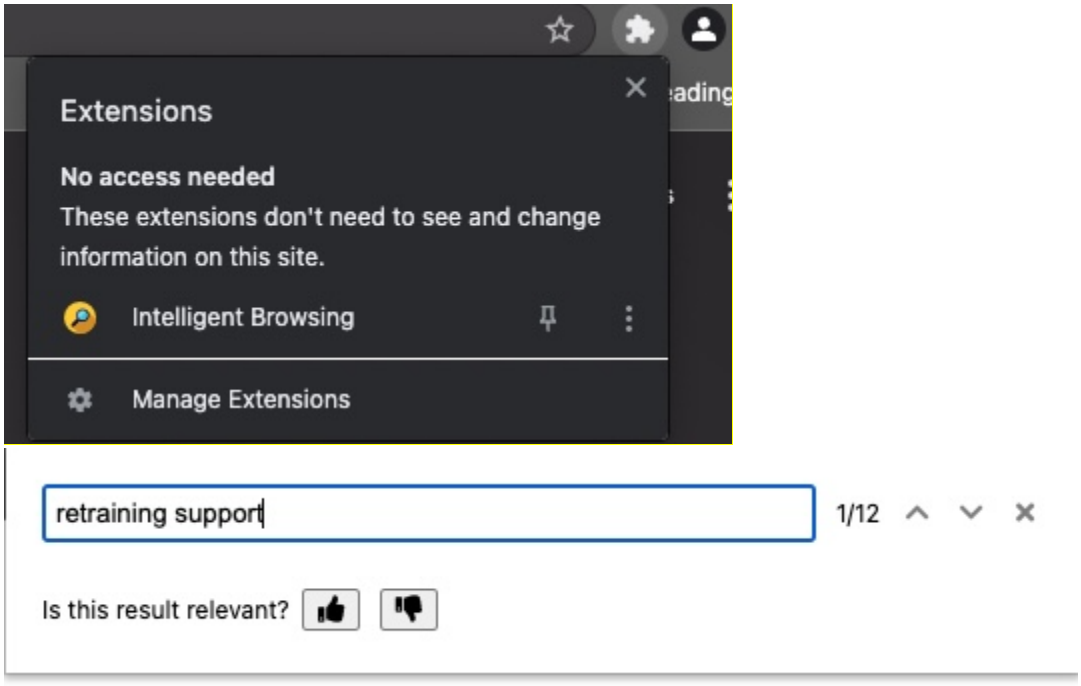
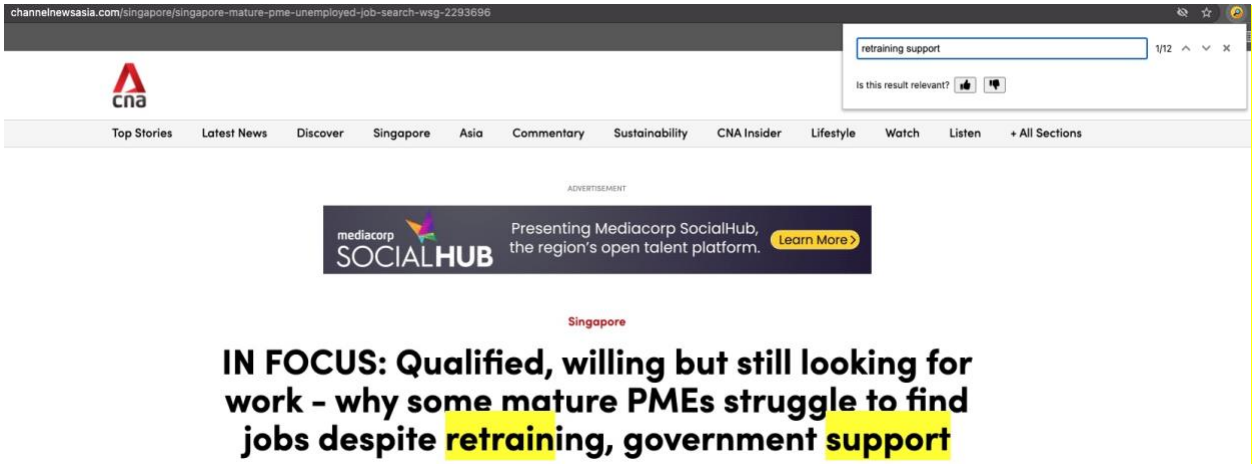
# CS410 Project Progress Report – Browser Extension for Intelligent Query Matching

