

Job Recommendation System

Team:

U18CO009 Keyur Tarsariya

U18CO010 Ganesh Jadhav

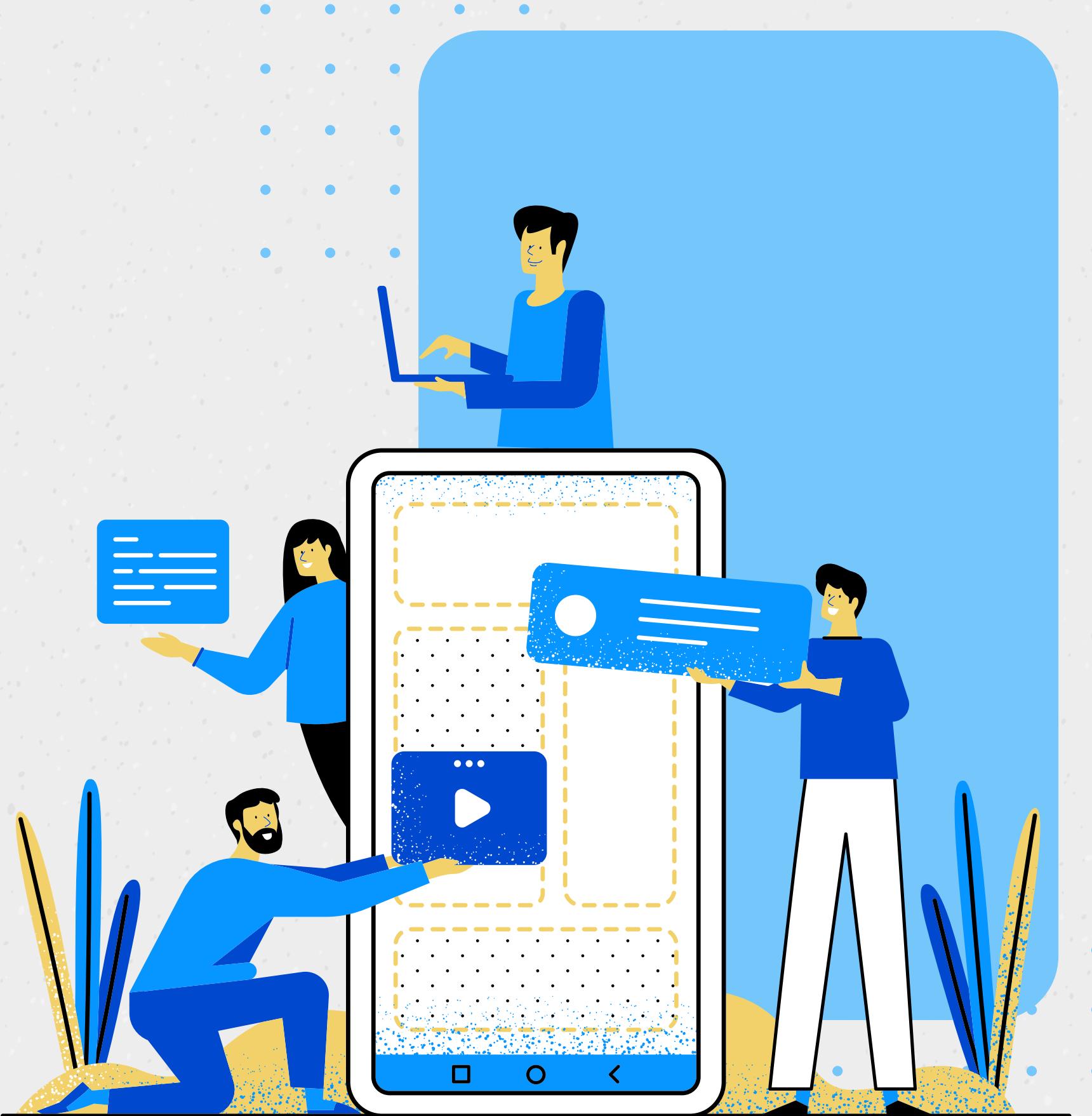
U18CO018 Shubham Shekhaliya

U18CO039 Jigar Nainuji

Guide :

