CS 410 Presentation

YELP Review Text Extraction
Team NVK
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Project Goal/Motivation

- To provide the users an option to see the most essential information from Google Maps/YELP business reviews and analyze them by positive and negative items.
- Use different text information algorithms and sentiment analysis and showcase the skills learned in the class
- To build a full system that uses the algorithms and gives them a specific use case, rather than just leaving the question of its purpose more open-ended

Text Keyword Extraction Algorithm

- Read papers on Common Keyword Extraction Techniques: (TextRank and RAKE)
  - RAKE: uses observation that keywords frequently contain multiple words but rarely contain standard punctuation or stop words, such as the function words and, the, and of , or other words with minimal lexical meaning
  - RAKE Research Paper Link.
- Implemented the Rapid Automatic Keyword Extraction (RAKE)Algorithm
  - Uses implementation
  - Utilizing functionalities in SPACY such as tokenizing and stop words
  - Tested function on reviews, made sure that relevant words were being outputted along with their importance score
- Brief Explanation of the Algorithm
  - When given any text, this algorithm uses the idea that that keywords frequently contain multiple words but rarely contain standard punctuation or stop words. In the code within that file, we are delimiting the input text by stop words and punctuation and combining adjacent words into phrases. Then we are creating an 2-D adjacency graph and mapping how often and with what other words does a specific word in the text share the same phrase with. The score of degree(word)/count(word) is summed across all words in a phrase, and the phrases with the highest scores highlight the most important parts of the text.

Text Sentiment Model

- We used VADER sentiment classifier which a module from the nltk library
- The module does not use any training or pre-processing and assigns a score how positive, negative or neutral a text is from a scale from 0 to 1.
- Module works by parsing word by word and then evaluates the sentiment of each word.
    - Module takes into account negations, idioms, and uses of words such as ‘but’ and ‘whereas’
- We pass in the extracted keywords and evaluate each of the sentiments

Flask-APP Architecture

- Goal:
  - Create a simple API
  - The API accepts the id of a Google Maps place as an input
  - The API uses the two algorithms described before on all the reviews retrieved from Google Maps
  - The API returns a JSON which contains the keywords from the reviews, their importance, and their sentiment.
  - Make the API available to our React application
- Use the UI to access the API in a human readable fashion
- Or use regular HTTP requests to get simple answers

Self-Evaluation

- Have you completed what you have planned? Have you got the expected outcome? If not, discuss why.
  - We weren't able to use the Yelp API and had to switch to Google Maps Review API instead.
  - We successfully implemented the keyword extraction algorithm that works very well.
  - We ran into technical difficulties when implementing the sentiment analysis model, which didn't give us enough time to finish it. We included all we have so far for this algorithm. We also substituted it with a pretrained model to use inside of our API.
  - We successfully created an API and a UI to expose our methods for the intended use-case.
  - **We have completed what we planned to do.**
  - **We got the desired overall result, though there's a good room for improvement.**

Prerequisites

- A Python 3.8 or 3.9 environment
- Conda v4.10.3 or later
  - Our team used Anaconda environment to run the application, may not be necessary for you
- Node.js v16.17.0 or similar
- Cloned github repo: https://github.com/nikhilk7153/NVK-Final-Project

Set Up Python Environment

1. Create conda environment `conda create --name test python=3.9`
2. Activate conda environment `conda activate test`
3. Open the Python folder inside of the project folder
4. Run the `pip install -r requirements.txt` command to install the required modules
5. Run the `python -m flask run` command to run the API application

