



CANDLE APP

Graduation Project v1



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Abstract

Reading has always instilled ideas in the heads of creative people and developed into new inventions, from the "Earth" program in Neil Stephenson's novel "The Avalanche", from which the "Google Earth" application was inspired.

Of course, the importance of reading is not the subject of the document. We all understand the importance of reading, and our project is very important for everyone who reads because it will simply change the concept of regular reading and will help extract important information in more than one form and will help to understand the texts better and thus get many inspirational ideas .

We provide three services through our App:

- 1-Automatically generating mind maps out of pure text and that requires many stages of text processing
- 2-Automatically generating summary is a shortened version of a text. It contains the main points in the text
- 3-Automatically generating Word cloud a word cloud is a collection, or cluster, of words depicted in different sizes. The bigger and bolder the word appears, the more often it's mentioned within a given text and the more important it is.

In addition, in order to be able to achieve all of this we are focusing on Natural Language Processing or NLP for short, is broadly defined as the automatic manipulation of natural language, like speech and text by software and of course, we will use python.

1- Introduction

When a Falcon rocket blasted into space in February 2018, it was carrying an unexpected payload. Unlike the red "Tesla Roadstar" car and the doll in the astronaut suit behind the steering wheel, SpaceX founder Elon Musk put in the front glove box of the car the "foundation" series of novels by Isaac Asimov recorded on an optical disk. Its events took place in a future era after nearly 50,000 years, igniting his passion for space travel as a teenager. It has now been flying in space around our solar system for about 10 million years or more.

Reading has always instilled ideas in the heads of creative people and developed into new inventions, from the "Earth" program in Neil Stephenson's novel "The Avalanche", from which the "Google Earth" application was inspired, to phones that have the ability to sense in Arthur C. Clarks' novel, which She led Tim Berners-Lee to invent the World Wide Web. Barack Obama says that reading helped him get to know himself and shaped his beliefs.

I have mentioned all these examples to demonstrate the importance of reading and that it was the first inspiration for all the great people who changed the course of history.

The question now is what is the relationship of all this to our project?

Our project aims to launch many services that facilitate the task of reading, and we can mention, for example, the word cloud, the mind map, and the summary of texts. All these services will help attract many readers and help them to reach the purpose of every article, report or scientific content that they read easily and without effort, our project will help many creative people to continue achievements, change the concept of reading for some, and continue working until reading becomes an enjoyable activity.

2- Domain model

Mind mapping is a popular brainstorming tool and thinking technique of visually arranging ideas and their interconnections. It is a way of representing related thoughts with symbols rather than with inessential words. The human mind forms associations almost promptly, and "mapping" allows capturing these ideas quicker than expressing them using only words or phrases. Originated in the late 1960s by Tony Buzan (1). It is now used by millions of people around the world.

Manually creating mind maps requires comprehensive reading and good understanding the text which takes much time and effort. In addition to that not all people are inventive enough to draw elegant and meaningful mind maps.

Therefore, automatically generating mind maps spares much time and exertion and serves way better and speedier several applications .

The applications that make the mind map is Xmind , FreeMind, Edraw MindMap, and MindMeister.

But this applications are manual, because the user manually determines the mind map element These softwares help the user in drawing the mind map and have some ready designs and diagrams which can be used. But the user must read, understand the text well and come up with a design for the mind map himself.

We provide Automatically generating mind maps out of pure text and that requires many stages of text processing.

2.1 Related Work

2.1.1 M2Gen In 2009 (2)

The concept of M2Gen is to generate the Mind Map object from semantic model taken from a given text. The English text is transformed into a semantic model or meaning representation using numerous natural language understanding tools such as morphological analysis, parsing and Semantic Analyzer.

The complete procedure is shown in Figure 1.

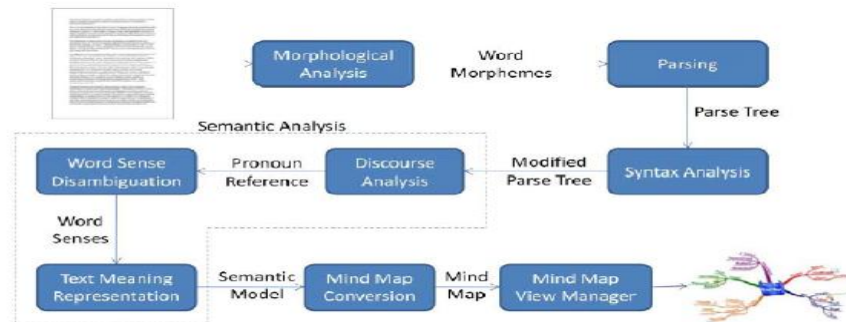


Figure 1. The Architecture of M²Gen [2]

First, the English text is processed by morphological analysis in order to analyze each word into its lemma and affix along with its POS tag. The result of morphological analysis is then processed by parsing component by using CFG and top down chart parsing. Since not all parts of parse tree are used, then there is a parse tree alteration process in the syntax analysis. The result is then used by semantic analysis to produce the semantic model. The semantic analysis contains of several sub components such as discourse analysis, word sense disambiguation and text meaning representation. The discourse analysis aims to solve the pronoun reference in sentences .

The word sense disambiguation aims to select the best sense of a single word, and the text meaning representation aims to transform the parse tree result into the semantic model. The resulted semantic model is then converted into Mind Map figure. The example of generated Mind Map figure is shown in Figure 2.

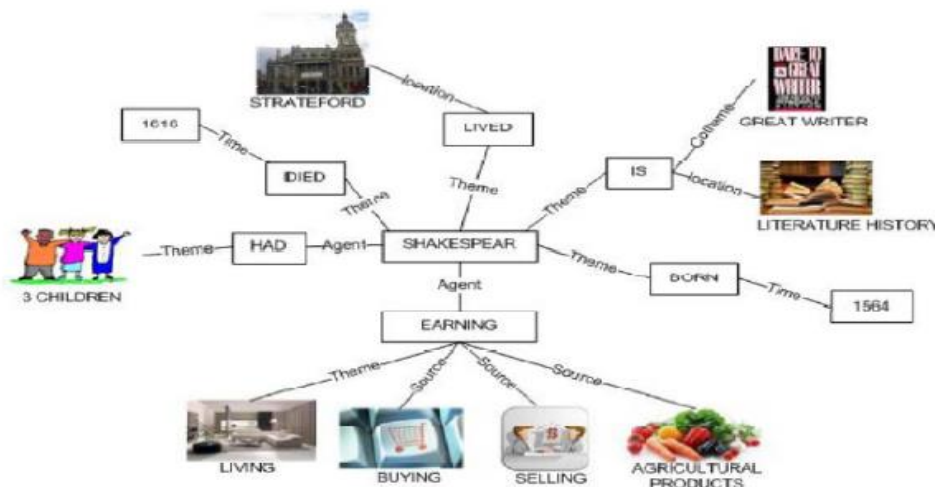


Figure 2. Example of Mind Map Resulted by M²Gen [2]

On the other hand:

- this version only supports single layer mind map and does not produce a hierarchical (multilevel)
- the images assigned to the nodes are not accurately representing them

2.1.2 Generating Mind Map from Indonesian Text using Natural Language Processing (3)

This make the process easier by generating mind map from text (here is Indonesian text) and providing mind map editor to manipulate the object and relation set.

