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1. INTRODUCTION

Recommendation systems have taken the information technology industry by storm. Many online domains such as sales, media, and social communities today have a recommendation system integrated to it which operates successfully by connecting users to the items of their interest and building their loyalty [4]. So when it comes to an online domain subjected to job search and recommendation, it can be a tedious task for any individual to browse through thousands of job openings and to filter the relevant ones. Not just for job seekers, it can also be very inconvenient for the job providers to recruit right job applicants. Hence, our main objective is to recommend relevant jobs to the job seekers and recommend worthy candidates to the recruiters as well.

Basically, a job recommender system can be partitioned into 2 subsystems: a job applicant subsystem and an e-recruiting subsystem [1]. A job applicant subsystem is designed for job applicants to help the candidates enter information focusing their profile. And an e-recruiting subsystem is used by the job providers (recruiters) to help them recruit deserving candidates. The system achieves personalization by making use of user's explicit information (e.g. age, gender and experiences and jobs' type, salary and key skills) along with user's implicit information concerning their online interactions such as the pages they visited, the time they stayed on a specific page and the items they saved for revisiting [6]. Only explicit information of user can also be used to recommend jobs by the system but this would result in higher number of dissatisfied job seekers and longer unemployment durations, so in order to reduce and maintain such high risk, it is a better move to consider user's implicit information as well.

Recommender systems can be classified into three or four categories: content-based methods, collaborative filtering, demographic filtering systems and hybrid approaches [2]. Content-Based filtering relies on the user preferences like ratings provided by the user on an item. Collaborative filtering considers the opinion of a community of users with similar field of interest to recommend items to a active user. Demographic filtering system makes recommendations by using user's personal information (age, gender, income, country). Hybrid recommender system is

the combination of more than one type of recommender systems into a single model which yield better results than simple recommendation techniques but are much more complex to design.

2. PROBLEM DEFINITION

Job seekers and job givers (Human Resource Manager), both, have a difficult time addressing their preferences on one another. Job seekers have a hard time searching for a company that values his/her skill sets and confirm their placements. Whereas, for job givers, it is a tedious task to surf through CVs of hundreds and thousands of applicants, contact them manually and conduct countless hours of interviews.

Therefore, our goal is to make things more convenient in between both parties. We will be using recommendation algorithms to solve these issues by recommending jobs that the job seekers are interested to apply for, on one hand and by recommending relevant candidates which the company is in need of, on the other. We will have a user interface for the job seekers to fill up fields with information like their qualifications, skills and every other detail that normal companies seek for. And we will also have a user interface for the job givers to fill up their respective fields comprehending each and every factor that they require in an applicant. This will help us to track down interests of job applicants and companies. And those with similar field of interests will be recommended correspondingly.

3. OBJECTIVE

We want our system to be a platform where Job Seekers and Job Providers can interact with one another and ease out the process of hiring and finding jobs. The main entities in out system are the Job Seekers and Job Providers. Therefore, the main objectives of our system are focused on these two entities and can be viewed as:

For Job Seekers,

1. Recommend jobs based on their skills, location, search histories and interests.
2. Provide and interactive UI where they can search jobs, acquire skills, give interviews and tests

3. Ensure credentiality of Job Providers.

4. Notify when new jobs fit for the users are available.

For Job Providers,

1. Filter out workers best fit for job.

2. Provide an interactive UI to setup hiring process, and hire workers.

3. Ensure credentiality of Job Seekers.

4. RESEARCH METHODOLOGY

4.1 Literature Review

4.1.1 Dynamic User Profile-Based Job Recommender System

This paper discusses the usability of hybrid recommendation algorithm to recommend jobs dynamically according to the characteristics of user profiles [1]. The recommender system allows the profiles of job applicants to be updated dynamically based on the historical applications they had sent and also based on their behavior (i.e. apply, collect or view) on the recruiting website. The user profile is classified into basic feature (i.e. job applicant: sex, age, degree, education, work length, need job type, etc. job post: job name, salary, location, job type), extracted feature (i.e. text information that describes the characteristics of jobs) and behavior feature. The basic features are updated and the extracted features are extended to create a dynamic user profile. The similarity between the job applicants and the job is calculated using updated basic features to implement recommendations. The similarity calculated using extended extracted features helps in improving accuracy of recommended results. The cold-start problem is solved using user-based collaborative filtering algorithm (i.e. initial recommendation).

