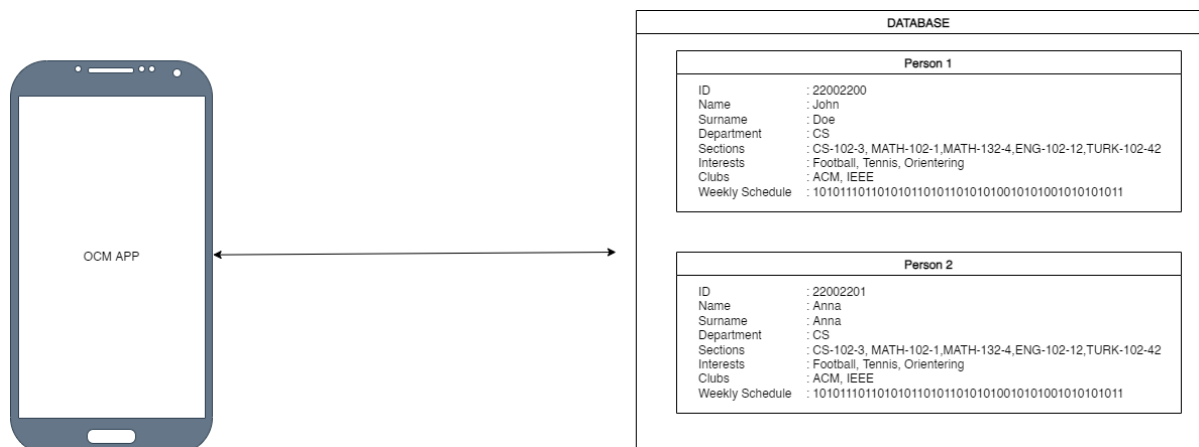
▪ Overall Relative Score: Final score for two users, which will be used to determine the rank of the user's other users. $(X+ Y+ Z +T)$

▪ Relative Section Based Score: A part of the Overall Relative Score that comes from Section Based Matching feature. Represented as (X)

▪ Relative Schedule Based Score: A part of the Overall Relative Score that comes from the Schedule Based Matching feature. Represented as (Y)

▪ Relative Student Clubs Score: A part of the Overall Relative Score that comes from the Interest Area Based Matching feature. (Z)

▪ Relative Interest Areas Score: A part of the Overall Relative Score that comes from the Interest Area Based Matching feature. (T)

1.3   Activity Suggestion

1.3.1 Suggestion Algorithm

Our application also provides an activity recommendation part. After the matching is done, matched users are suggested to do some activities together in order to ease the process of meeting and having fun. A list of activities that can be done on campus will be presented to the users in the interests section. According to their selection, the application can suggest them to do an activity together that is commonly liked by both users. The application will use the information in the database about the users' interests and weekly schedule. The users were matched according to this information too, so there will be common interests and common spare hour gaps in their schedules. In order to clarify the process, lets assume that there are two matched users named John and Anna.

John's interests		Anna's interests	
Playing table tennis. Reading.		Walking outside. Swimming. Trying different cuisines.	

By looking at their interests, we can see that watching movies is liked for both users. If there is more than one activity both can be suggested to the users. After the activity is selected, the time will be defined by the users weekly schedules.

John's Weekly Schedule   Anna's Weekly Schedule

It can be seen that between 10.30-3.30 at Friday both users are free and this can be a good time to watch a movie together. Since we have the information about both users' weekly schedules, the application can suggest both users to go and watch a movie together in the library.

1.3.2 Other Implementations

Many students also want to meet people from their sections to study together for upcoming midterms, quizzes, etc. Our application can provide a solution for this too. When midterm or final periods are close, this activity suggestion can be used as a platform to meet with other users with the same sections and work together. This change can be selected by the user and according to their choice the application can suggest two users to go to the library and work together in a specified time period.

1.3.3 Feasibility Checking

After matching people's free times, our program will also tell you that if that place is open or closed as well. Information about that place, like when it opens, and closes will be held in the database we use. It will also display a number and/or site of that place for quickly booking that event field. Necessary equipment for that activity will also be displayed for convenience. ,

Person A (Pars)   Person B (Faruk)

For example, let's say Pars and Faruk have both interests at playing tennis, they have same free time at Friday afternoon, and they are matched. Our app will then display if tennis court is open, number and/or site for tennis court and necessary equipment for tennis game.

