EE322 Engineering Design IV

Assignment 6

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Automatic Keywords Extraction

Section 1

Summary of Assignments:

Yuanpei Zhang – Algorithm and its implementation in C Language; Connecting C code with JavaScript

Xin Li – Google Chrome® extension development with JavaScript

	Member 1 name	Member 2 name
Percentage of effort towards this assignment	50%	50%

Section 2

Our project is a Google Chrome extension application which can automatically extract the keywords of selected text segments on websites for its users. This project consists of two major parts: the algorithm and the development of Google Chrome® extension. However, since the core algorithm is intended to be programed with C Language, and the Chrome® extension development tool is JavaScript, we need to consider the problem of connecting the fundamental functions programed by C to the user interface programed by JavaScript.

- Keywords extraction algorithm – TF-IDF

  TF-IDF, short for term frequency-inverse document frequency, is a numerical statistic that is intended to reflect how important a word is to a document in a collection or corpus. It is often used as a weighting factor in information retrieval and text mining. The TF-IDF value increases proportionally to the number of times a word appears in the document, but is offset by the frequency of the

word in the corpus, which helps to control for the fact that some words are generally more common than others.

Our project utilizes the algorithm of TF-IDF. By calculating the offset of each word in the selected text segment from the corpus, the program can determine the most important words that feature the major content of the text.

The program implements TF-IDF as described above by C language. The free c code library Bag-Of-Words contains the necessary sources to implements the TF-IDF. Specifically, the library contains the source files providing the basic implementation of weight-setting and scoring, which are essential techniques in TF-IDF.

- Google Chrome® extension development

  For out project, we will be utilizing the Google Chrome® as our operating platform. Chrome® extensions allow users to add functionality to Chrome® without diving deeply into native code. The extension can be developed with the common web development: HTML, CSS, and JavaScript.

  Chrome® extensions are zipped bundle of files – HTML, CCS, JavaScript, images, etc. – that adds functionality to the Google Chrome® browser. Extensions are essentially web pages, and they can use all the APIs that the browser provides to web pages, from XMLHttpRequest to JSON to HTML5.

- Connecting C to JavaScript

  The project we intend to do is an extension program that is able capture selected text on any website and automatically find out the keywords featuring the major content of the text. Therefore, one essential technique is to capture the selected text and send it to the core function programed by C that extracts the keywords from the texts.

  Since JavaScript runs at a completely different environment which is separated from the webserver by a HTTP connection, the best way to run the core function programed with C Language in JavaScript is to fire a HTTP request to the serve side on a specific URL which has the C code attached.

Section 3

1. Realistic constraints
   a) Economic

      The team managed to minimize to cost of the product. Basically the most expensive part is the software needed to program the application, which may cost hundreds of dollars depending on the type. However, once the programed is developed, this cost will not be a problem since it will be averaged out by the selling price.
   b) Environmental

      The product is environmentally friendly since the end product is a software application which does not contain any parts contaminating the environment or jeopardize human health.
   c) Health and safety

      As stated above, the product is unlikely to threaten human health.
   d) Manufacturability