4.1.2 Applying Different Classification Techniques in Reciprocal Job Recommender System for Considering Job Candidate Preferences

This paper proposes a reciprocal job recommendation system, CCRS (Classification – Candidate Reciprocal Recommendation System) [3]. The paper refers reciprocal recommendation to be a different recommendation process than the traditional user-item recommendation process .i.e. the traditional system focuses on recommending items based on the user preferences whereas, the reciprocal recommendation system focuses on people-to-people recommendation based on preferences of both sides (for e.g. job seekers and job givers for a job search website). Basically, the jobs are advertised/ recommended to the target candidate using their user profile, interaction and preference information and candidates are recommended to the recruiters according to the mutual characteristics between them. The cold start problem (new users joining the site) is also taken into account with this recommendation system.

4.1.3 Tree-based Contextual Learning for Online Job or Candidate Recommendation with Big Data Support in Professional Social Networks

This paper proposes an online mining and predicting system for personalized job or candidate recommendation with big-data support [6]. The personalized job recommendation facility can be achieved by acquiring user's explicit information. The cold start problem is handled by observing similarity between the context of new user's information and implicit information of the previous users. The paper proposes that the system has implemented Expandingly Tree-based and Dynamically Context-aware Online Learning algorithm (ETDC). The algorithm has four steps:

1) The incoming jobs are checked and new jobs are added into the tree structure at each round since new jobs can be posted by the companies at any time.

2) When an employee arrives at the platform, the employee's preference is predicted by aggregating historical rewards from the employees whose context vectors are similar to the arrival.

3) With the rewards, the scoring-tree structure is updated and the most promising job is searched and recommended to the employee.

4) The reward is extracted from the employees' browsing behavior and the log is updated to facilitate future recommendation
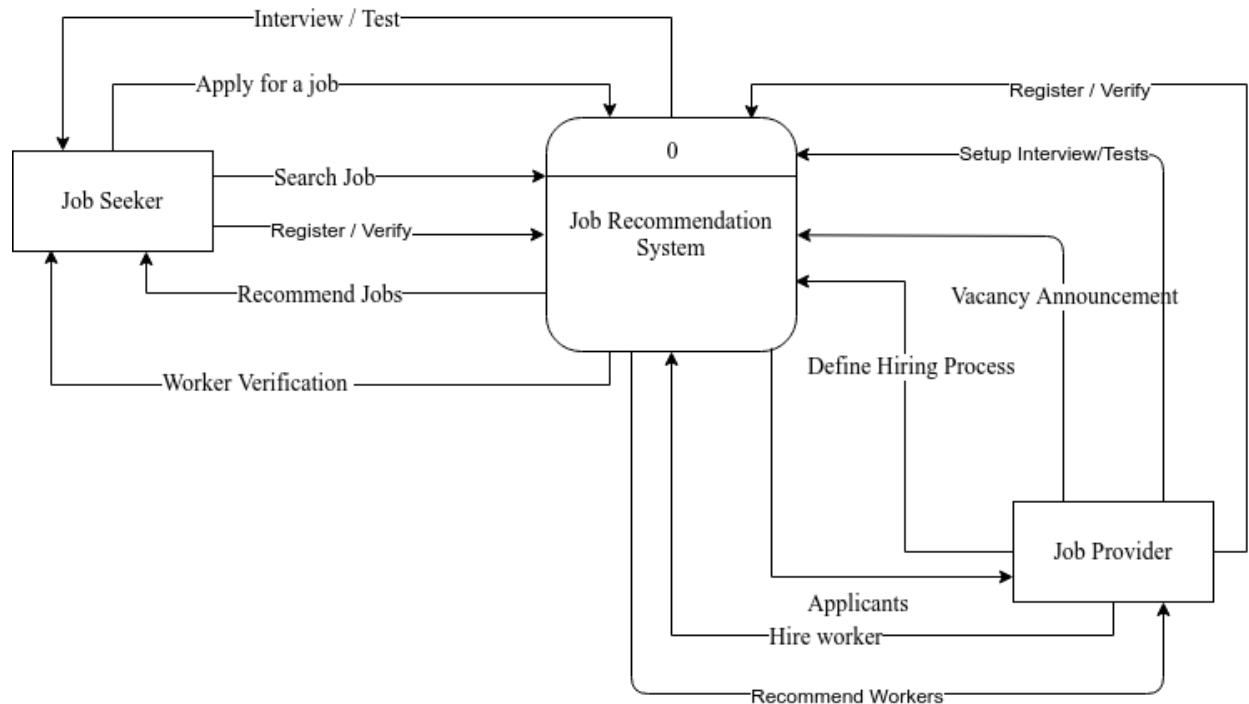
4.2 Framework Model

Fig 1. DFD of Job Recommendation System

5. DATA COLLECTION

We have collected datasets from kaggle where Job Posts and User histories are listed out. We will using a scaled down version of this dataset as it consists of a large set of data. We will be using 70% of the data set for training purpose and remaining 30% for testing purpose. We will remove unnecessary fields in the dataset to meet our purpose.