Set up Node.js Environment

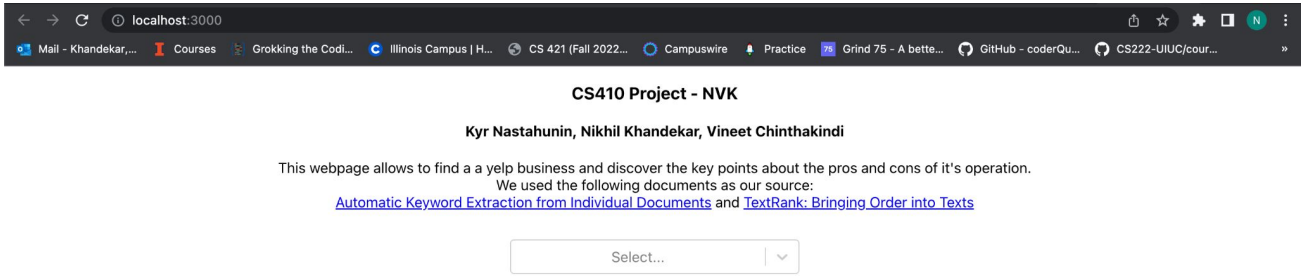
1. Open the js-ui folder inside the project folder
2. Run the ‘npm install’ command
3. Run the ‘npm start’ command and then the webpage will open automatically in the browser (this may take a minute)
4. If the app starts and the page doesn’t open you can open it by opening http://localhost:3000/ in the browser

How to Run

- Using the UI
  - Run the `python -m flask run` command from the Python folder to run the API application
  - Run the `npm start` command from the js-ui folder to run the UI application (this may take some time)
  - Open http://localhost:3000/ in your browser
- Using HTTP requests
  - Run the `python -m flask run` command from the Python folder to run the API application
  - Enter http://localhost:5000/api/keywords/ChIJ4Vrk3Bo3DogRpHfXxy0yu98 as a URL
  - You can change the ID at the end of the request to a different Google Place ID. The IDs can be found on this web page: https://developers.google.com/maps/documentation/places/web-service/place-id