To build such tool, they utilize obtainable Indonesian NLP (Natural Language Processing) tools.

There are three constituents needed: semantic net generator, mind map visualization and interaction handler. In the semantic net generator, the resulted first order logic (FOL) resulted by the semantic analyzer is changed into semantic net which is represented by roll of objects and roll of relations. The resulted semantic net is then imagined by using combination method of radial and layering drawing. The interaction is obtainable for editing the object and the relation. The tool was then assessed by 2-experiment set: testing the semantic net generation and testing the resulted imagining.

The semantic net generation was assessed by using the valid input text, while the visualization was assessed by user acceptance test.

As the result, although the semantic net generation (from FOL) is an acceptable one, but the whole semantic analyzer for Indonesian text still has a soft accuracy specifically for composite sentence. As for the user acceptance test, the automatic generation still gives inconsequential object which should be altered by the interaction.

2.1.3 Generating mind map from an article using machine learning (4)

Data Collection: The data used in this study contains of two types, namely:

- a. Article: article contains of numerous paragraphs, data in given to the expert for validation.

b. Validation Results: articles that have been stamped topic sentence in each paragraph.

Model design: At this stage there are several things that are improved that is Information Retrieval Approach where in it there is a pre-processing text procedure, Core NLP, Part of Speech Tagger. At the procedure of text processing technique used is segmentation, tokenization. Data is processed to distinct sentences into words per word text pre-processing, then done core NLP and part of speech tagger to determine the word type per word in the sentence. There are three types of words specified, among others, Noun, Verb, and Adjective. The following handle is the highlight extraction in which there's a prepare: frequency, sentence position value, and similarity with title and sub-title. After that, sentence scoring is done to sum up the value obtained from the feature extraction. Then the last phase is the sentence ranking and summary extraction after the calculation is done it will be selected the highest value to be the topic sentence of the paragraph .

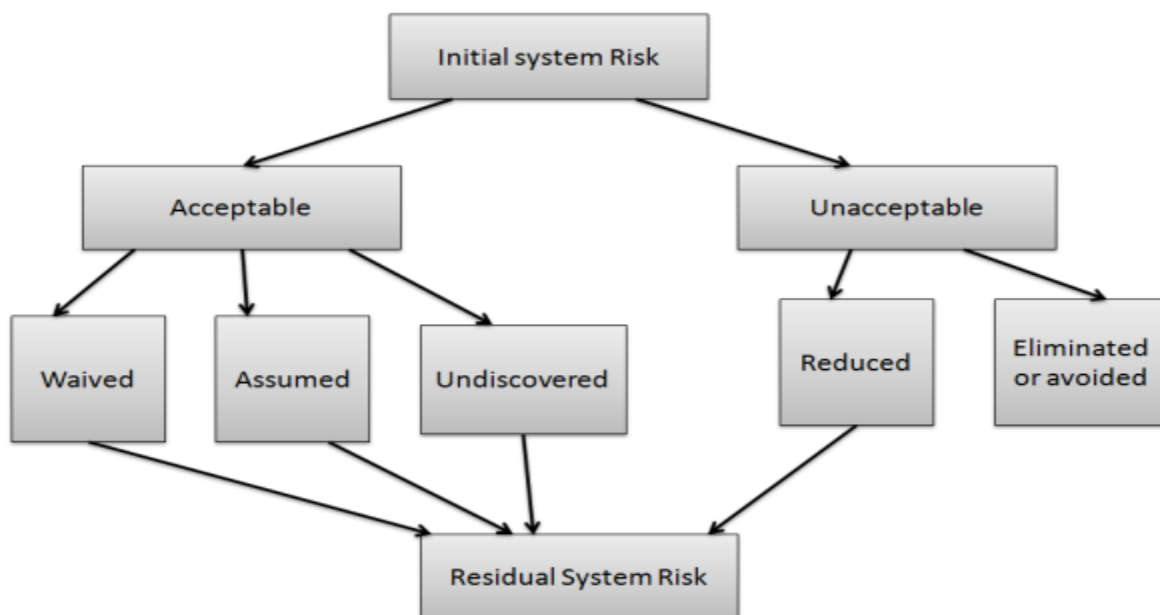
Testing is done by contrasting the concept map of automatic generation with concept map made by experts , The results showed 52.5% accuracy the accuracy of the system is average.

3- Risk/Constraints

3.1-Risk

A possibility of suffering from loss . Loss can be anything, can be anything, increment in production taken a toll, improvement of destitute software, not being able to total the project on time. Software risk exists because the future is ambiguous and there are many known and unknown things that cannot be combined in the plan.

In order to identify the risks that our project may be subjected to, it is vital to begin with think about the issues confronted by past ventures. Study the project plan accurately and check for all the conceivable regions that are helpless to a few or the other sort of dangers. The most excellent ways of analyzing a project is by changing over it to a flowchart and assay all fundamental areas. It is important to make few brainstorming sessions and mind map to identify the known unknowns that can influence the project. Any decision taken related to technical, operational, ,internal or external factors should be evaluated correctly.



Risk Planning

Consequently, we will provide problems that faced previous projects and potential risks:

- The accuracy of the mind maps produce by the model may be low in accuracy compared to the mind maps that humans produce for the same articles or reports
- Complex sentences that need to focus and understand the context of the whole sentence. The model may not define its meaning precisely or it may show undesirable results for these sentences.
- If we try to add more than one language that the model can deal with, we will face many difficulties, most notably languages that contain many words and there is a difficulty in understanding their grammatical rules, and among these languages of course is the Arabic language, and accordingly we think that we will focus on the English language.
- The M2Gen version only supports single-layer mind map and does not produce a hierarchy (multi-level), and we believe that we should solve this problem in order for our model to produce mind maps whose efficiency is higher than that of the mind maps produced by M2Gen.

