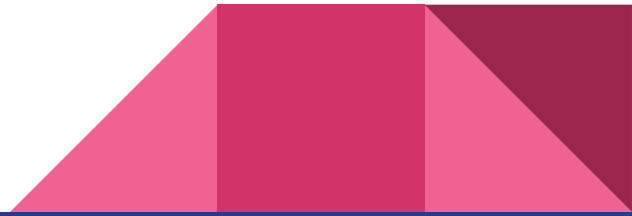
Job Recommender System

By: Winter Blue

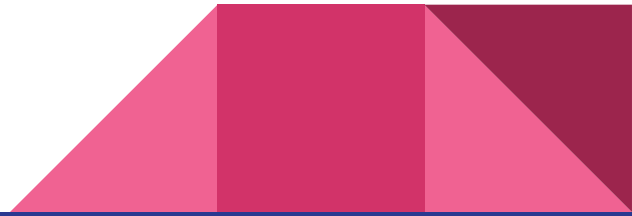
Problem Definition

Create a recommender system that can recommend jobs based on the resume. The system will go over the resume and then search different job descriptions that match the keywords on the resume.



Problem Motivation

- Make it easier for individuals to find jobs hiring based on their skills
- Reduce the complications in the job application process
- Introduce people to other disciplines that require their skillset



Data/Dataset Description

Data Source: Indeed

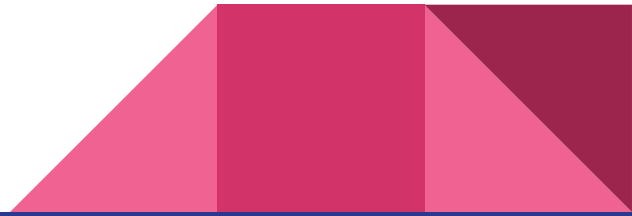
Key Information: company_name, role, location, salary_estimated, job_id, job_description,url

Filters applied:

1. Key words : data
2. Posted Date: 7 (Last 7 days)
3. Experience: Entry Level
4. Job Type: Full Time

Edge Case:

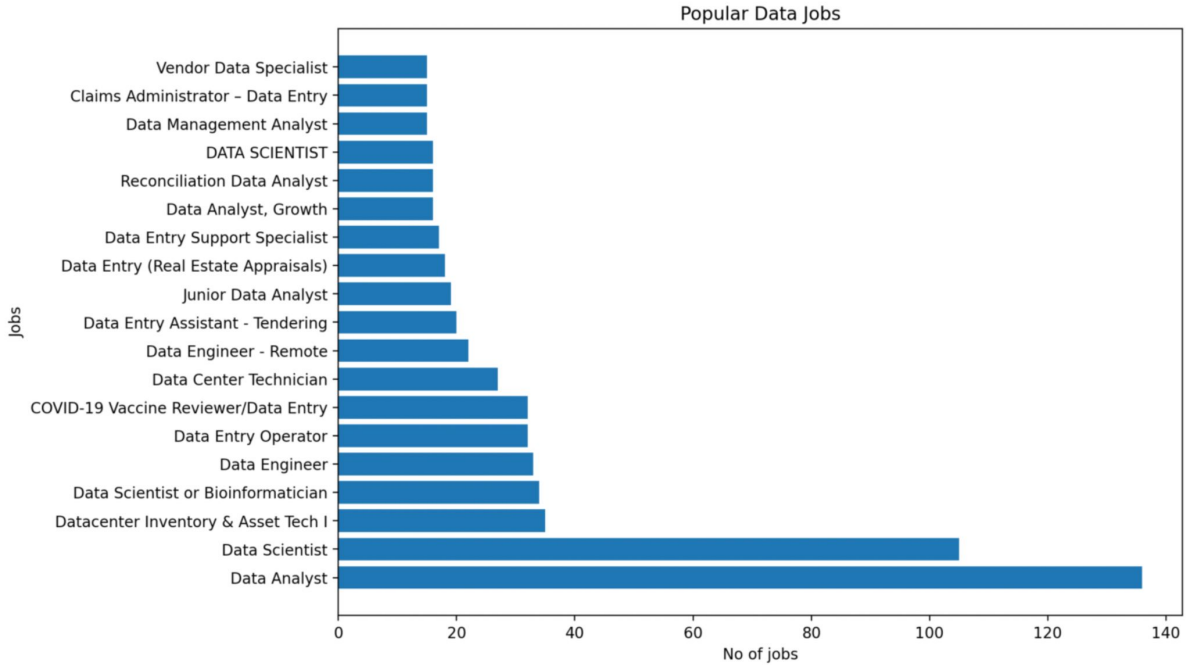
1. Jobs that are not relevant to data field: Discard data
2. Jobs without job description: Discard data