Sankita J Patel

Assistant Professor at NIT-Surat

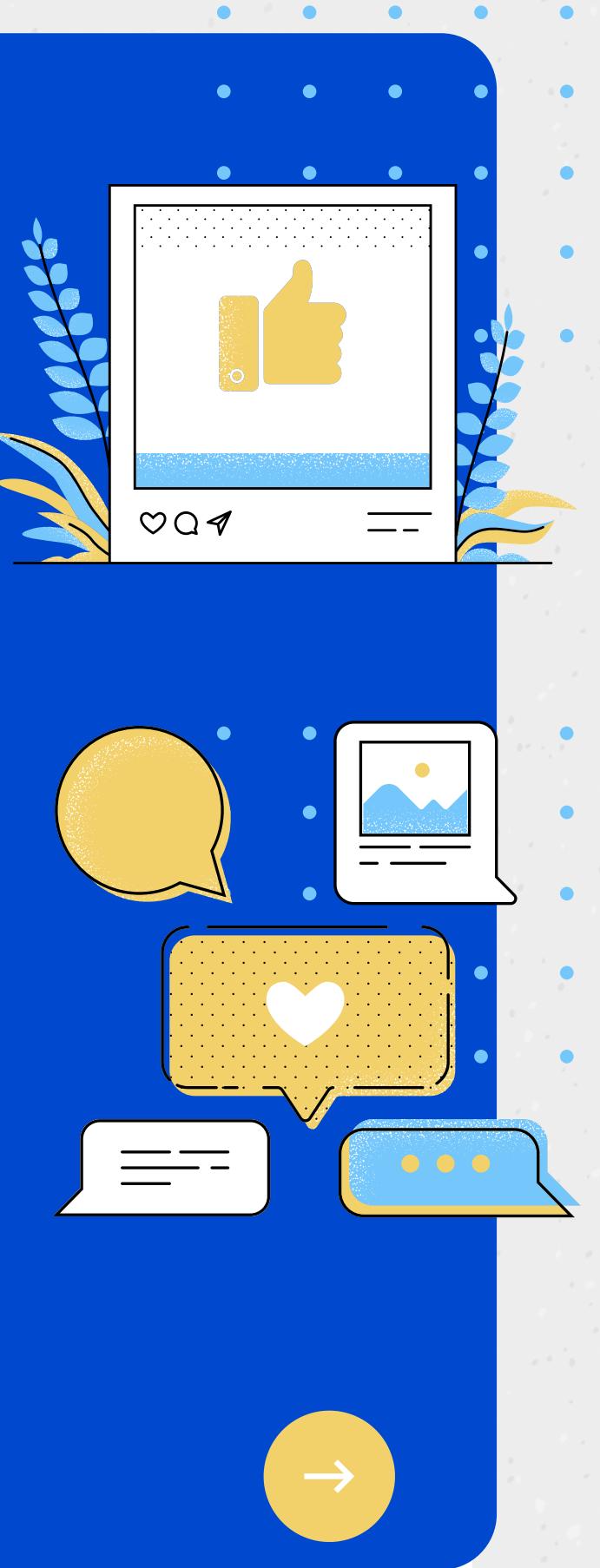


Introduction

- Overwhelming amount of information
- Searching is the big challenge
- One field of research
- Need for Online Job hunting
- Takes lots of time and energy

Applications

- Not often spends hours find useful ones
- huge number of Job Roles and candidates
- short-listing poses a challenge For HR
- required effective screening
- cost & time savings



Motivation

1. Lack of a standard structure and format for a resume
2. Different Job Roles
3. Time-consuming and Tedium
4. A large number of applications
5. Mostly CF algorithms Used
 - a. Without Resume & Job Profile Consideration



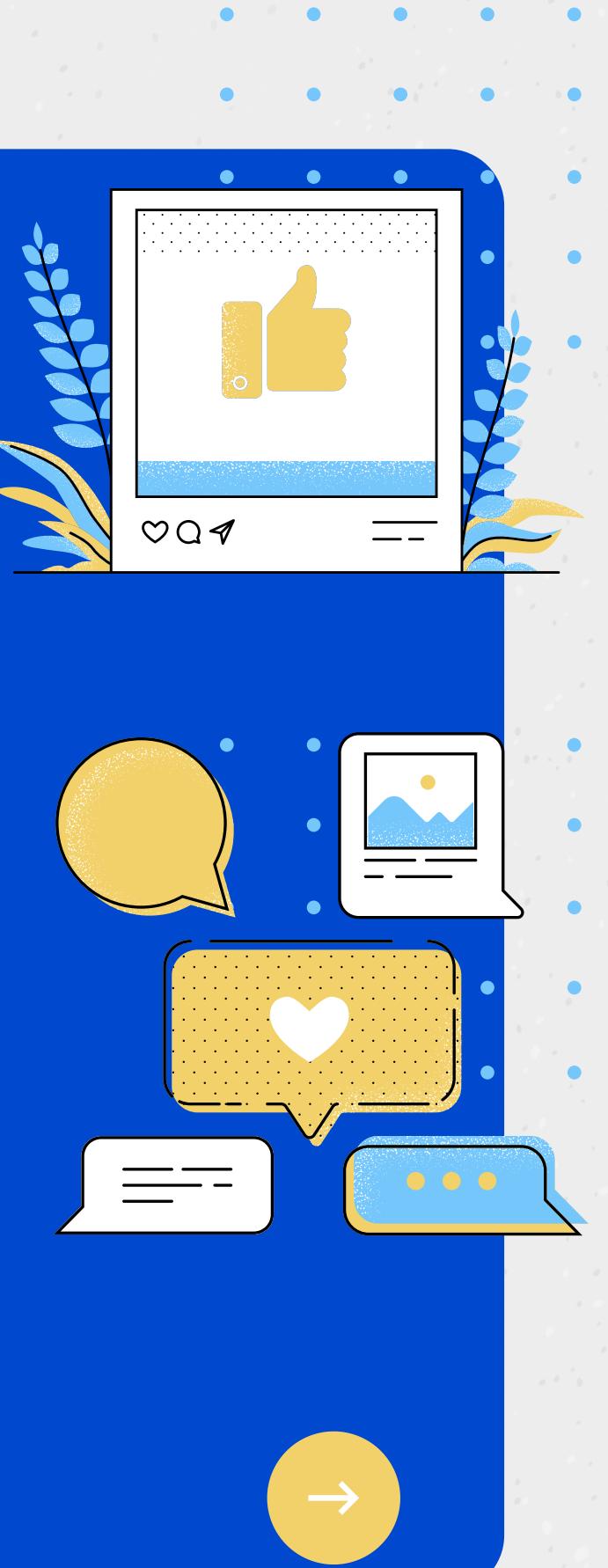
Objectives

- Mostly Boolean search and filtering techniques
- Some of them also using recommender system concept
- bidirectional recommendation
- Two viewpoints
 - a.recruiters
 - generate the job description
 - b.job seekers
 - Create resume
- Based on the good match

