

# THE JOB-HUNTING ARTIFICIAL INTELLIGENCE WEB TOOL

Use AI to obtain personalized, relevant job recommendations tailored to your unique mix of skills, experience and education.

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## DESCRIPTION

Job searching can be difficult and time consuming. This project deploys a job search website that receives user input – industry, years of experience, city, relevant skills, academic credentials, and free-text user input – and returns AI matched job recommendations. The user can also browse the entire job catalog, or filter and view based on job category.

## FEATURES

- AI/Machine Learning** – user input and job descriptions are broken down into small text chunks called tokens, which are then converted into vectors through a process called Term Frequency-Inverse Document Frequency (TF-IDF). This process observes the frequency of words in a text body and assigns a higher vector value to more frequent words. This application uses the Scikit-learn open-source ML library TF-IDF functions to rank jobs based on user input.
- Text Preprocessing** – removes common words, capitalization, punctuation and other “noise” to ensure high quality input is entered into AI/ML processing.
- Reactjs Frontend** – sleek user interface utilizing autocomplete, dropdown menus, multiple-selection and freeform user text entry. Utilizes light and dark mode.
- Flask Backend** – manages traffic between user input form, AI/ML model, results page, browse page and sqlite jobs database.
- Google Cloud App Engine** – hosts frontend and backend of website on world-wide web.

## USER INTERFACE

Home page allows user to enter professional information the AI/ML model will use to recommend jobs.

“Tell us about yourself” adds words that AI/ML model will use to select most relevant jobs.

Other UI selections include ability to browse all jobs in filtered or unfiltered state. Additionally, user can choose between light and dark mode.

Autocomplete function and multi-chips selection assists user in entering relevant skills.

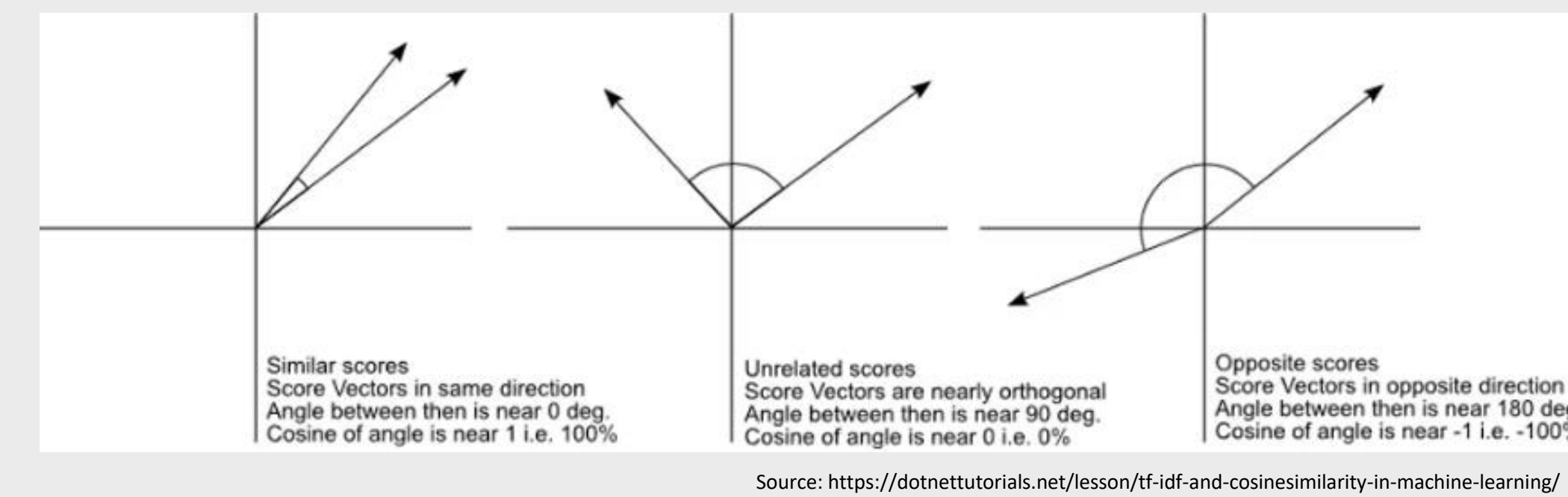
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## AI/ML HIGH-LEVEL PROCESS OVERVIEW



