Sentiment-based Chatbot using Machine Learning for mental health.

by Ekata Ghimire

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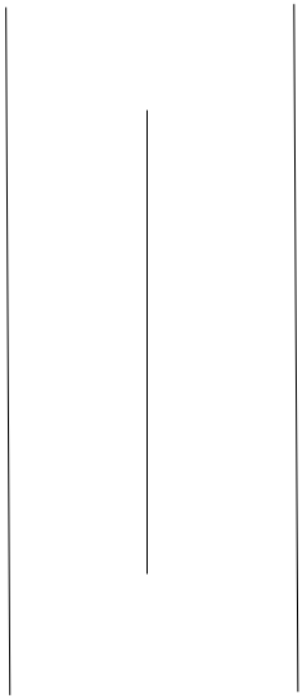
Initial Project Specification Document

of

Level 6 Production Project

BSc (Hons) Computing Course 2023/24



Submitted by:

Ekata Ghimire

Student ID: 77261096

BSC(Hons) Computing

Supervisor:

Rohit Raj Pandey

Final Project Individual Aim and Objectives

Title of the project:

Sentiment-based Chatbot using Machine Learning for mental health.

Aim of the project:

The focus of this project is to create a chatbot using Machine Learning that is based on Sentimental Analysis and provides recommendation to the users on mental health issues. By making resources and information more available it also aims at improving mental health awareness and reducing stigma around it.

Objectives of the project:

The main intension of this project is to develop a project that:

- provides instance support and answers to the users.
- enlarges the understanding of the Natural Language Processing.
- analyses the sentiments based on the chats with the chatbot.
- helps people overcome the mental health issues by being a chatbot that can make recommend.

Specification of the project:

Functional Requirement:

Functional Requirements	Moscow
NLP ability to translate user input and appropriate response generations.	C
Evaluating the emotional state of the user using the Sentiment analysis algorithm.	M
ML to learn from user interactions	M
Protect the sensitive data user.	S
Chatbot should be able to provide instructions as per user's mental health.	S
For wellness practice the chatbot could have ability to recommend proper recommendations.	C

Non-Functional Requirement

Non-Functional Requirements	Moscow
Sensitive information must not be leaking.	M
Simple and easy-to-use user interface	S
Accurate response to the questions asked.	M
Product validation and completely tested	S

Research for the project:

Mental Health is a growing concern in Nepal (Asim, M., van Teijlingen, E. and Sathian, B., 2020). In Nepal, there is Stigma and Discrimination towards people with the mental health issues. Here chatbot could come in hand.

Creating chatbot with the help of natural language processing (Gunasekara, L., Vidanage, K., 2019) system that can preprocess and classify the text data into appropriate categories. The emotional state of the user should be understood by the chatbot and respond accordingly. To be effective and to do so Sentiment Analysis and Machine Learning come in (Moulya, S. and Pragathi, T. R., 2022). The chatbot can provide relevant support by recognizing patterns in language through chatbot training on different dataset of text which indicate user's emotional state (Gifu, D. and Pop, E.,2022).

Evaluation for the project:

As mentioned in the product objective and specification, the final evaluation would be fulfillment of all those objectives mentioned. The Evaluation could be done in both qualitative and quantitative methods. Response time and Sentimental analysis accuracy could be the Quantitative analysis. User engagement with the chatbot could also be measured by the output given or the response by the chatbot. The ability of the chatbot to handle the appropriate response, recommendations and tone could be the Qualitative evaluation.

Project Planning:

Methodology:

This is the product-based research project that will need the proper planning and implementation. After the research, the dataset findings are done and the chatbot models will be trained upon and then later integrated on the different web Application. Once the chatbot starts fully responding to the queries, it is tested. Since the project is solo based project, this will follow the Agile Methodology and planning is done using the Gannt chart and the project timeline defining the resources.

Project Timeline:

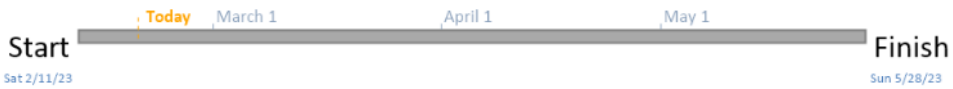
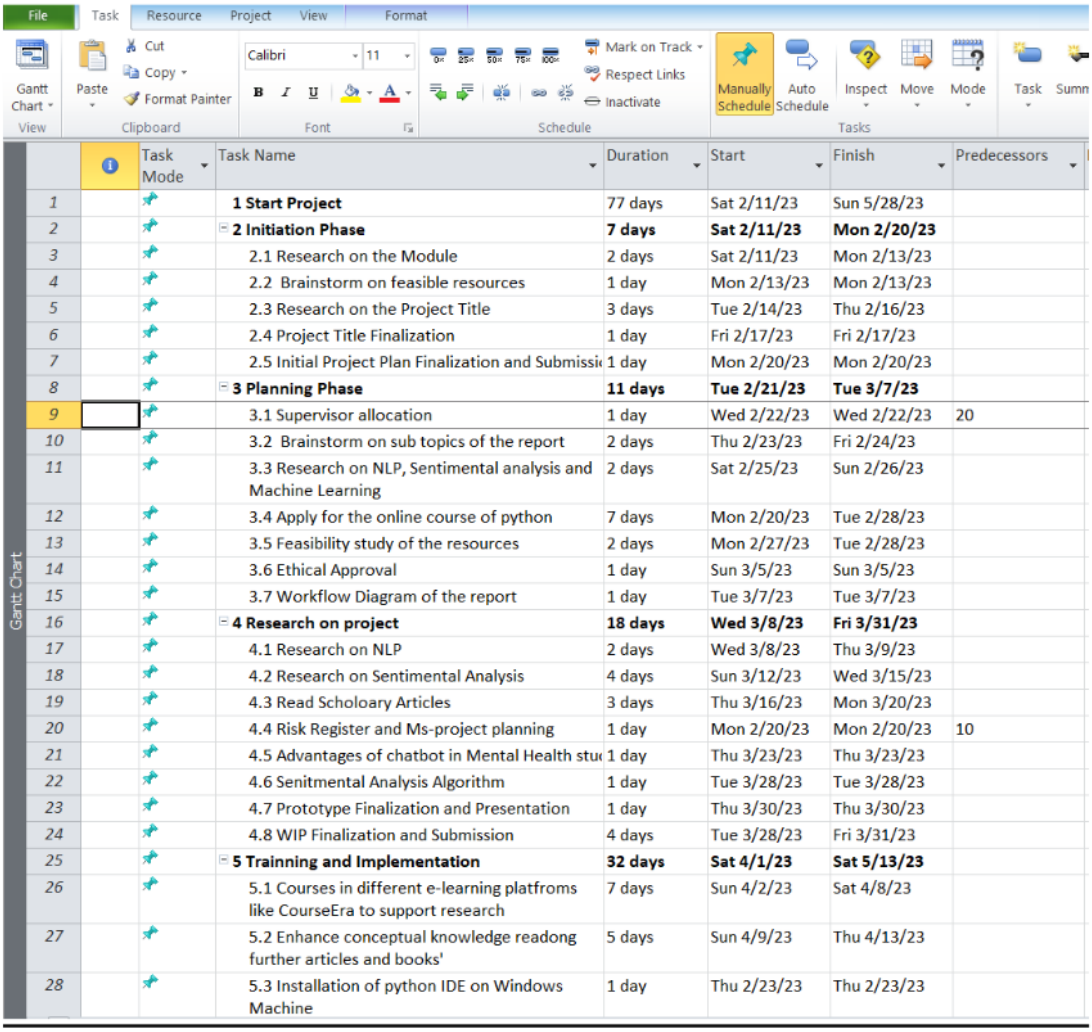