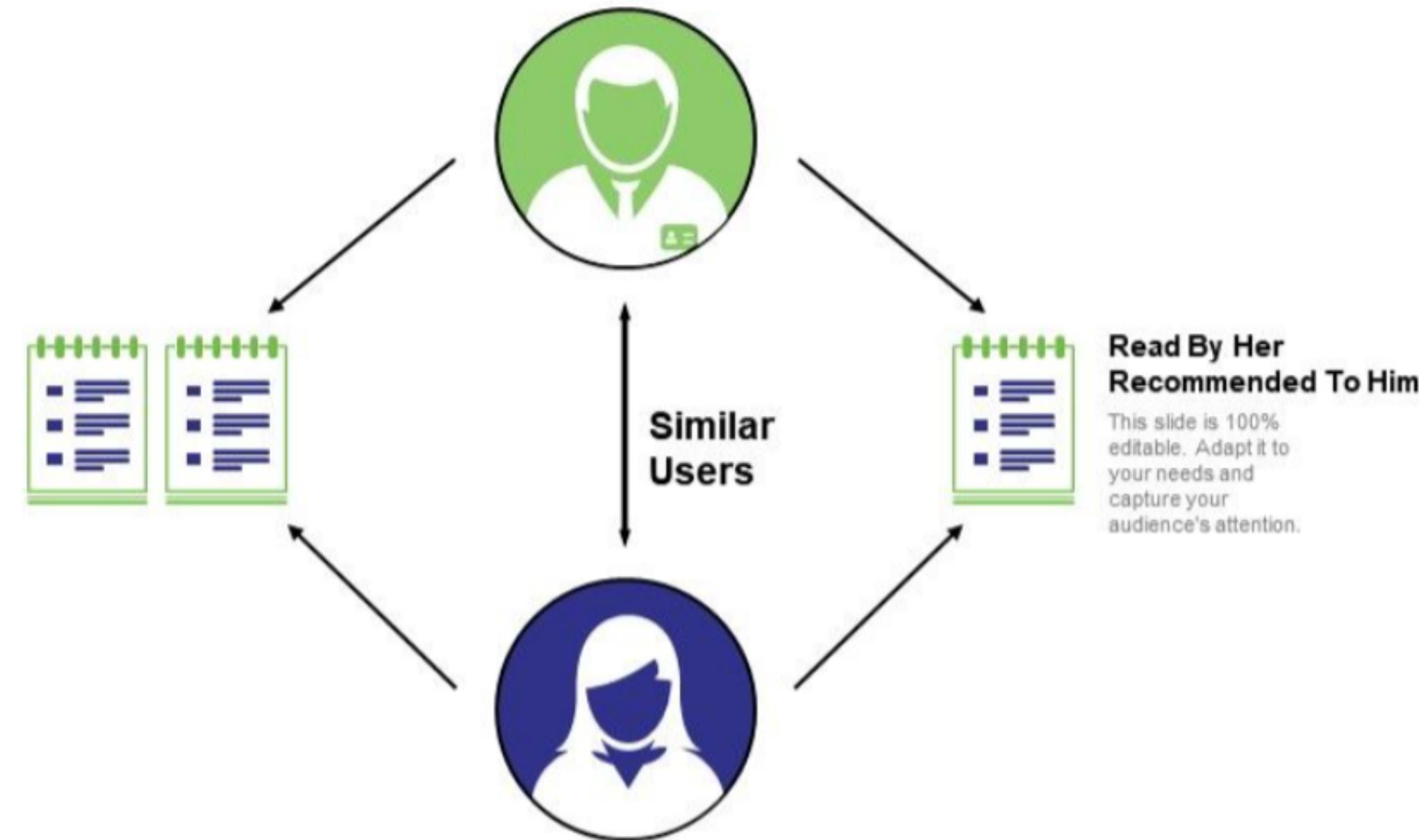


Overview of Recommendation System

- Use various techniques and algorithms
- a useful alternative to search algorithms
- The concept of understanding a user's preference
- Information overload by prioritizing the delivery
- Help the user to concentrate on the area of interest
- Types of the job recommendation System.
 - a.Collaborative Filtering recommenders
 - b.Content-Based Filtering recommenders
 - c.Knowledge-based recommenders
 - d.Hybrid Recommenders



