

PEER TO PEER LEARNING PLATFORM

A Project Report

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THESIS CERTIFICATE

This is to certify that the thesis titled **PEER TO PEER LEARNING PLATFORM SUBMITTED TO IIT-M**, submitted by **HONEY GOYAL**, to the Indian Institute of Technology, Madras, for the award of the degree of **Master of Technology**, is a bona fide record of the research work done by her under our supervision. The contents of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.

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ABSTRACT

People learn a great deal by explaining their ideas to others and by participating in activities in which they can learn from their peers. They develop skills in organizing and planning learning activities, working collaboratively with others, giving and receiving feedback and evaluating their own learning. This is known as "*peer learning*".

However, it is very difficult for people to find peers having expertise in similar interests. So, it is necessary to build a system that can help people find peers with similar interests.

Hence, this project will focus on developing such a system known as "*GetMate*". Through *GetMate*, a person can

- *find peers* with *interests* similar to his/her interests
- can *organize meetings* related to a *particular interest* which can be attended by like-minded people
- *get recommendations* regarding
 - interests or hobbies that the person can indulge in which are similar to his/her interests
 - people having a particular level of expertise in his/her interest

Through the above mentioned recommendation system, the application *predicts efficiently the future interests* of users by using *content-based* and *collaborative-filtering* approach that takes into account individual interests and location. These interests can be very useful as this will not only be based on his/her usage history but also on the current trends followed among similar users globally. The solution helps the users to collaborate among themselves socially and learn, contributing to each other's growth.

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CHAPTER 1

INTRODUCTION

Suppose person A , who knows how to play synthesizer, is highly interested in learning salsa. She thinks that it will be a good idea to approach another person, say person B , who knows salsa since she can't afford a professional tutor. On the other hand person B wants to learn to play the synthesizer. They both live in the same locality, however, they don't know each other. In this scenario, if some system exists which can help person A and B find each other, then it will be beneficial for both of them.

This project aims to develop such a system. So, this chapter defines the problem, gives an overview of the system, describes the existing system and provides a comparison analysis between our system and the state-of-the-art systems. Moreover, this chapter also contains the organization of the thesis, i.e., the way this thesis describes the development and the working of the system.

This chapter is divided as follows:

- **Section 1.1** describes the problem and gives an overview about the current existing methods that help in solving the problem
- **Section 1.2** explains the importance of the problem and provides further motivation for the problem
- **Section 1.3** gives an overview about the approach followed, compares the approach to existing work and describes the novelty about the approach
- **Section 1.4** details the organization of the thesis

1.1 Overview and Problem Statement

An instance where the system could be helpful was presented in the beginning of the chapter. However, there are many more scenarios and issues that can arise which the system needs to solve. This section details all those issues with the help of various scenarios and finally describes the problem and what needs to be done to solve it.

Consider a person A who wants to learn a particular dance, say Odissi. A decides to learn by watching videos. However, the videos do not seem to explain certain aspects of the dance which makes learning Odissi difficult for A . This lessens the interest of A in Odissi and as a result, A stops learning it after a while.

But, it would have been better if A would have come in contact with some mentor/guide who would have helped A initially in learning the dance. Then, A would have been able to maintain her interest and, as a result, learn the dance.

Similarly, let's say a person B wants to learn sewing. Say, some event is being organized in her town that teaches the basics of sewing. It would be helpful if she knows about that event. But it's very difficult for a person to keep track of the events regarding sewing that are being organized. So, it will be helpful to have a system which can suggest her the events related to sewing in her neighbourhood. Also, say a person C whose interest matches with that of B is going to an event which is being organized far away from B . The system should also suggest this event to B (even if it lies outside B 's neighbourhood), but with lesser importance.

Let's consider another case. Suppose person A , who knows how to play synthesizer, is highly interested in learning salsa. She thinks that it will be a good idea to approach another person, say person B , who knows salsa since she can't afford a professional tutor. On the other hand person B wants to learn to play the synthesizer. They both live in the same locality, however, they don't know each other. In this scenario, if some system exists which can help person A and B find each other, then it will be beneficial for both of them.

The above scenario can also lead to a '**cycle problem**'. Say, A is an expert in playing badminton but a beginner in table tennis. Another person B is an expert in table tennis

but a beginner in football. Still another person, say C , is an expert in football but a beginner in badminton. In this scenario, A should be matched to B (for acquiring expertise in table tennis), B should be matched to C (for acquiring expertise in football), and C should be matched to A (for acquiring expertise in badminton). Therefore, it is helpful to have a system that takes into account the expertise of the people in their respective interests and suggest the required people living nearby who have the appropriate expertise in those interests.

Problem Statement

So, in short, there should exist a “*recommendation system*” which does the following:

- matches two people with complimentary expertise in their common interests, i.e., it should help in “mutual symbiosis” of the two people
- even if there is a one-sided symbiosis, it should match a person with the appropriate guide/mentor, i.e., the guide is not reaping the benefit
- take into account different interests of a person and match that person with possibly multiple people based on common interest
- suggest interests similar to those of the person
- suggest events being organized in relation to a person’s interests and, if the event is being organized outside the person’s neighbourhood, then it should suggest it with lesser importance
- suggest trending interests in the society to the person

1.2 Motivation

To learn a lot of stuff, it is helpful to share the ideas that people have among each other. This flow of idea from one person to another can happen when like-minded people participate in activities in which they have interest. Moreover, participating in such activities helps the people to organize and plan the learning activities.