1.4   Additional Features

1.4.1 Multi friend Schedule Comparison

The main purpose of this feature is to find common lecture-free hours of a couple of other users. For example, if a user wants to have a meeting in lecture hours, then they need to know the lecture-free times of the other members of the meeting. To do this, the user needs to see the weekly schedules of every other member and compare the schedules in mind.

On Campus Matcher App offers a digital solution to this problem with Multi friend Schedule Comparison. From the interface of the App, the user touches Multi friend Schedule Comparison. Then, the user selects other users to have a meeting with. After touching SEE POSSIBLE FREE TIMES, the common lecture-free times of all members is displayed.

1.4.2 Personality Test

We aim to make more efficient matches thanks to the personality test we apply to the users while they disappear into the application.

1.4.3 Dining Hall and Lunch Appointment

We have an easy appointment system so that all students can socialize more easily during the lunch break, which is the common free time of all students. They can also make an appointment for lunch among themselves if they wish.

1.4.4 Student Clubs

In this student clubs part, user will mark the student clubs via the interface when they sign up. After marking the students club they are interested in, the database will update the students club part for each user.

When students touch MATCH, activating the algorithm, the algorithm will use the students club's database to determine matches. The more student clubs two user have common, the more point they have for the matching algorithm.

1.4.5 Student Clubs Activities

In the activities part, users will mark the activity they are to attend via the interface. After marking the activity, the activity part of the database will be updated accordingly.

When students touch the See Who Is Attending part of the activity, the others who have connected to the user who attend the activity will be called from the database. The list will be displayed.

A notification part that sends a notification when a connection of the user attends the same activity can be implemented later.

An invite to activity button on each profile can be implemented. This way users can invite their connections to the activities they attend via the interface of the profile of the users.

1.5 Targeted Users

This application is shaped around university students to help them to meet with new students who share the same interests and similar weekly schedules. Briefly, this application aims at those who have difficulty making new friends, managing time to pay attention to many activities, and looking for someone to share their interests with. After a bit of observation, it can be said that many people feel lonely in Bilkent Campus. There are also ones who cannot allocate time to join any social activities because they think they do not have sufficient time to do that. Moreover, it is hard for many people to run into someone who has similar hobbies. Even if students know each other, university life generally does not allow them to reveal their friend's hidden interests and skills. At that point, we believe that the On-Campus Matcher app has a promising potential to solve these problems and help these students.

1.6 Competitors

- Speaky / HelloTalk

  o These applications match their users based on language preferences. Users can practice and learn foreign languages with other people and fill up their free time. However, compared to On Campus Matcher app, these applications are not as successful as our app in terms of productivity. The reason is that our app finds the interval between the lectures of the users and fills their gaps with useful activities, whereas these applications do not regard the schedules of the users.

- Instagram / Facebook / Twitter

  o These applications match their users based on their areas of interest. To learn their areas of interest, the apps evaluate what the users follow, like, and comment.And even though these applications are successful in matching people with similar interests as the parameters these apps use and On Campus Matcher app's parameters are alike, the two users matched may never be available at the same time. Thus, these apps are not successful at evaluating the timing of their users in contrast to OCM.

  - Vampr / Tastebuds

o These applications match their users based on the music their users performed. This way, users can find other users to practice music. Musicians can also be matched by On Campus Matcher app via Student Clubs Activities part as the Student Clubs Activities part will enable the users to see whether their matches attend a music activity, say, an classical music orchestra in Odeon. Besides, with the help of On Campus Matcher app, musicians can see the availability of their group members, whereas these apps do not provide such features.

1.7   Advantages and Benefits

- Making new friends easily
- Studying together and getting more productive
- Filling up intervals between lectures with social activities
- Finding someone to sit with at meals
- Having a broad network

2.   Summary & Conclusions

On-Campus Matcher is a mobile app that promises to increase the socialization of university students. It is an innovative solution to those who suffer from loneliness and unable to find friends easily. Not only does it help people finding friends within same sections, but it also matches people with similar interests.

References

- 1 "OpenCV Modules." OpenCV, https://docs.opencv.org/4.5.5/.