Collaborative Filtering



Collaborative Filtering

Advantages

- Content independent
- takes feedback from the users
- based on user similarity

Limitation

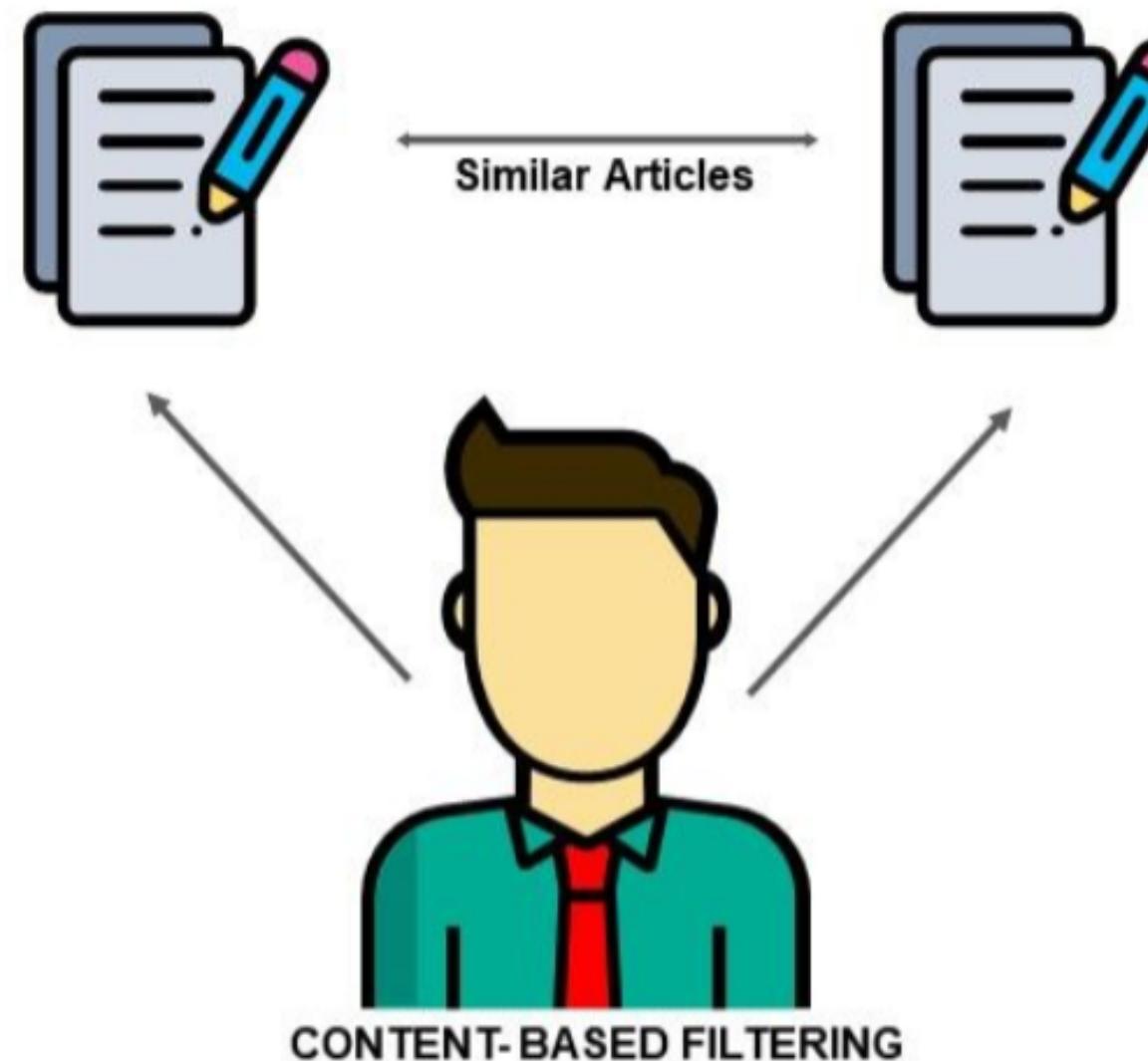
- Cold start problem
- false feedback can cause the wrong recommendation
- black boxes that cannot explain



Content-Based Filtering

Read by Users

This slide is 100% editable. Adapt it to your needs and capture your audience's attention.



Recommended to User

This slide is 100% editable. Adapt it to your needs and capture your audience's attention.

Content-Based Filtering

TF-IDF Algorithm

- To show similarity
- TF Means Frequency of a word occurs in a document
- DF Means Frequency of a word occurs in an entire set of documents
- Similarity can be calculated using
 - TF/DF or Term Frequency * Inverse document frequency

Advantages

- No need for data about other users
- The user gets items they love.
- No Cold start problem
- New items can be recommended

Limitation

- The user will never be recommended for different items.
- user not try a different type of product