Data/Dataset Description


```
{
    "job_id": "job_cc6bd88852e668e7",
    "company_name": "Treehouse Technology Group",
    "role": "Data Engineer",
    "location": "Remote",
    "salary_estimated": "Estimated $97.3K - $123K a year",
    "job_description": "\nTreehouse Technology Group is strategy and data firm providing
    The ideal candidate has a combination of a business and technical experience and will
    data models and algorithms, and develop processes and tools to monitor production sys
    Visualizations, and/or Analytics\n Experience with Python\n Experience with 3rd party
    progress with in person events quarterly where we brainstorm, roadmap, and have fun t
    "url": "https://www.indeed.com/rc/clk?jk=cc6bd88852e668e7&fccid=3211509bc4d6c792&vjs=
},
```

EDA Results and Inferences



The most occuring jobs in the job data

Word clouds of Data analyst and Data scientist jobs

Data Analyst

Data Scientist

Current Model Choice

NLP(Natural language Processing) Model - Cosine similarity

1. Cleaning the job description data - removed unnecessary symbols and punctuations.
2. Stop word removal - removes words that occur commonly across all documents (ex. is, and, your, that, etc.). These words provide no unique information to the text. Stop words were removed for the job description.
3. Resume Parsing - extracts skills, experiences, degrees and company name from resume. This is used to extract skills from the resume which will be used to match the job description.
4. Vectorization using TF-IDF - assigns numerical values based on the word frequency in a document. This is applied to the keywords extracted from the resume.
5. Computing cosine similarities with TF-IDF values and selecting the jobs with highest scores.
6. Matching resume to job description - Cosine similarity model.

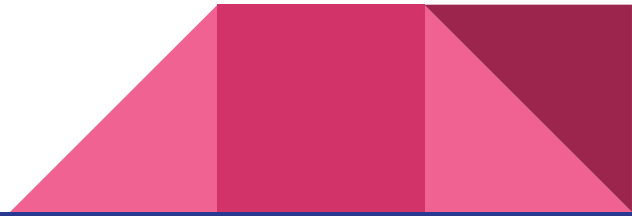
Current Model Choice

Justification:

- The **ATS(Applicant tracking system)** works by identifying the resumes that are relevant to the job description and assigns them to the similar job postings.
- We tried to develop a model which does the same and Cosine similarity model helps achieving this.
- Cosine similarity gives the scores which helps in comparing the similarity of the text data.
- We have compared the skills in the resume and compared them with job descriptions using Cosine similarity scores and selected the top 10 scores indicating the 10 most relevant jobs.

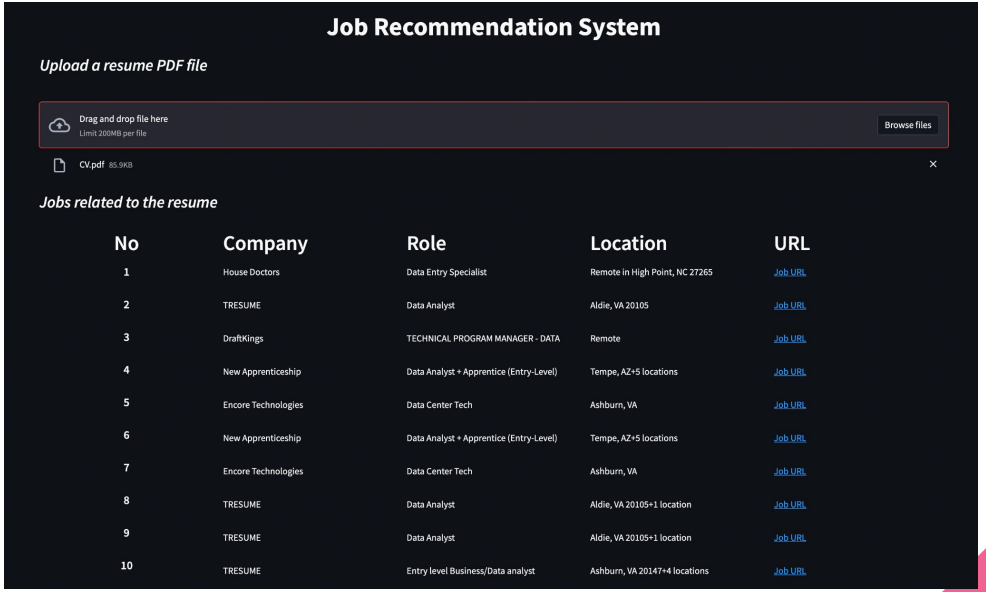
Final Analysis Plans

1. A web scraping program that fetch new job post from **Indeed** daily
2. Allows users to upload resume as PDF format
3. Chooses 10 jobs most relevant to the resume from S3 data lake
4. Each of the jobs will have the similar metric - Cosine Similarity score
5. Each of the jobs that are showed in the web page will have URL that can take users to application website



Current Output & Expected Final Output

Top 10 relevant jobs along with their details and an job posting URL, to the uploaded resume based on the skills mentioned in it.