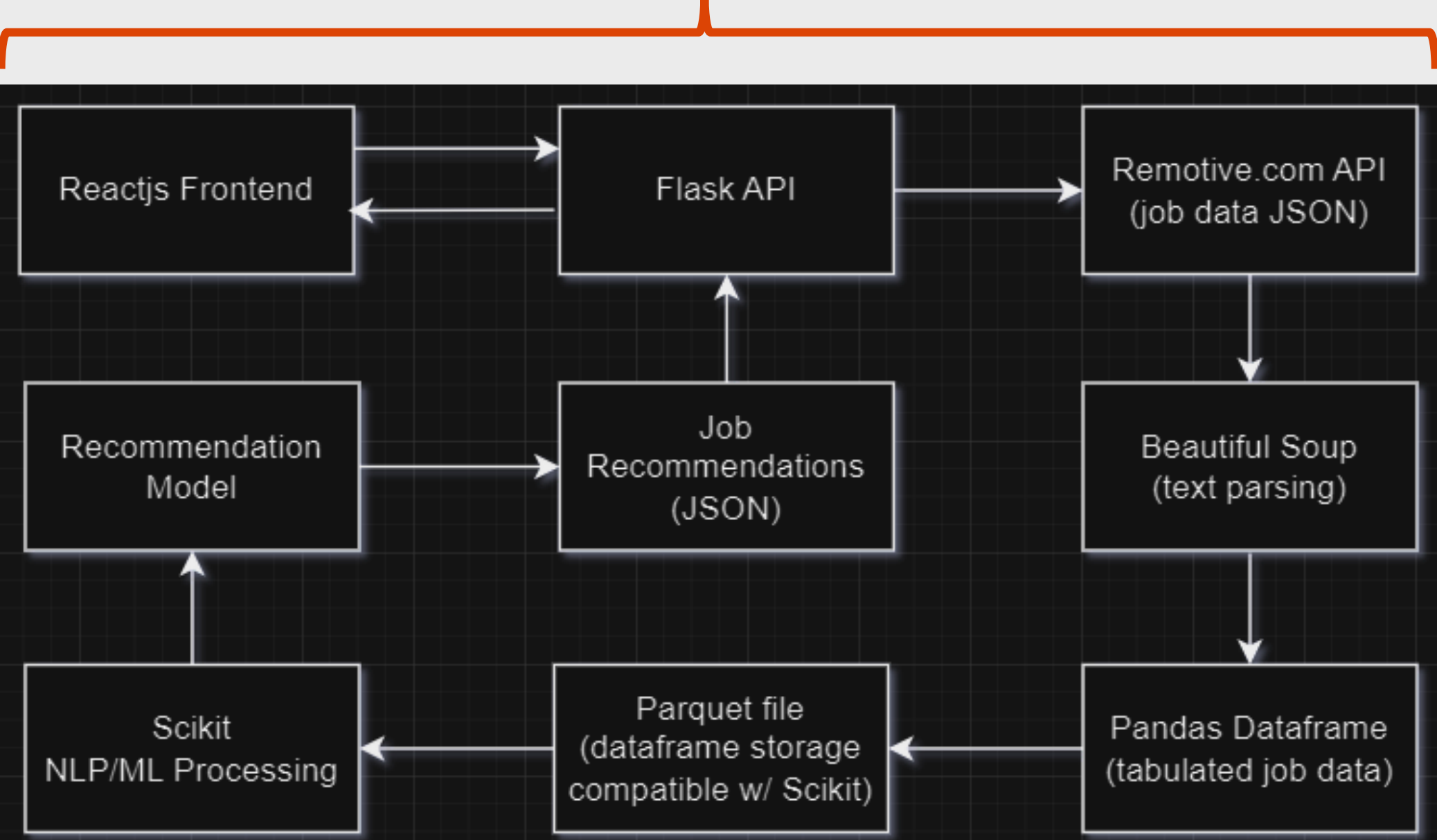
- Cosine Similarity** – method to determine how similar two vectors are. Performed by dividing the dot product of (2) vectors by the magnitude of each. Result is between -1 and 1. Cosine similarity close to 1 are very similar. In relation to this application, the vectors are the user input and a job description.