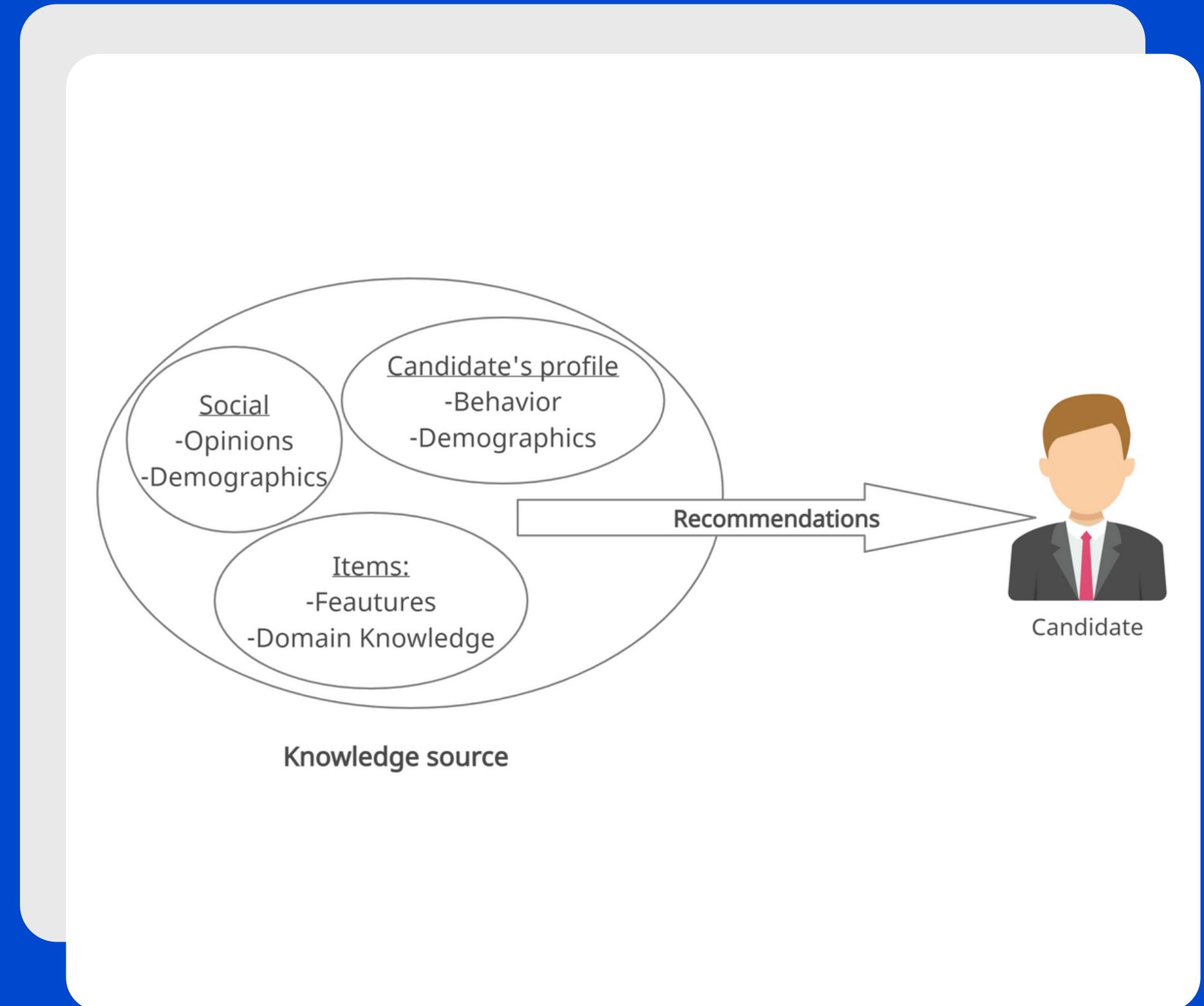


Knowledge based Recommender

- To recommend the items which are less frequently used.
- user and item can be explicitly modelled.
- Use the knowledge of an item based on rules and patterns

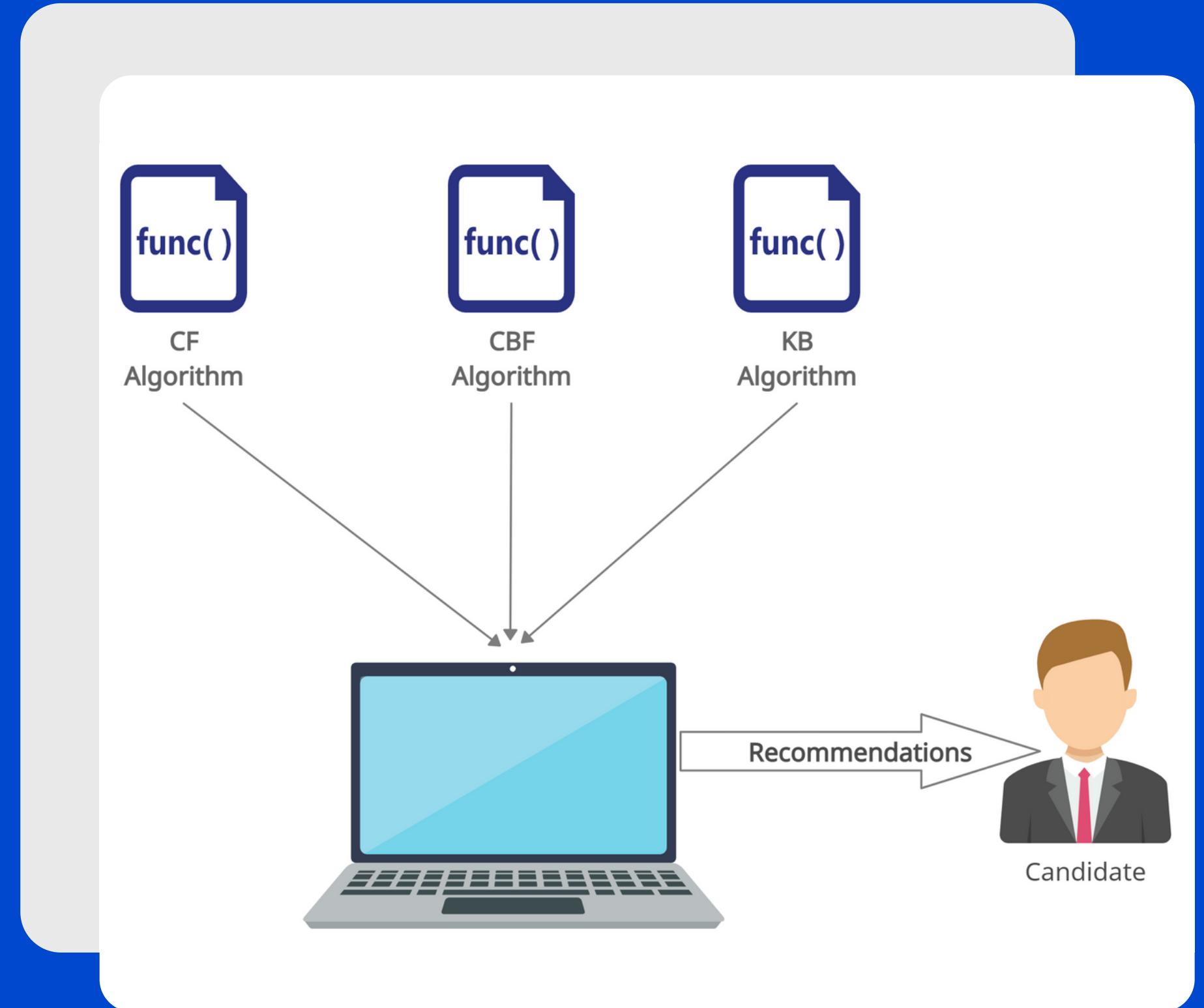
Advantage

- solves the problem of cold start



Hybrid Recommender

- mix of various techniques to override the drawback of the existing techniques.