No	Company	Role	Location	URL
1	House Doctors	Data Entry Specialist	Remote in High Point, NC 27265	Job URL
2	TRESUME	Data Analyst	Aldie, VA 20105	Job URL
3	DraftKings	TECHNICAL PROGRAM MANAGER - DATA	Remote	Job URL
4	New Apprenticeship	Data Analyst + Apprentice (Entry-Level)	Tempe, AZ+5 locations	Job URL
5	Encore Technologies	Data Center Tech	Ashburn, VA	Job URL
6	New Apprenticeship	Data Analyst + Apprentice (Entry-Level)	Tempe, AZ+5 locations	Job URL
7	Encore Technologies	Data Center Tech	Ashburn, VA	Job URL
8	TRESUME	Data Analyst	Aldie, VA 20105+1 location	Job URL
9	TRESUME	Data Analyst	Aldie, VA 20105+1 location	Job URL
10	TRESUME	Entry level Business/Data analyst	Ashburn, VA 20147+4 locations	Job URL

Current Progress

Job scraping - Shun An Chang, Harsh Nisar, Hemanth Talla

Overall Description:
Create a robust scheduled web scraping program that can get job information and store them in cloud base data lake

Progress:

- Completed the web scraper for Indeed job board
- Deployed the scraper on cloud through AWS Lambda (Stored the data to S3)
- Created S3 API for the web application to access the job data

Current Progress

Model - Chidubem Okorozo, Saad Azim, Vaibhav Patel

Overall Description:

Create a model to produce matching metric from user's resume and job description

Progress:

- Removing stop words in job description and extracting keywords from resume
- TF-IDF vectorization of skills extracted from resume
- Matching skills in resume to job descriptions using KNN method

Current Progress

Dashboard - Bhargav Singuluri, Sravani Dulipalla

Overall Description:

Create a Web based Dashboard allow user to interact such as uploading resume and show users the most relative jobs for them based on their resume and EDA.

Progress:

- Created a webapp with streamlit for the WIP1 presentation with EDA(Exploratory data analysis) with preprocessed data.
- Integrated resume parser into the webapp to extract skills from the pdf resume file.
- Automated the integration of web scraped data into the model and EDA.
- Developed a new cosine similarity model and deployed it on webapp.
- Worked on the visual presentation of results in the webapp.

Roles & Responsibilities

Team leader: Shun An Chang
Responsibility:

- Organize the team and host the meeting
- Make sure every task done before the due date.

Team Secretary: Chidubem Okorozo
Responsibilities:

- Take notes for every meeting
- Record attendance of every meeting

Team Git manager: Sravani Dulipalla
Responsibilities:

- Manage the Git Repository
- Make sure every team member use the git properly

Team Task manager: Hemanth Talla
Responsibilities:

- Make sure every team member finish their task on time.
- Make sure every subgroup to use the task board properly.

Roles & Responsibilities - Task Completed

Job scraping

- Completed the web scraper for **Indeed** job board – Shun An Chang
- Deployed the scraper on cloud through **AWS Lambda** (Stored the data to **S3**) – Shun An Chang
- Created S3 API for the web application to access the job data – Shun An Chang

Model

- Stop words removal and resume parser - Chidubem
- Ngrams and TF-IDF vectorization - Saad
- Matching skills in resume to job descriptions using KNN method - Vaibhav

Dashboard

- Created a webapp with streamlit for the WIP1 presentation with EDA with preprocessed data - Bhargav Singuluri
- Integrated resume parser into the webapp to extract skills from the pdf resume file - Sravani Dulipalla
- Automated the integration of web scraped data into the model and EDA - Bhargav Singuluri
- Developed a new cosine similarity model and deployed it on webapp - Bhargav, Sravani
- Worked on the visual presentation of results in the webapp - Bhargav, Sravani

Challenges

- Setting up chrome drivers
- Deploy the application on cloud based environment.
- Resume parsing - config file error with spacy
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