3.2-Constraints

To minimize constraints, then, it is first helpful to understand their definition. A constraint is anything that slows a system down or prevents it from achieving its goal. We could think of a constraint as a bottleneck in our processes that impedes our progress.

There are numerous, numerous distinctive sorts of constraint. Be that as it may, it's vital to note that a framework cannot have hundreds or thousands of limitations at one time. The most extreme is capped. This can be since constraints are the variables that most restrain your production.

- people constraints are caused by not having enough skill for a project or having skills not related to our project but we distribute tasks that suitable to each one as we can . While this can be the case, in software development, having as well numerous talented individuals on a venture can moreover cause a people constraint (Known as and explained by Brooks' law.)

- The idea of the project should be purposeful and its implementation solves an existing problem or facilitates doing work that would have required much effort and time to complete it . And we believe that our project meets these conditions. **otherwise** You're spending time creating things that consumers don't want or need.
- Equipment constraints are those delays caused by defective, moderate, or out of date gear or a need of adequate space. In our project it might be a lack of devices And in this case we may go to the web because it does not require devices with high capabilities, all we need are devices that can run the browser, and unlike that in Android, which requires devices with specific capabilities to run Android Studio

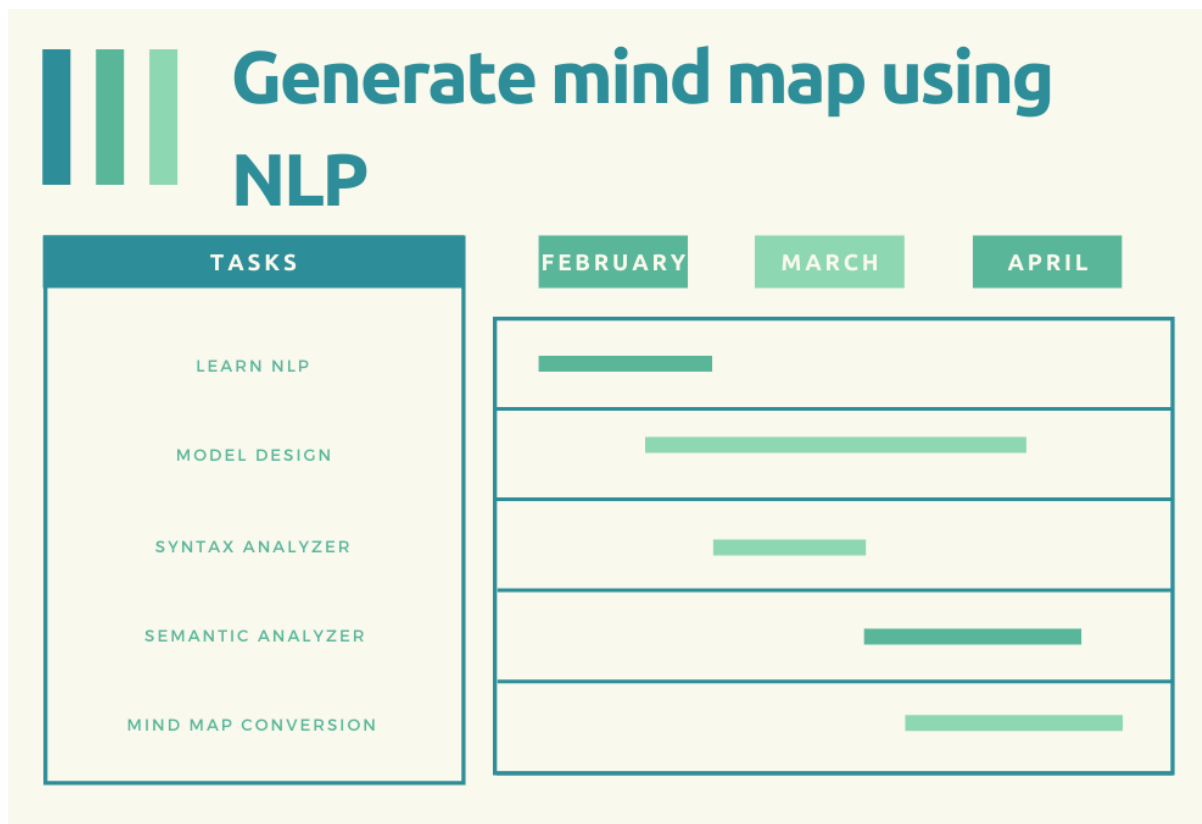
4- Project plan

Project planning is at the heart of the project life cycle, and tells everyone involved where we are going and how we are going to get there.

Generate mind map automatically from articles using Natural language

processing(NLP) is idea for our project and this is what we want to go to achieve But How?

the project work plan can be shown using Gantt chart to illustrate phases and tasks:



Gantt Chart

5- Software Quality Assurance (SQA)

(SQA) is easily a way to ensure quality in the software. It is the group of activities which ensure processes, procedures as well as standards suitable for the project and implemented accurately.

list of SQA activities	Description for each activity
Executing Formal Technical Reviews:	<p>An FTR is done to evaluate the quality and design of the prototype.</p> <ul style="list-style-type: none">• In this process, a meeting is conducted with the team to discuss concerning the genuine quality prerequisites of the software and the design quality of the prototype.• This activity helps in discovering errors in the early stage of SDLC and reduces rework effort in the later stages.
Controlling Change:	<p>In this activity, we use a combination of manual procedures and automated tools to have a mechanism for change control.</p> <ul style="list-style-type: none">• By validating the change requests evaluating the nature of change and controlling the change effect,• it is confirmed that the software quality is maintained during the development and maintenance stages.
Having a Multi-Testing Strategy:	<p>By multi-testing strategy, we mean that one should not rely on any single testing tactic, instead, multiple types of testing should be performed so that the software product can be tested well from all viewpoints to ensure better quality</p>
Enforcing Process Adherence:	<p>This activity require for handle adherence amid the software development process. The advancement prepare ought to moreover adhere to the characterized methods.</p> <p>This activity is a mix of two sub-activities which are explained below in detail:</p> <ul style="list-style-type: none">• Product Evaluation: This activity confirms that the software product is meeting the requirements that were discovered in the project management plan. It ensures that the set standards for the project are followed correctly.• Process Monitoring: This activity verifies if the correct steps were taken during software development. This is done by matching the actually taken steps against the documented steps.