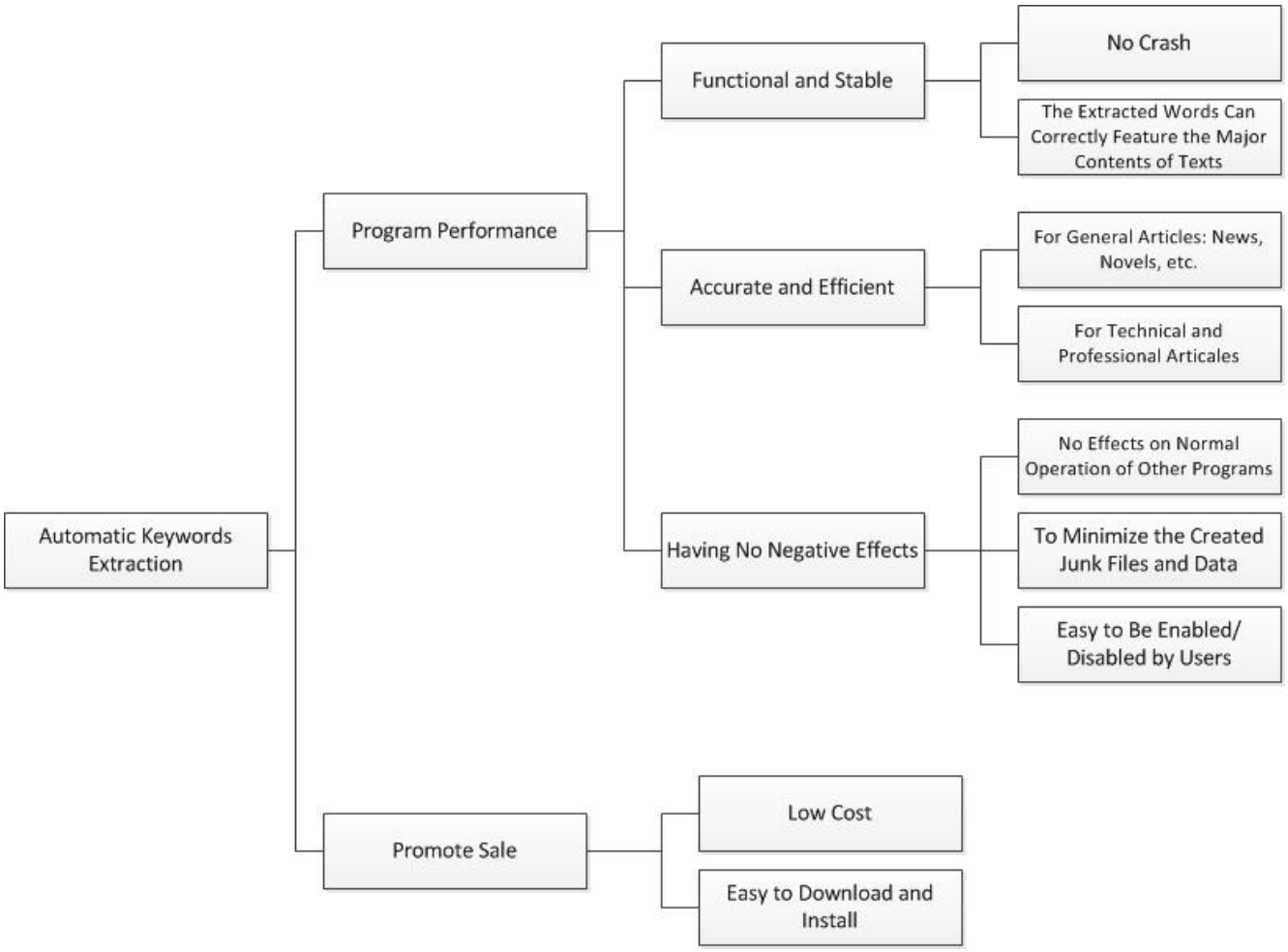
      Since the end product is a downloadable supplication, it faces no problem of manufacturability. It may take the team some efforts to develop a Chrome® extension and to implement the automatic keywords extraction algorithm. However, when this product enters into business, the only problem is to sustain and to keep updating.
   e) Sustainability

      Since the end product is a software program which is non-destructible, we assume that the product can sustain a long life. However, the product need to be frequently updated as most software programs do to fix potential bugs and to improve its performance.

Section 4

- To create a Google Chrome® extension that is convenient to use for extracting keywords from selected text segments
- A functional and stable program for internet users to save time in browsing websites
- Being accurate and efficient
- Being easy to operate for users
- To minimize the negative effects on regular operation of other programs
- To bring innovation to a field in the midst of a technological standstill

Objective Tree



Reference

http://www.cs.cmu.edu/afs/cs/project/theo-11/www/naive-bayes/bow_diff/tfidf.c

http://developer.chrome.com/extensions/index

http://stackoverflow.com/questions/2626859/chrome-extension-how-to-capture-selected-text-and-send-to-a-web-service

http://stackoverflow.com/questions/2796472/connecting-c-backend-to-javascript