Finding Similarity

1. Cosine Method

$$\text{similarity} = \cos(\theta) = \frac{A \cdot B}{\|A\| \|B\|} = \frac{\sum_{i=1}^n A_i B_i}{\sqrt{\sum_{i=1}^n A_i^2} \sqrt{\sum_{i=1}^n B_i^2}}$$

2. Euclidian distance Method

$$d(p, q) = \sqrt{\sum_{i=1}^n (q_i - p_i)^2}$$

Literature Survey

Boolean matching technique

- thousands of resumes are received by companies
- a huge volume of job descriptions and candidate resumes are available online
- a great opportunity for enhancing the matching quality
- this potential is unused
- Mainly restricted to boolean search Method



Literature Survey

- must consider unary attributes
- In this context, literature usually distinguishes between
 - a.person-job
 - b.person-team
 - c.person-organization fits
- still a challenging domain and a growing area of research
- Some of the existing systems
 - Hybrid job recommender System
 - A probabilistic hybrid approach
 - A proactive job recommender system
 - Content-based job recommender systems
 - Machine learned recommender system



Literature Survey

Hybrid job recommender systems

- A probabilistic hybrid approach
 - Uses content-based filtering and collaborative filtering
 - To improve the match between people and jobs
 - Recommending CVs that are similar to resumes previously selected by the recruiter for a specific job profile
 - that recommends jobs to candidates based on their preference profiles which are in turn based on previous preference ratings
- Limitations
 - cannot answer in rank wise



Literature Survey

Hybrid job recommender systems

- A proactive job recommender system
 - An adaptive system that attempts to integrate the idea of recommender systems.
 - Five components: web spider, ontology checker, profile analyzer, preference analyzer, and user interface generator
- Limitations
 - One way recommendation
 - Cold start problem



Literature Survey

Content-based job recommender systems

- Machine learned recommender system
 - supervised machine learning problem
 - recommend jobs based on their past job histories
 - characterized by a set of features
 - uses all past job transitions
 - to predict an employee's next job transition
- Limitations
 - sparsity and cold start could occur