Table1: QSA

6. System requirement specification

6.1 Function Requirements

This section **Function Requirements** contains the specification of function requirements of the system, below tables are the lists of function requirements

6.1.1 Manage Articles [MA]:

Requirement ID	Requirement Description
MA 1	System allow users who are logged to it to (Add / Upload) New articles
MA 2	System allow user who are logged to it to (Update) his articles
MA 3	System allow user who are logged to it to (Delete) his articles
MA 4	System allow user who are logged to it to (read statistics) of his articles

Table 2 Manage Articles

6.1.2 Liked Articles [LA]:

Requirement ID	Requirement Description
LA1	User who logged to system can put likes to the articles

Table 3 Likes

6.1.3 Reply on Articles / Comment on Articles [CA]:

Requirement ID	Requirement Description
CA1	User who logged to system can comment on the articles

Table 4 comment

6.1.4 Generating Mind-map [GM]:

Requirement ID	Requirement Description
GM1	System generating mind map automatically To the uploaded Articles

Table 5 Mind Map

6.2 Non- Functional Requirement

6.2.1: Performance Requirement [PR]

Requirement ID	Requirement Description
PR1	System must respond The Operations in less 7 seconds for user
PR2	The System should be compatible with all android versions and browsers
PR3	" Accessibility/direct access " System should be accessible for all
PR4	" Maintainability " Make the system capable to use in order to achieve a particular goal
PR5	" Extensibility " The ability to make extend a system and this is by can be through the modification of previously existing functionality or through addition of new functionality in the system
PR6	" Usability " the system provide for user capability to use in order to achieve a particular goal
PR7	" Privacy " the system must be able to protect user information and articles from unauthorized person
PR8	" Security " the ability to provide protection to the system from attack and intrusions.

Table 6: performance Requirement

6.2.2: Safety and Security Requirement [SSR]:

Requirement ID	Requirement Description
SSR1	The System must handle safe login and logout through session.
SSR2	Hashing technology and Algorithms should be used to handle the secure login for users.
SSR3	The database should be secured from SQL Injection to prevent leak or loss of information
SSR4	The system could use SSL (Secured Socket Layer) certificates to secure the data transmitted.

Table 7 Safety and security Requirement

6.2.3: Reliability [R]:

System should be designed in modular manner to ease in software maintenance. By designing modularly, we are able to reduce coupling allowing each module to perform a specific function.

Requirement ID	Requirement Description
R1	The Program should be reliable and provide catching of exceptions so that unintended result do not occur such as system crashes or data validation failure.

Table 8: Reliability

6.2.4 Other Software Quality Attributes:

6.2.4.1 Usability:

Usability the system provide for user capability to use in order to achieve a particular goal.

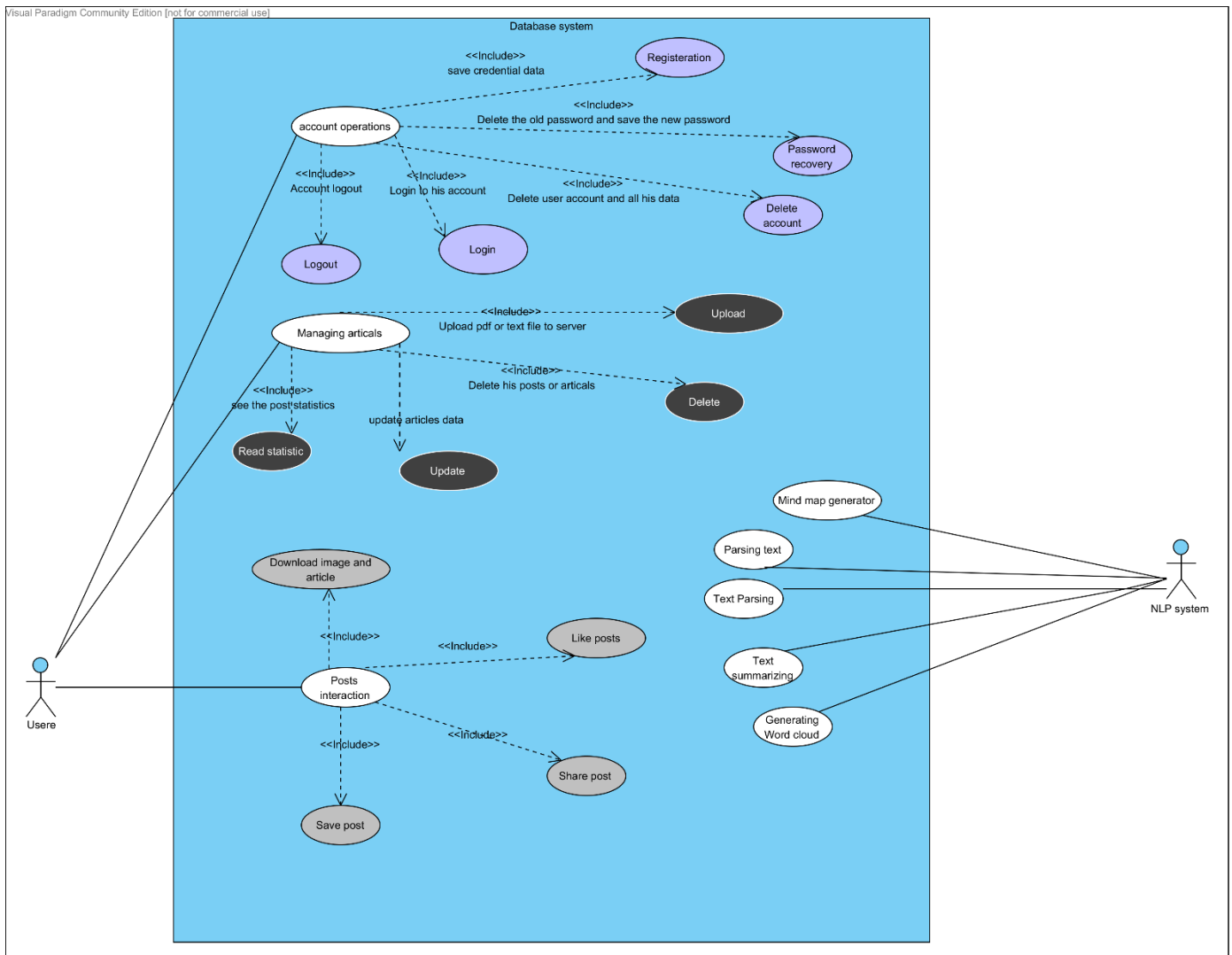
The system should have user-friendly interface