$$\text{Cosine Similarity} = \frac{\mathbf{A} \cdot \mathbf{B}}{\|\mathbf{A}\| \|\mathbf{B}\|}$$

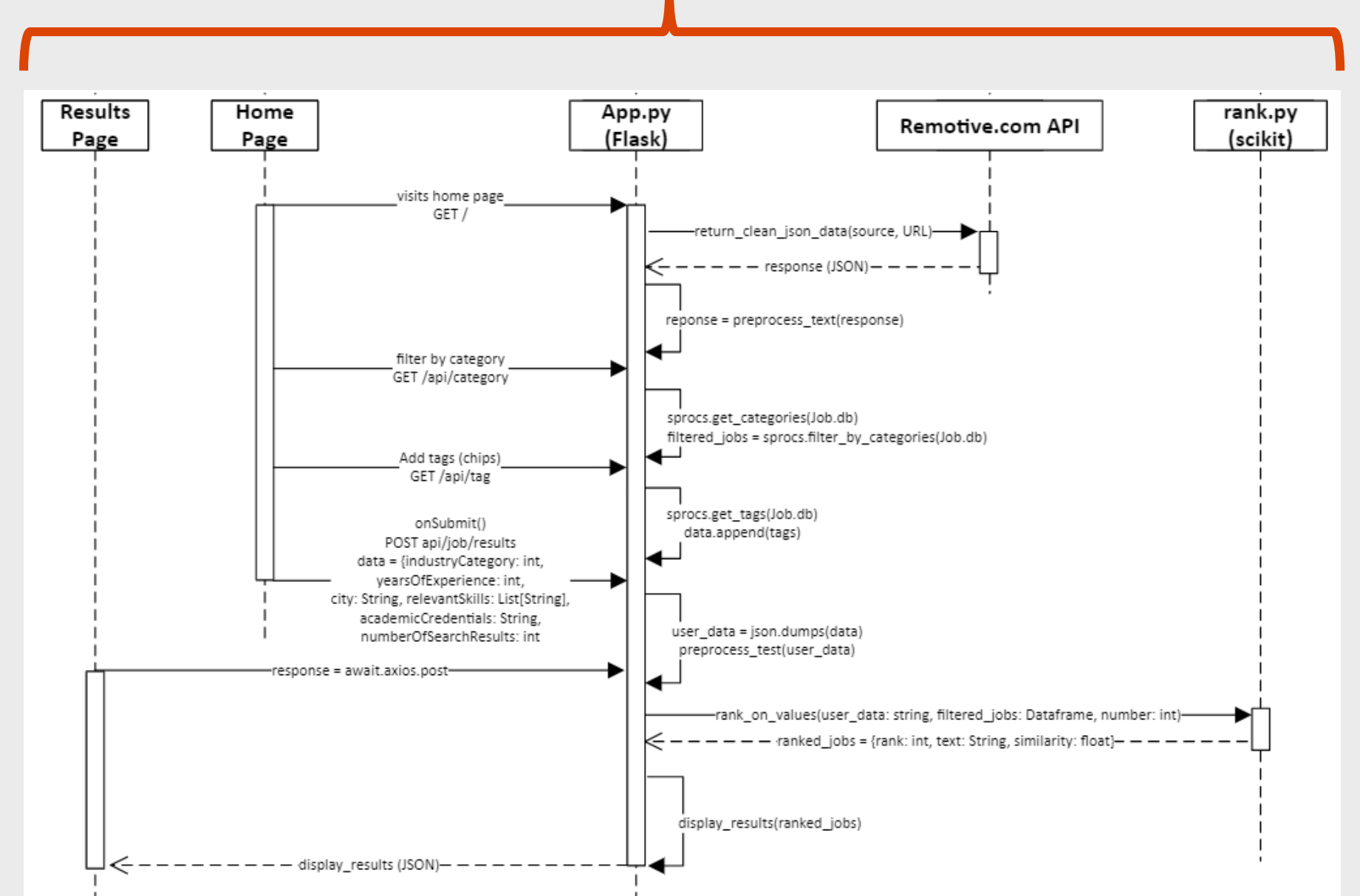


## SOFTWARE ARCHITECTURE & DESIGN

Entity Relationship Diagram (ERD) shows how the combination of technologies and libraries are called to perform the job recommendation process.