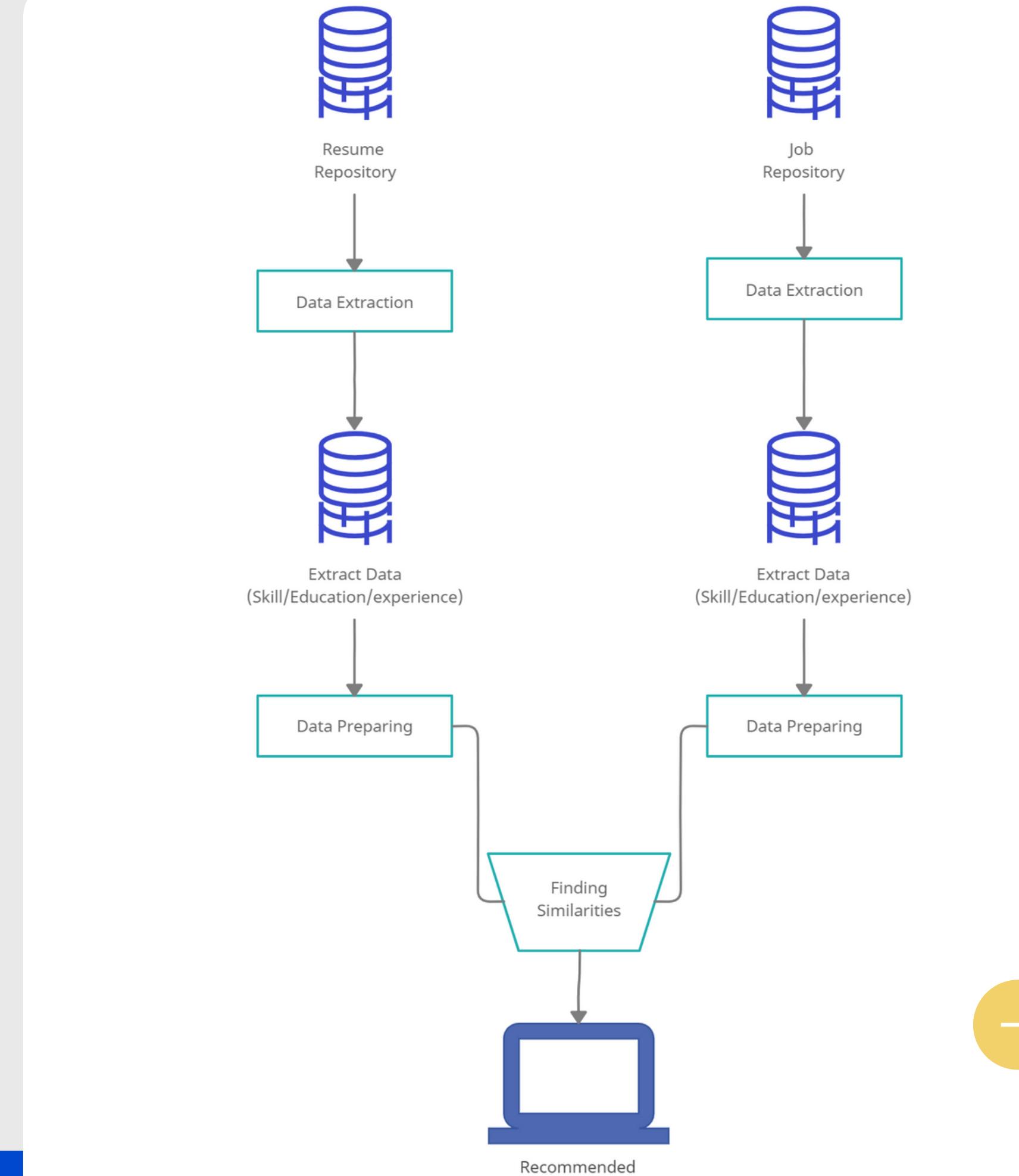


Proposed Work

- Decision support tool
- Extracting features of the candidate profile
- Use information retrieval techniques
- Ranking can be processed by adding filtering criteria
- The system consists of three main components:
 - Batch processor
 - Query processor
 - Resume matcher
- Reciprocal recommendation for recruitment
- Its process is divided into two parts
 - job recommendation and job-seeker recommendation
- The steps of reciprocal recommendation
 - a. user's preferences are extracted
 - b. similarity calculated
 - c. the recommendation is generated