6.2.4.2 Availability:

The system must be available 24/7, with no more than 20 minutes down time per day

7- Use-case

Visual Paradigm Community Edition [not for commercial use]



7.1-Use-case description

Table 1: NLP System

Use case Name	NLP System
Scope	Product
Level	Task
Description	This use case does the all the NLP tasks (text preprocessing, Text parsing, Text summarization, Mind map generation and word cloud generation)
Step performed	<p>This use case starts when file uploaded</p> <ol style="list-style-type: none">1. Text preprocessing<ul style="list-style-type: none">• The system does some operations on the text• The system executes a standard template from text2. Text parsing<ul style="list-style-type: none">• The system takes the processed text and parse it• The system generates a parse tree from the text3. Text summarization<ul style="list-style-type: none">• The system takes the processed text• The system generates a summary from the processed text4. Min map generator<ul style="list-style-type: none">• The system takes the processed text• The system generates mind map from the processed text5. Word cloud<ul style="list-style-type: none">• The system takes the processed text• The system counts each word how many it repeated• The system generates a word cloud picture based on the most repeated words
Alternative path	The uploaded file is too large.
Precondition	A file must be uploaded.
Post conditions	If the use case was successful, the system executes Mind map picture, word cloud picture and text summary.

Table 1: Login

Use case Name	Login
Scope	Product
Level	Task
Description	This use case describes how a user log into the System to leave a comment ,like and upload articles
Step performed	<p>This use case starts when the actor wishes to log into the system.</p> <ol style="list-style-type: none">1. The actor enters his/her name and password2. The system validate the entered username and password and logs the actor into the system.
Alternative path	<p>Invalid Username/Password</p> <p>When user enters an invalid username or invalid password, system displays an error message.</p> <p>The use choose either return to the beginning of the Basic Flow or cancel the login, at which point the use case ends.</p>
Precondition	The system is in the login state and has the login screen displayed.
Post conditions	If the use case was successful, the actor is now logged into the system. if not, the system state is unchanged.

Table 9: Login

Table 2: Manage Articles

Use case Name	Manage Articles
Scope	Product
Level	Task
Description	This use case allows to the user to dealing with articles in the system of articles. This includes adding, modifying, and deleting his Articles from the system.
Step performed	<p>This use case starts with user want to add, change, delete, articles in his profile in the system.</p> <ol style="list-style-type: none">1. The system request the user specify the function he would like to perform (either Add an Article, Update his articles, delete his article)2. Once the user provide the requested information, one of the sub flows in executed. <p>If the user select "Add an article", the Add an Article sub flow is executed.</p> <p>If the user select "Update an article", the Update an Article sub flow is executed.</p> <p>If the user select "Delete an article", the Delete an Article sub flow is executed.</p> <p>Add/Upload Article</p> <ol style="list-style-type: none">1. The system requests that the user enter the Article information. This includes :<ul style="list-style-type: none">- Article Text- Mind map addition to the auto-generated one .2. Once the user provides the requested information, the system generates and assign unique id number to the article. The article is uploaded to the system.3. The system provides the user with the new article id .

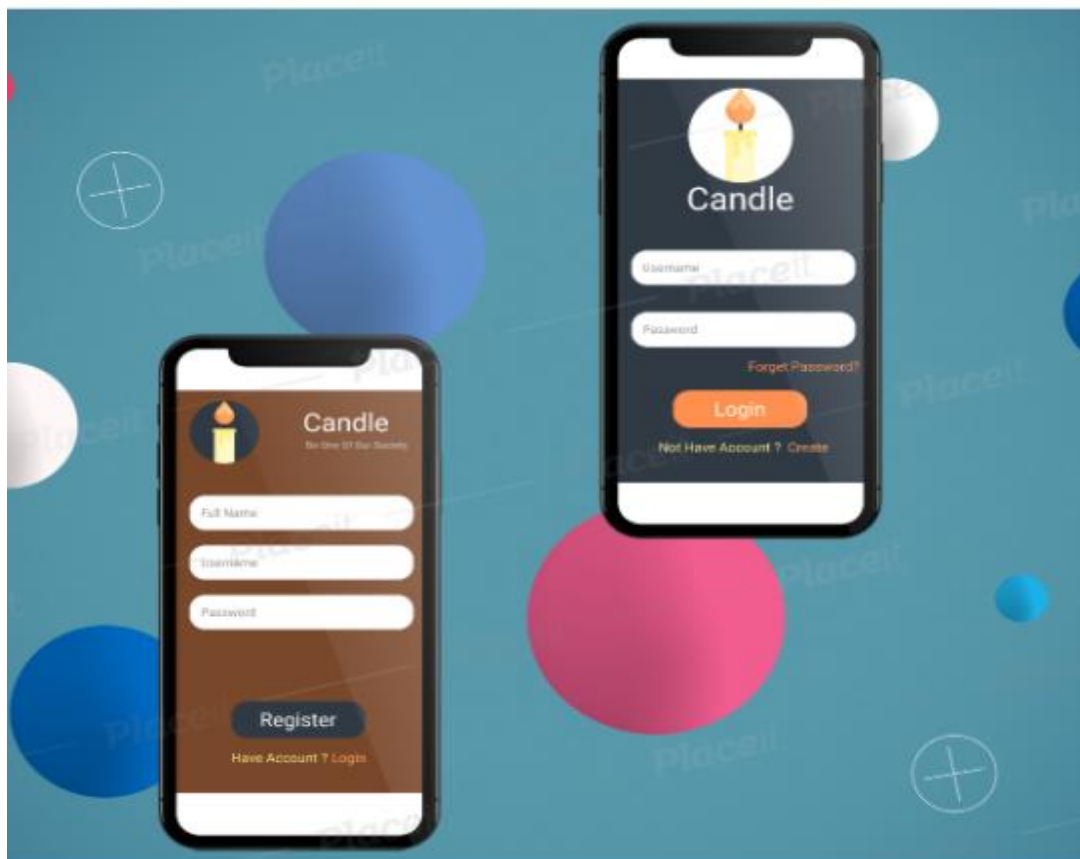
	<p>Update an article</p> <ol style="list-style-type: none"> 1. The system requests the user choose the article. 2. The user choose the article , the system retrieves and displays the article information. 3. The user makes the desired changes to the article information. This includes any of the information specified in the Add /Upload an Article sub-flow. 4. Once the user updates the necessary information, the system updates the article information and generate another mind map and conclusion to it. <p>Delete An Article</p> <ol style="list-style-type: none"> 1. The system requests the user to choose one of his articles . 2. The user choose one. The system retrieves and display its information. 3. The system prompts the user to confirm the deletion of the article. 4. The user verifies the deletion. 5. The system deletes the articles from the system.
Alternative path	<p>Article Not found</p> <p>If, in the Update a student or delete an article sub-flows, an article with a specified id number does not exists, the system displays an error message . The user can choose different id number or cancel the operation or this may mean that the article is deleted previously ,at which point the use case ends.</p> <p>Delete Cancelled</p> <p>If, in the Delete an Article sub-flow, the user decides not to delete the student, the delete is cancelled and the Basic flow is re-started at the beginning.</p>
Precondition	The user must be logged onto the system before this use case begins.
Post conditions	If the use case was successful, the student information is added, updated or deleted from the system. Otherwise , the system state is unchanged.