A person who is a beginner in a particular field can benefit from the expertise of a person who has been engaged in that field from a long time. This flow of idea from the skilled person to the novice helps the novice to grow. Further, this flow of idea and knowledge can be bi-directional too.

To facilitate such development of skills in people, it is a good idea to help people find the appropriate event in which they have interest and help them come in contact with the appropriate people. This can happen in the following ways:

- when the person comes to know about those events that are organized in the neighbourhood of a person (so that the person can attend the same) and are of interest to the person
- the person is able to organize events to bring like-minded people together
- the person is able to find another person who is willing to teach the skill that is of interest to the person

However, in practice, it is quite time-consuming for a person to keep track of all the relevant events that are being organized and find the required people. This deviates the person from pursuing his/her own interest. So, it is helpful to have a system in place that does the above mentioned laborious tasks and allows a person to focus on his/her interest.

Such a system will be beneficial to people of all ages since different age group people have different kinds of interests. This will especially be helpful to those people who want to pursue an interest of their own apart from their professional life.

1.3 Contributions of this work

1.3.1 ...

1.3.2 ...

1.4 Organization of thesis

1.4.1 ...

1.4.2 ...

CHAPTER 2

Background and Related Work

CHAPTER 3

Proposed Mechanism and algorithm

This Chapter provides a detailed description of system architecture and overview of working the system. The development of a software system and the mechanism associated with it proceeds in multiple stages from data binding through user interface to storage in MongoDB and CRUD operations in Node.js and Angular.js. This chapter is divided as follows:

- **Section 3.1** describes the structure of the system, behaviour and provides high-level view of the system.
- **Section 3.2** describes the challenges faced while making system for optimal solution, and the complexity of the challenges.
- **Section 3.3** describes the idea proposed to face the challenges and and illustration with examples.
- **Section 3.4** describe the implementation details of the system

3.1 System Architecture

It consist of four layered architecture as shown:

3.1.1 User Interface Layer

This layer serves for input-output of data and first hand user interaction with the system. System uses Android platform to build Graphical User interface. The android app will composed of certain activities which will draw information from user. Facebook Authentication will be used for primary authentication and email ID as secondary system. Then the information related to interests and level of indulgent will be taken from user and other basic information including profile details will be imported from facebook. Then the information will be bind in the **JSON** format.

3.1.2 Service Layer

Suppose person A recently created an account (either used Facebook or email ID) and wanted to visit to her profile. She clicks the button, in background a service is initiated which sends a data in the form of URL to the Service Layer which disintegrates the URL to get data about query to be fired(in this case it takes the objectId of user and fires search query). The fired query returns data and Service Layer accepts the data in JSON format and returns it to application which display the data in profile activity.

Similarly, operations like creating events(PUT method), making groups(PUT method), looking for mate(search query), getting interested in event(UPDATE method), finding nearby mates(Geospatial queries), leads to set of queries to be fired and give JSON object in return or callback function.

3.1.3 Business Logic Layer

3.1.4 Database Design

System uses MongoDB database (NoSQL database) which deals with JSON objects. The database model consists of four collections namely : USERS, INTERESTS, USER-INFO, EVENTS. System uses online database provided by MongoDB Atlas which will be accessed through REST API by Node.js/MongoDB Stitch. The database accept query through query router which is linked to Express.js module in service layer and the mongoose model connects the service layer to database design. Whenever a user asks for a tasks, a query is to be fired in service layer, service layer calls for mongoose model via query router, which thereby refers to configuration server

3.2 RESTATE the Problem Definition

3.2.1 ...

3.2.2 ...

3.3 Proposed Idea

3.3.1 Hierarchy of Interest

3.3.2 UI Design and Relation between Activity

3.4 Implementation Details

3.4.1 Algorithm

Working of Recommendation System :

3.4.2 Various Software Component

Node.js and MongoDB

CHAPTER 4

Performance Study

This chapter is divided as follows:

- *Section 4.1* ...
- *Section 4.2* ...
- *Section 4.3* ...
- *Section 4.4* ...

4.1 Implementation/Simulation Environment

4.1.1 Hardware Requirement

4.1.2 ...

4.2 Scenario 1: Results and Analysis

4.2.1 ...

4.2.2 ...

4.3 Scenario 2: Results and Analysis

4.3.1 ...

4.3.2 ...

4.4 Summary of performance study

4.4.1 ...

4.4.2 ...

CHAPTER 5

Conclusions and Future Work

APPENDIX A

A SAMPLE APPENDIX

Just put in text as you would into any chapter with sections and whatnot. Thats the end of it.

REFERENCES

LIST OF PAPERS BASED ON THESIS

1. Authors.... Title... *Journal*, Volume, Page, (year).