Logical Development



Tools



python



jupyter

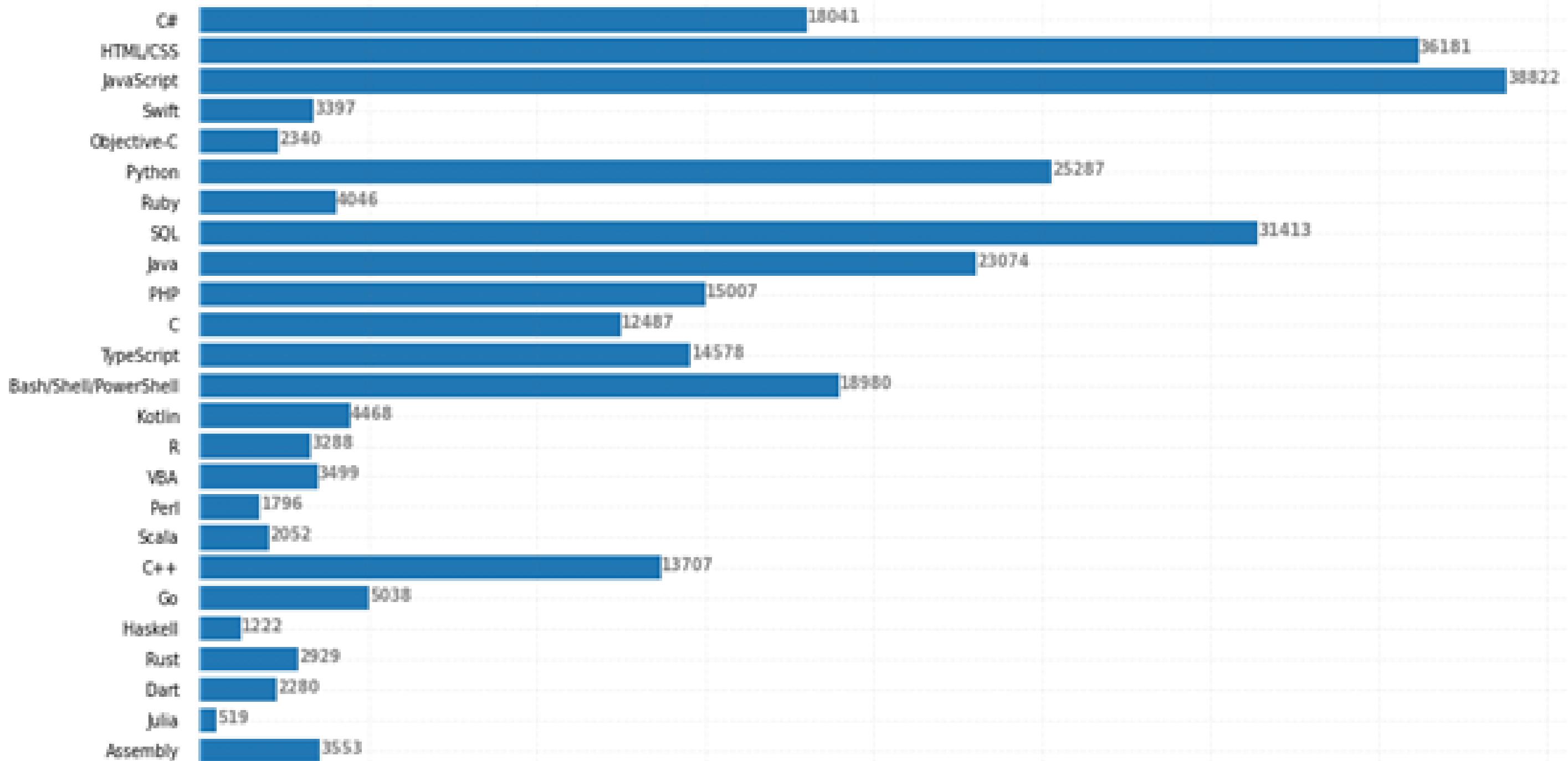


pandas

spaCy

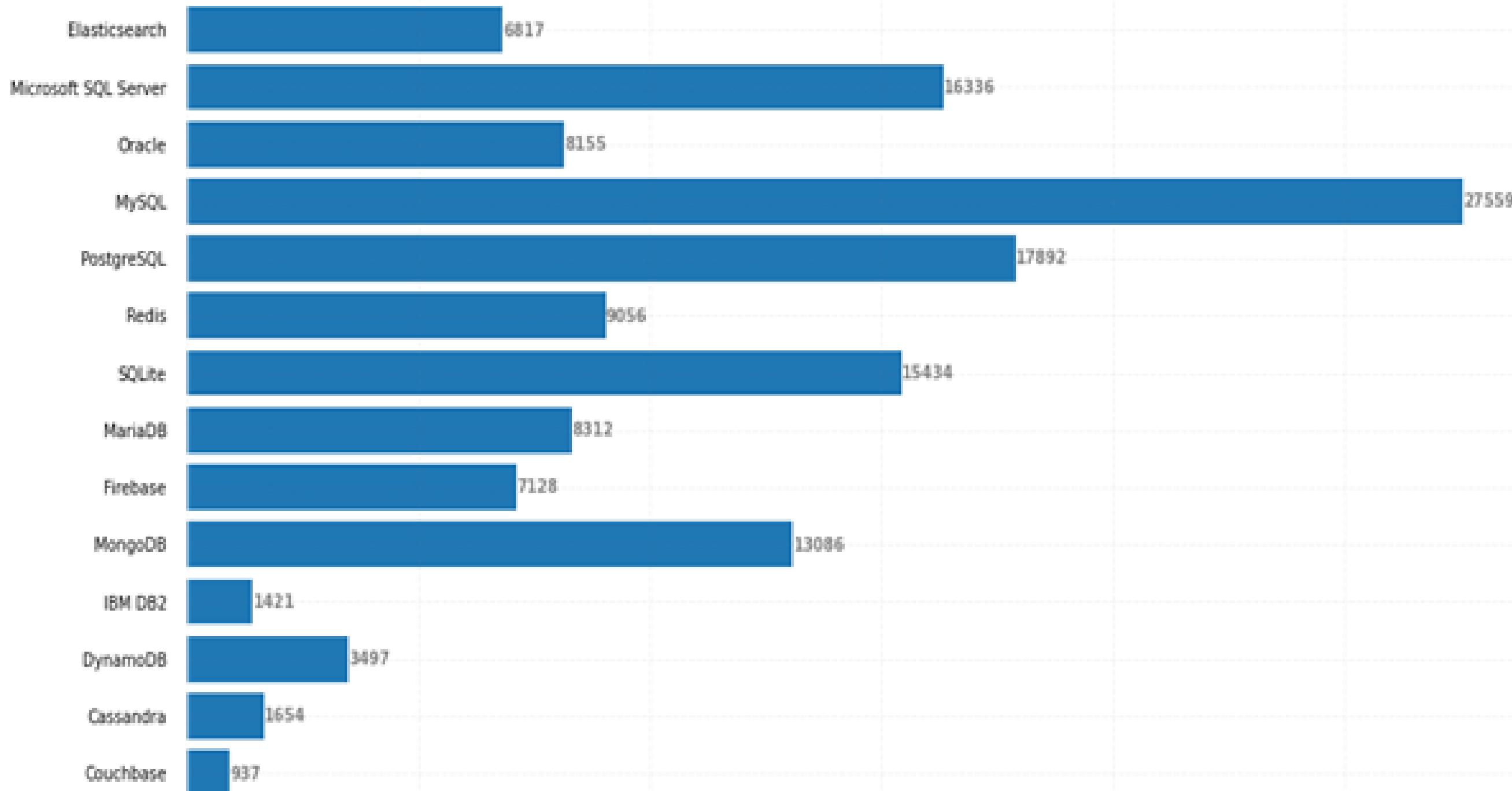
spaCy

Visualisation



Show number of Users who know particular Language

Visualisation



Show number of Users familiar with particular Database

Conclusion

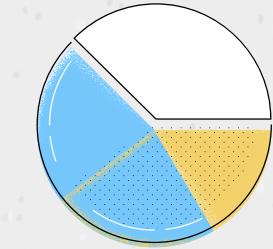
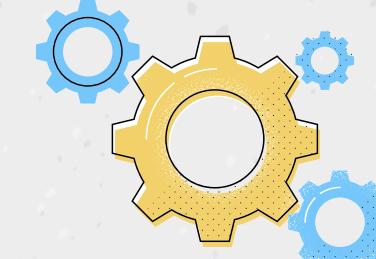
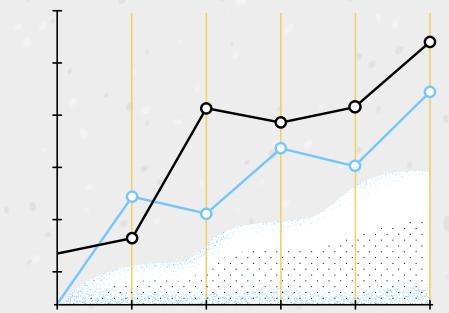
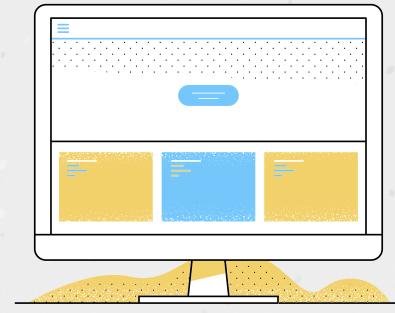
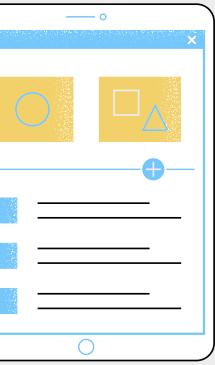
- Making automation of the resume matching process by using the various techniques for the data extraction from the given text or description and finding similarities between the job seeker's profile and job description

.....

Future Works

- After deciding which technique is better, we can implement the suitable best technique or the mix of techniques.
- Also keywords and data extraction can also be performed in future to gather data and build profiles for users or job.

.....



A big Thanks to Dr Sankita J Patel for giving us the opportunity and My Team-mates for their unparalleled and untiring efforts!