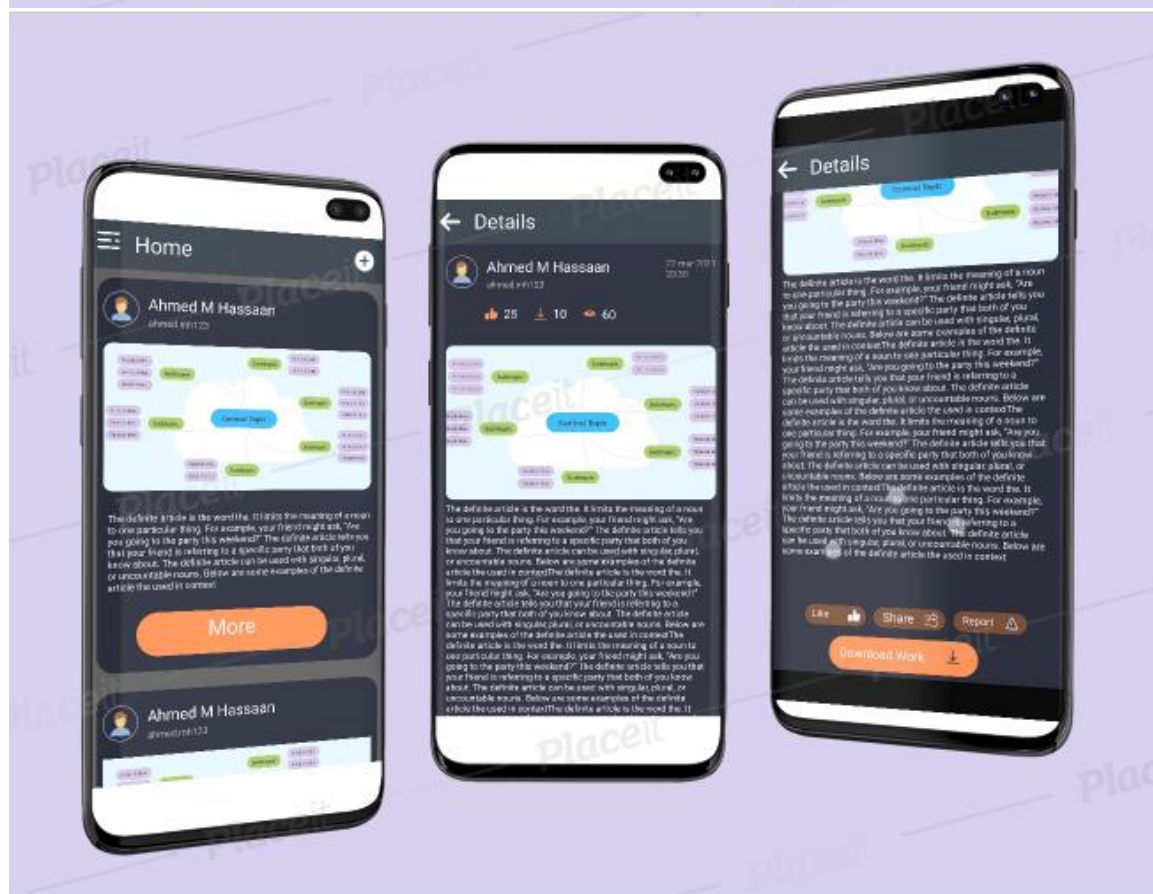
Table 10: Manage Articles

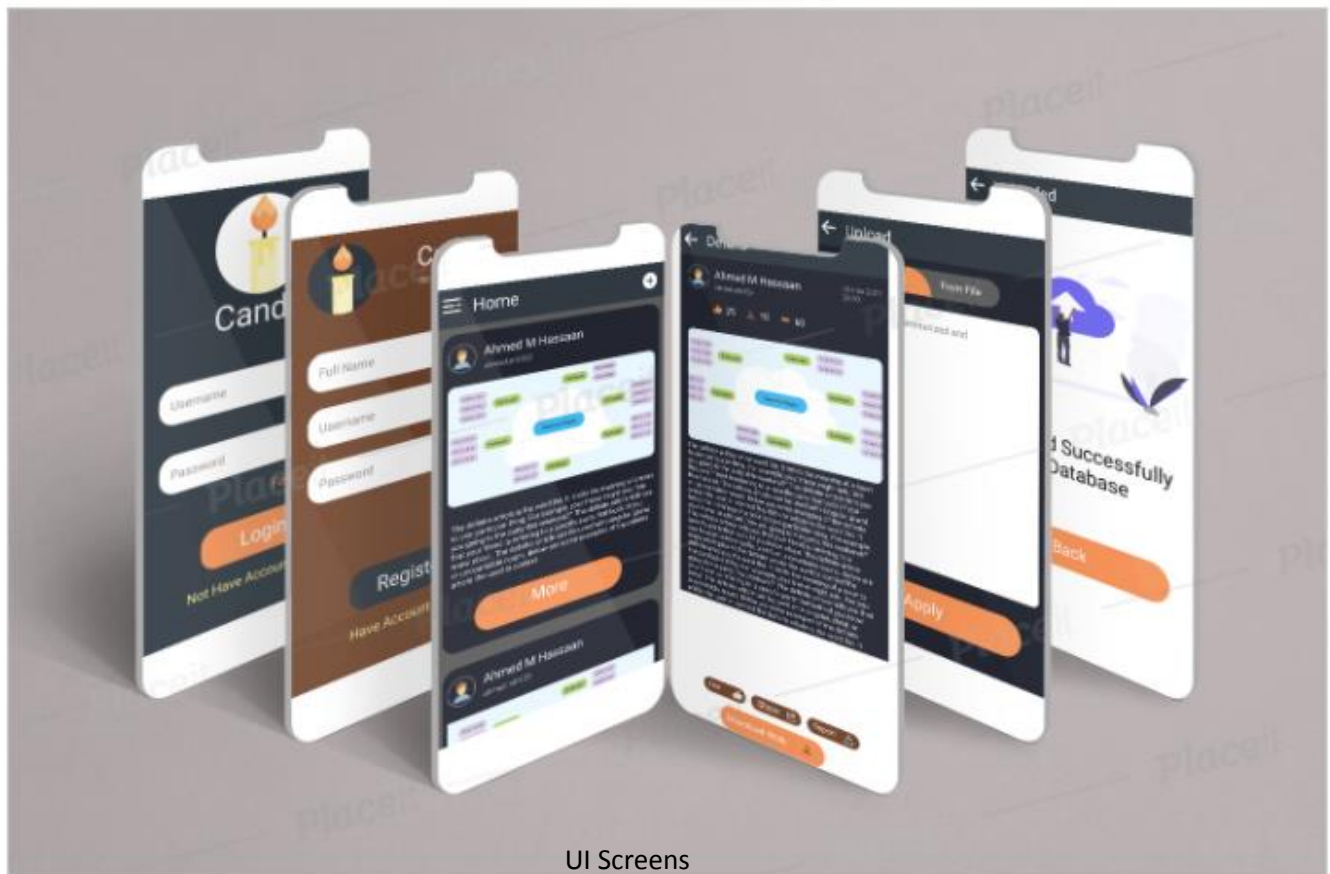
Table 4: Posts Interaction

Use case name	Posts Interaction
Scope	Product
Level	Task
Description	This use case allow user to interact with the posts (Like posts, share posts, download image from the post, and save posts)
Step performed	<p>This use case starts when the user wants to (Like posts, share posts, download image from the post, and save posts)</p> <p>3. The system request the user specify the function he would like to perform Like posts, share posts, download image from the post, and save posts)</p> <p>4. Once the user provides the requested information, one of the sub flows in executed.</p> <p>If the user wants to "Like an article", the Like an article sub flow is executed. If the user wants to "share posts", the share posts sub flow is executed. If the user wants to "download image from the post", the download image from the post sub flow is executed. If the user wants to "save posts", the save posts sub flow is executed.