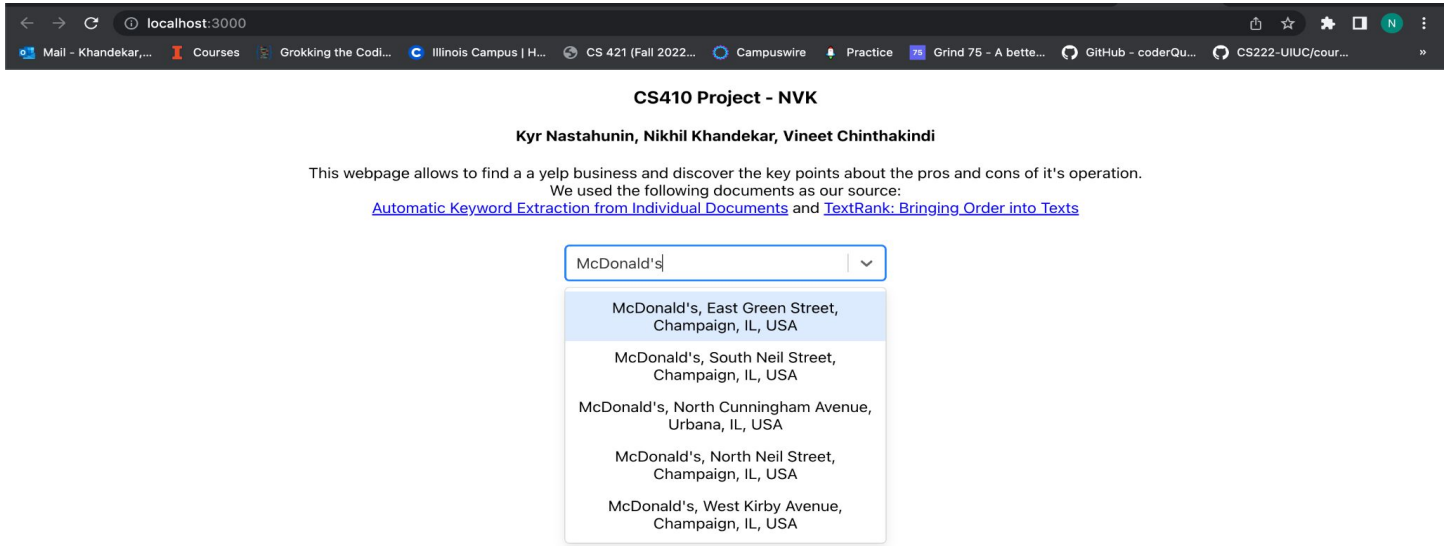
Webpage at the beginning

- Upon starting the page, you will see the following page:
-



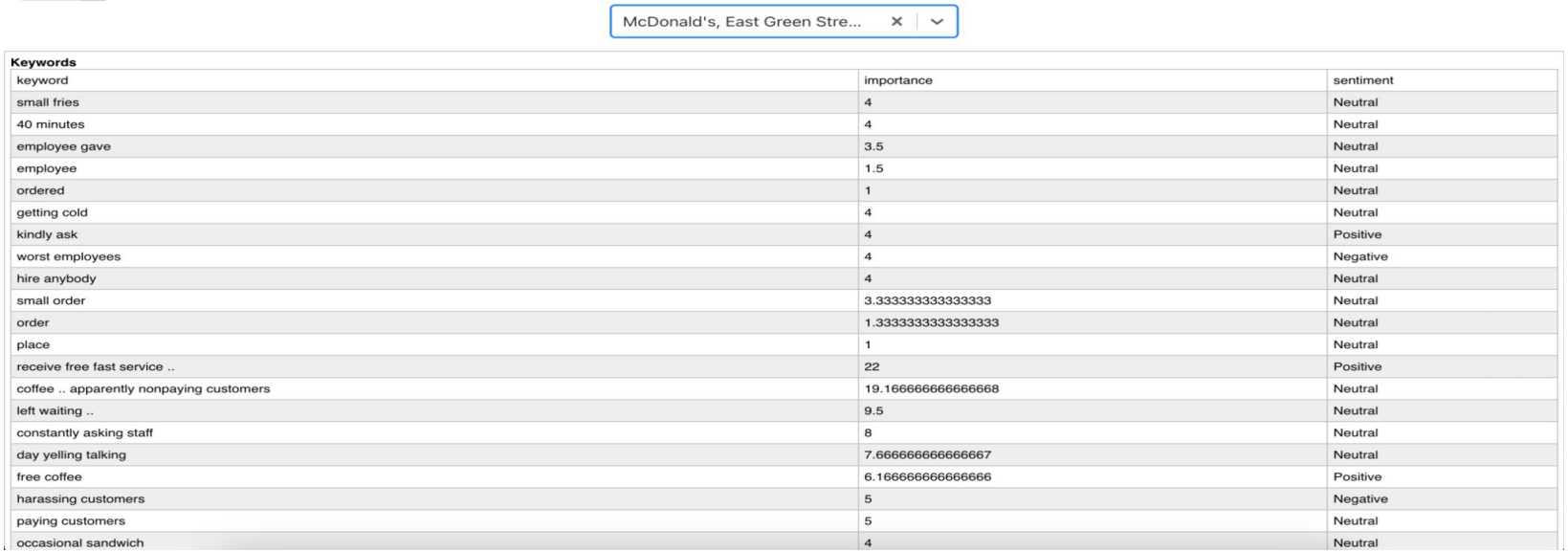
Supply Input

- Type in the name of a restaurant and it will show up if there is a Yelp Review Available from the Yelp API and click on it



Obtain Output

You can obtain the output of a review and see the importance of the extracted key words along with the classified sentiment



Keywords

keyword	importance	sentiment
small fries	4	Neutral
40 minutes	4	Neutral
employee gave	3.5	Neutral
employee	1.5	Neutral
ordered	1	Neutral
getting cold	4	Neutral
kindly ask	4	Positive
worst employees	4	Negative
hire anybody	4	Neutral
small order	3.333333333333333	Neutral
order	1.3333333333333333	Neutral
place	1	Neutral
receive free fast service ..	22	Positive
coffee .. apparently nonpaying customers	19.166666666666668	Neutral
left waiting ..	9.5	Neutral
constantly asking staff	8	Neutral
day yelling talking	7.666666666666667	Neutral
free coffee	6.166666666666666	Positive
harassing customers	5	Negative
paying customers	5	Neutral
occasional sandwich	4	Neutral

Original reviews:

- "Horrible! We ordered a small fries and nuggets. That’s it and we were waiting for 40 minutes. When we asked the employee (nicely might I added) about the order the employee gave us an attitude and argued."
- This place has the worst employees I guess they just hire anybody. You’ll be waiting an hour for a small order and sometimes the order will be just sitting there getting cold and if you kindly ask about your order after they’ve seen you standing there for an hour and ignoring you they’ll get mad at you, yell at you, and refuse to help you. This place is wild idk where they find these people.

Real Time- Demo