Unified Modeling Language (UML) diagram shows contracts and calls between each major component.



## SOFTWARE CODE & IMPLEMENTATION

Folder structure

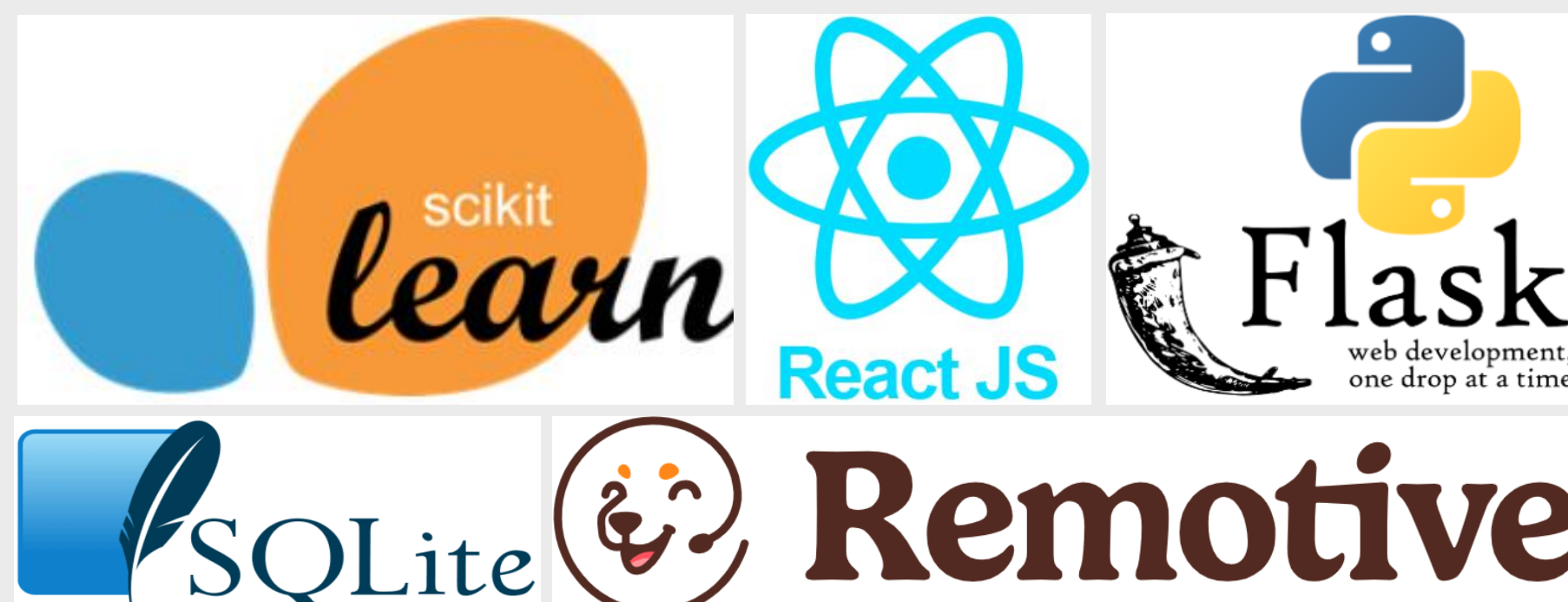
Reactjs Frontend User Input Form

Flask Backend Application

Text Preprocessing Python Script

SQLite Database Management

TF-IDF Vectorization Python Script



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