</p> <p>save posts</p> <p>Like posts</p> <ul style="list-style-type: none">• The user clicks like button a post• The system stores the post id in the database• The system updates the number of post likes• The system shows the number of likes <p>Share posts</p> <ul style="list-style-type: none">• The user clicks share button a post• The system saves the user id and post id in the data base• The system posts the shared post on the user profile <p>Download Image</p> <ul style="list-style-type: none">• The user clicks download button• The system starts downloading the image in the specific file in the user device <p>Save posts</p> <ul style="list-style-type: none">• The user clicks save post• The system adds the article id into saved posts menu of the user account
Alternative path	
Precondition	The user must be logged in and the article owner must give the permeation to other users to interact with his posts
Post conditions	If the use case was successful, the Interaction is Updated In UI, Liked, Shared, Downloaded or Saved from the system. Otherwise, the system state is unchanged.

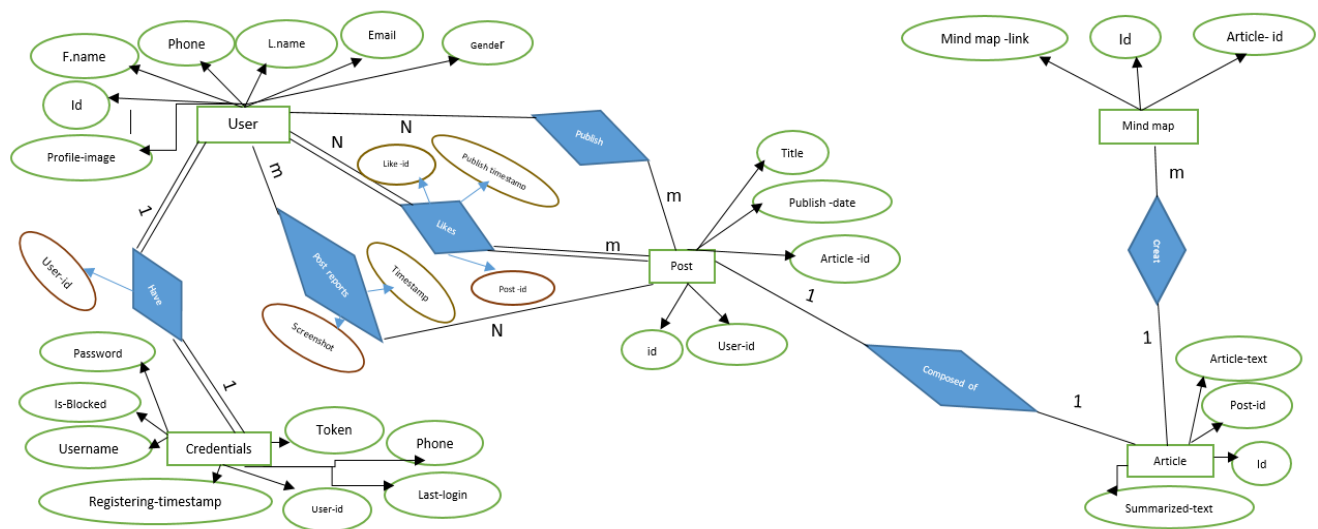
8- Graphical User Interface:



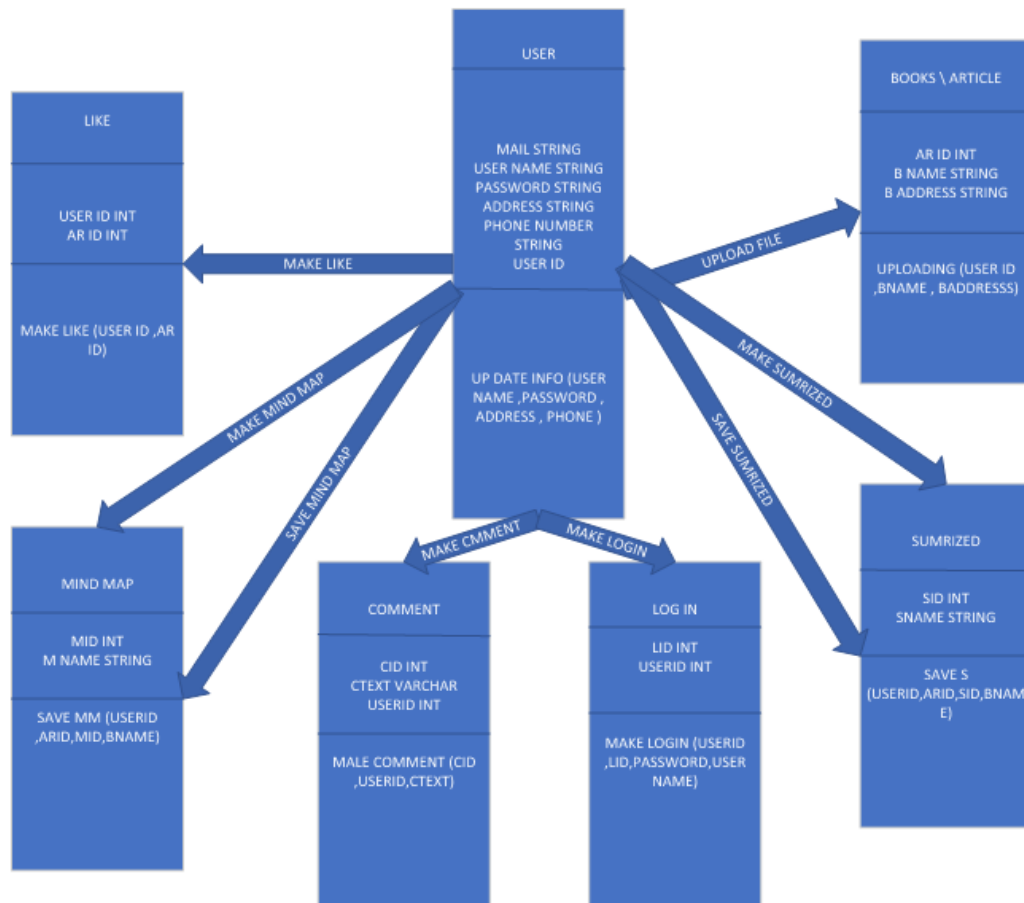




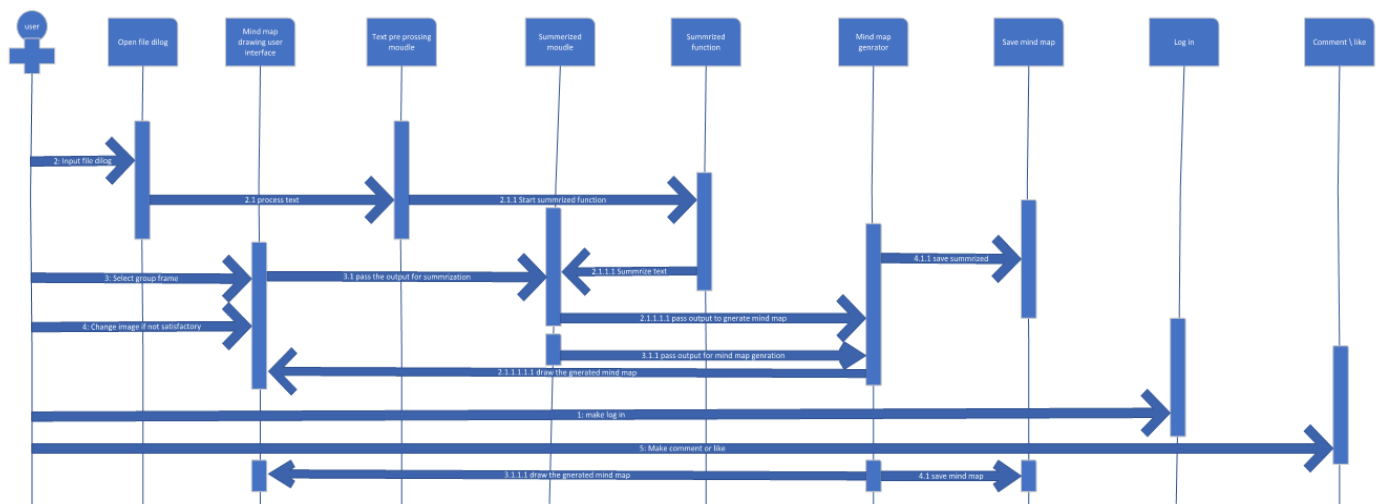
9- Entity Relation Diagram (ERD)



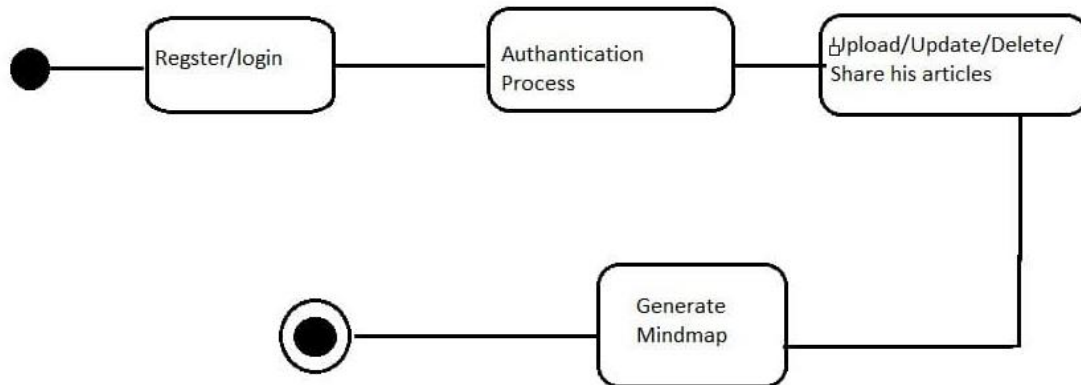
11- Class Diagram



12. Sequence diagram



13-State for Project



15- Conclusion

We have discussed in this document more than one service that can help people to read and extract important information from texts because we believe in the importance of reading and it is the first inspiring activity for all creative people who changed the course of history, and this is precisely a point that we referred to in the Abstract.

It is clear that we have focused on the mind map because of its advantages, and if it is extracted automatically from the texts, it will be an easy way to understand the content and there is consensus on its importance and the ease of remembering the mind map.

We face many difficulties, including, for example, the production of two versions of the application, one in Arabic and the other in English, and the lack of educational content for natural language processing (NLP) compared to other common topics.

All these challenges motivate us more for success and for the benefit to prevail and for the largest number of people to benefit from the application, and life is full of success and failure.

We hope that our application will not fail, and God willing, with our cooperation, we will be able to achieve the achievement.

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