NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

Hierarchical Topic Detection from Text Data
Final Year Project Plan

31st August 2017

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1 INTRODUCTION

1.1 PROJECT OBJECTIVES

This project aims to study the concept of hierarchical topic detection from text data. An effective algorithm needs to be designed and implemented after comparing different approaches. Web Crawler and website API would be used to crawl large scale of data from the Internet for model training and testing purpose. Natural Language Processing would be used to preprocess the data into model readable format. Training data and validation data would be used in Machine Learning to train and validate the model. Testing data is used to evaluate the models' performance when comparing different models generated by different algorithms.

1.2 SCOPE

Through the project, 5 major components need to be achieved.

1. Research on online papers on texting mining, especially text topic detection to understand available methodologies.
2. Collect and preprocess large-scale text data from Internet. Preprocess and store them in appropriate format.
3. Design and implement effective algorithms to detect topics in a hierarchical manner from the text data.
4. Compare and contrast performance of different algorithms. Discuss the benefits and limitations of each method.
5. Visualize the final result and deliver it in the form of final report and presentation

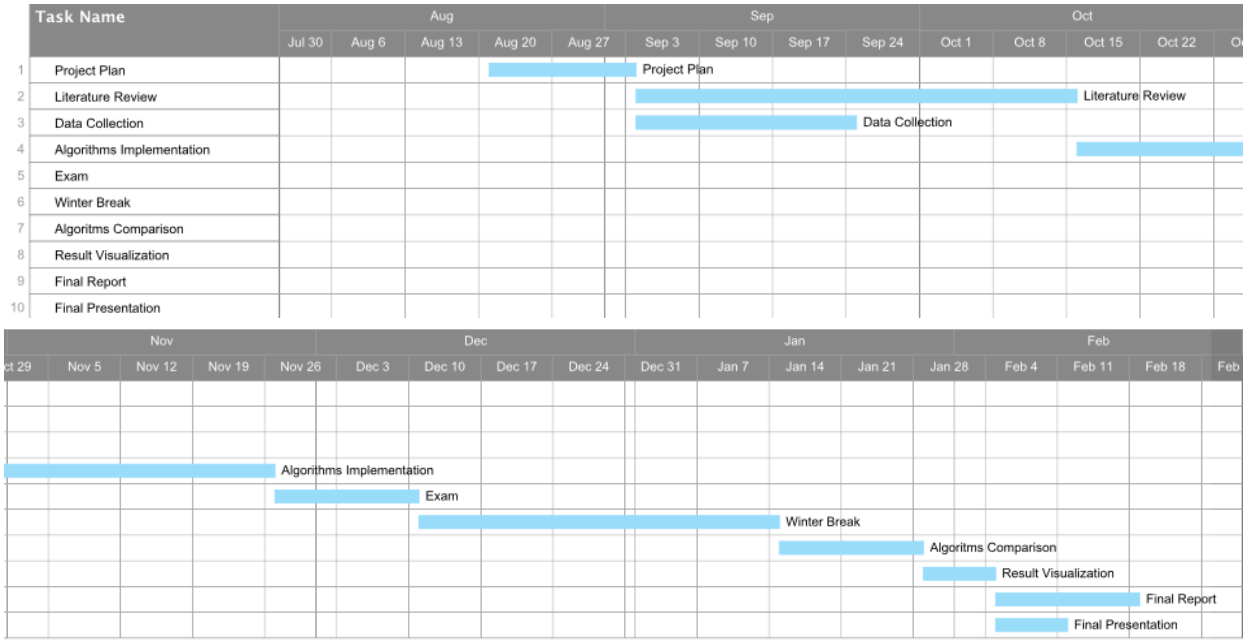
2 PROJECT BREAKDOWN

2.1 TASK TO COMPLETE

Task	Description	Efforts Estimate	Dependencies
Project Plan	Complete project plan and understand its objective	3 weeks	Not Applicable
Literature Review	Read published papers related to text mining and topic detection. Learn existing methods and technologies	6 weeks	Project Plan
Data Collection	Collect large scale data from online website for next stage model implementation	3 weeks	Project Plan
Algorithms Implementation	Choose from available algorithms or design own	6 weeks	Literature Review & Data Collection

	algorithm and implement it using software tools		
Algorithms Comparison (Result and Discussion)	Based on results of different algorithms (models), discuss respective pros and cons, and select the best one as final algorithm	2 weeks	Algorithms Implementation
Result Visualization	Visualize the experiment result using visualization tool such as matlibplot in Python and Excel	1 week	Algorithms Comparison
Final Report	Aggregate all the steps completed through the project and compile them into a single report	2 weeks	Result Visualization
Final Presentation	Prepare PowerPoint slides and relevant materials to do a presentation to professors and judges to demonstrate the project achievements	1 week	Result Visualization

2.2 PROJECT SCHEDULE



3 APPROACH

This project would use agile methodology. All the steps including literature review, data collection, experimental study and implementation would be broken into small increments which are iterative. Each iteration would last for about 2 weeks and the task in certain iteration would be planned beforehand. After iteration completes, a summary of achievement and next iteration task would be sent to Prof. Ke Yiping Kelly to seek for suggestion so that feedback can be obtained frequently throughout the project and new changes can be adapted quickly.

The main programming language used for algorithm implementation and data collection would be Python. Natural Language Processing and Machine Learning techniques would be utilized for data preprocessing and data modeling. Last but not least, Latex would be used to write the final report.

4 RISK MANAGEMENT

Risk Description	Mitigation/Contingency Plan	Criticality (Low/Medium/High)
Network connection fails or connection is blocked when crawling data from online resources	Use dynamic IP when crawling or use API provided by the website	Low
Crawled data loss	Perform frequent data backup	Medium

Risk Description	Mitigation/Contingency Plan	Criticality (Low/Medium/High)
Scheduled task cannot be completed within the planned timeframe	Plan buffer time for each task. Communicate with Prof. Ke and modify the plan accordingly. Lit	Medium