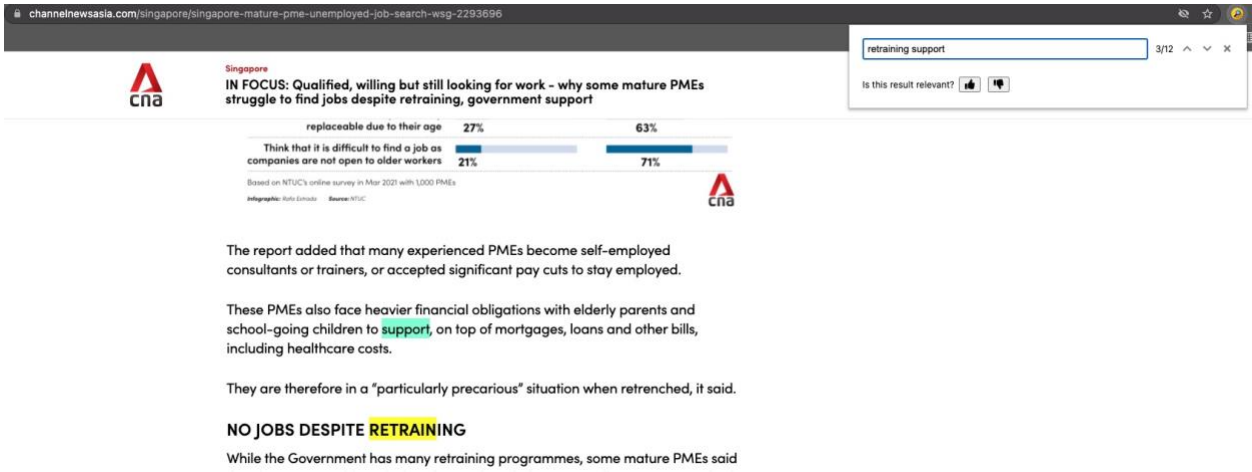

| Marcus Hwai Yik Tan (leader) | Omid Afshar | Xue Ying Lin |
|---|---|---|
| htan8 | oafshar2 | xylin2 |


**Progress Update**

- Implemented the following for the frontend (Chrome extension)
    - Grab text nodes from webpage
    - Get query from user
    - Send http request to server with query and text nodes
    - Receive http response from the backend with matches and find the relevant sentences. Highlight words contributing to the match in a sentence
    - Order results by their ranking provided by the backend
    - Add next / prev buttons to navigate between result
    - Like/dislike buttons have been added to the extension pop-up, allowing a user to indicate whether a particular result returned by the extension for the query issued is relevant or not. This feature enables us to obtain relevance feedback to conduct measurements on how useful our extension is.






- Implemented the following for the backend (Python Flask and Gensim packages)
    - Receive text nodes from frontend and split them into sentences, each sentence corresponding to a document for ranking
    - Create a mapping from sentences to text nodes
    - Tokenize the query and the sentences, i.e., separate them into lists of words. Remove punctuations and special characters, make the words lower case and stem the words in the process
    - Create bag of words representations of the query and sentences
    - Use BM25 to rank the sentences
    - Find words in each ranked sentence that are matching the query words
    - Return results containing the text node indices and the relative locations of the ranked sentences and the matching words in relevant text nodes
    - We began implementing the backend logic to keep track of the relevance feedback issued for search queries. This logic keeps track of the document and corresponding search query issued on the document to log the user's relevance judgments for each result item issued by our application for the query. This log of relevance judgments can be later used to assess the overall utility of our application.

**Remaining Tasks**

- In order to better assess the performance of our extension, we want to surface an option for the user to toggle between conducting an exact match or BM25 ranking search. We will potentially add more ranking options as well.
- We will complete the implementation for recording user relevance judgements on the backend. As mentioned previously, each user's judgment will be logged with the following information: website, query, result_ranking, relevance judgement (i.e. relevant or non-relevant).
- Calculate MAP
- Remove text nodes that are invisible in the browser

**Challenges/Issues**

- Setting up the frontend with limited and obsolete online documentations and templates. Templates for older versions of the extensions no longer work with current extension (Manifest 3.0)
- Highlighting sentences with different ranks in each text node should be done in a *single pass* since previous highlighting would be removed in the next pass
- Text nodes that are invisible on screen but are sent to the backend. Results that include parts of the invisible text nodes will show up as one of the results in the search bar but not in the webpage
- Highlighting is challenging since it involves inserting spans into the text nodes at the correct locations and changing the spans as the user goes over the results with next/previous button
- Figuring out what information needed to be included in network requests from the frontend to the backend to ensure that user relevance judgments would be grouped together properly was non-trivial. Initially, we considered generating a unique ID with each user "session", but since this would reset each time the user closed and re-opened the extension, we opted instead to rely on the website and search query as the basis of a "session".
- Lack of prior experience using Flask to receive and send information to the frontend. For example, figuring out how to use app.route function of Flask to communicate with the frontend
- Figuring out proper way to parse and rank documents with gensim when documentation is incomplete and scattered

**Feedbacks from Reviewers**

- Feedbacks were lost when we uploaded the progress report to CMT. Here are the feedbacks that we remember of our heads
- Meta-reviewer
    - Another group is working on ranking of job-posting. Maybe you can talk to them to split the tasks
    - Answer: the workload for our group is just right and we are handling it well
- Reviewer 2
    - Describe data structures used

- Answer:  different types of data structures have been used such as array and list. The json data format is used to pass data between the frontend and the backend. It is best to look at the code when it is ready.