6. TESTING AND VERIFICATION

We will carrying out tests throughout our development and after completion and divide testing strategy into two parts:

6.1. Black Box Testing

These tests will focus on the output generated by the system for a given input. The tests used are:

6.1.1. Smoke Testing

To test the basic components

6.1.2. Regression Testing

To test whether a new feature doesn't break the other functionalities.

6.1.3. System Testing

We will carry out test on various platform like Android, Linux, Windows, IOS and different browsers to make sure it is cross-platform.

6.1.4. Stress Testing

In order to know the systems limitation, we will test the system at extreme inputs.

6.2. White Box Testing

These tests will be carried out to test the internal mechanisms of the system. The white box tests are:

6.2.1. Unit Testing

We will use automated unit tests to carry out tests to a unit in the system

7. EXPECTED OUTPUT

We expect our final result to be a system that makes it easy for job seekers to get jobs and job providers to hire workers. The system should recommend jobs to job seekers based on their skills and interests. It should be easy for Job Providers to setup a hiring process and hire workers based on their requirements. Also, the system should be easy to use and convenient for both parties.
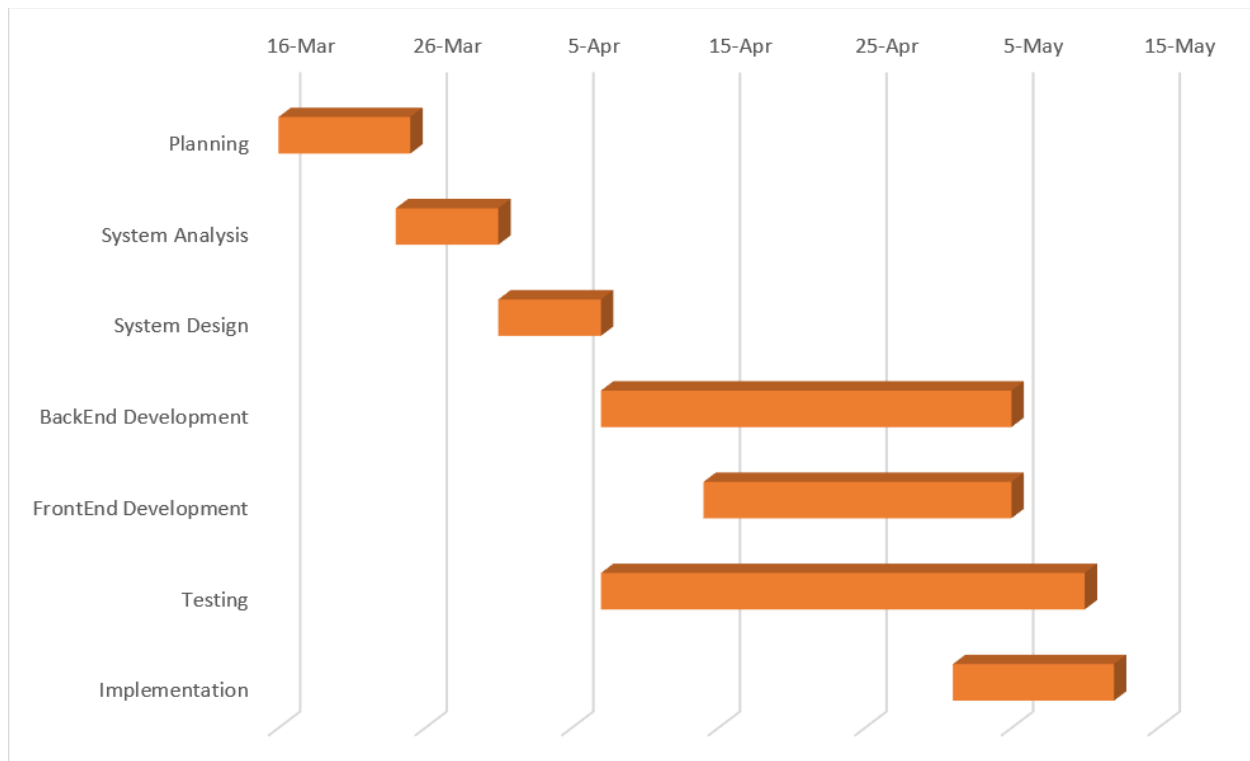
8. GANTT CHART

Fig 2. Gantt chart of the Project

9. CONCLUSION

Job Recommendation system will allow Job seekers to get jobs according to skills and interests. Job Providers will be able to hire workers based on type of jobs and requirements of the job and have a convenient way hiring workers. It will be a web based application running across all platforms capable of facilitating both parties with the necessary tools and platform.

10. REFERENCE

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