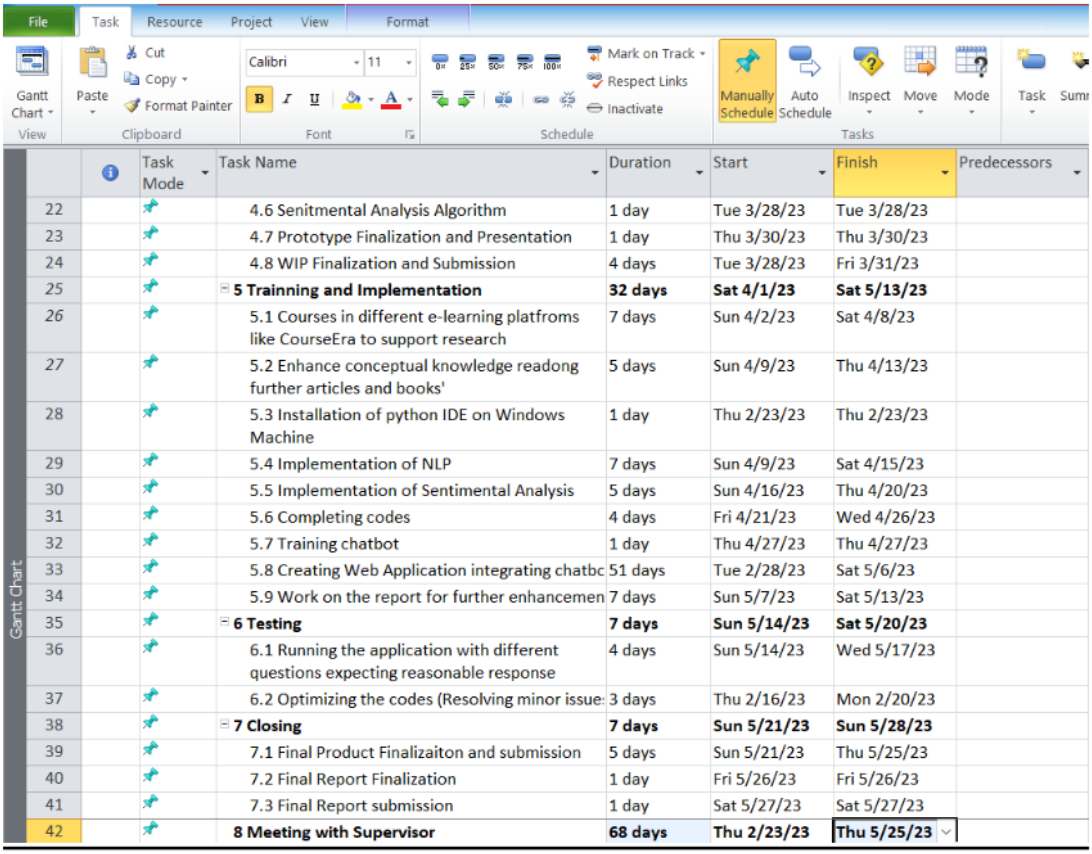
Fig 1: Project Timeline

Gantt chart:



	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**1 Start Project**	77 days	Sat 2/11/23	Sun 5/28/23	
2		**2 Initiation Phase**	**7 days**	**Sat 2/11/23**	**Mon 2/20/23**	
3		2.1 Research on the Module	2 days	Sat 2/11/23	Mon 2/13/23	
4		2.2 Brainstorm on feasible resources	1 day	Mon 2/13/23	Mon 2/13/23	
5		2.3 Research on the Project Title	3 days	Tue 2/14/23	Thu 2/16/23	
6		2.4 Project Title Finalization	1 day	Fri 2/17/23	Fri 2/17/23	
7		2.5 Initial Project Plan Finalization and Submissi	1 day	Mon 2/20/23	Mon 2/20/23	
8		**3 Planning Phase**	**11 days**	**Tue 2/21/23**	**Tue 3/7/23**	
9		3.1 Supervisor allocation	1 day	Wed 2/22/23	Wed 2/22/23	20
10		3.2 Brainstorm on sub topics of the report	2 days	Thu 2/23/23	Fri 2/24/23	
11		3.3 Research on NLP, Sentimental analysis and Machine Learning	2 days	Sat 2/25/23	Sun 2/26/23	
12		3.4 Apply for the online course of python	7 days	Mon 2/20/23	Tue 2/28/23	
13		3.5 Feasibility study of the resources	2 days	Mon 2/27/23	Tue 2/28/23	
14		3.6 Ethical Approval	1 day	Sun 3/5/23	Sun 3/5/23	
15		3.7 Workflow Diagram of the report	1 day	Tue 3/7/23	Tue 3/7/23	
16		**4 Research on project**	**18 days**	**Wed 3/8/23**	**Fri 3/31/23**	
17		4.1 Research on NLP	2 days	Wed 3/8/23	Thu 3/9/23	
18		4.2 Research on Sentimental Analysis	4 days	Sun 3/12/23	Wed 3/15/23	
19		4.3 Read Scholoary Articles	3 days	Thu 3/16/23	Mon 3/20/23	
20		4.4 Risk Register and Ms-project planning	1 day	Mon 2/20/23	Mon 2/20/23	10
21		4.5 Advantages of chatbot in Mental Health stu	1 day	Thu 3/23/23	Thu 3/23/23	
22		4.6 Senitmental Analysis Algorithm	1 day	Tue 3/28/23	Tue 3/28/23	
23		4.7 Prototype Finalization and Presentation	1 day	Thu 3/30/23	Thu 3/30/23	
24		4.8 WIP Finalization and Submission	4 days	Tue 3/28/23	Fri 3/31/23	
25		**5 Trainning and Implementation**	**32 days**	**Sat 4/1/23**	**Sat 5/13/23**	
26		5.1 Courses in different e-learning platfroms like CourseEra to support research	7 days	Sun 4/2/23	Sat 4/8/23	
27		5.2 Enhance conceptual knowledge readong further articles and books'	5 days	Sun 4/9/23	Thu 4/13/23	
28		5.3 Installation of python IDE on Windows Machine	1 day	Thu 2/23/23	Thu 2/23/23	

Fig 2: Project Task and Duration



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23		4.7 Prototype Finalization and Presentation	1 day	Thu 3/30/23	Thu 3/30/23	
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28		5.3 Installation of python IDE on Windows Machine	1 day	Thu 2/23/23	Thu 2/23/23	
29		5.4 Implementation of NLP	7 days	Sun 4/9/23	Sat 4/15/23	
30		5.5 Implementation of Sentimental Analysis	5 days	Sun 4/16/23	Thu 4/20/23	
31		5.6 Completing codes	4 days	Fri 4/21/23	Wed 4/26/23	
32		5.7 Training chatbot	1 day	Thu 4/27/23	Thu 4/27/23	
33		5.8 Creating Web Application integrating chatbc	51 days	Tue 2/28/23	Sat 5/6/23	
34		5.9 Work on the report for further enhancemen	7 days	Sun 5/7/23	Sat 5/13/23	
35		**6 Testing**	**7 days**	**Sun 5/14/23**	**Sat 5/20/23**	
36		6.1 Running the application with different questions expecting reasonable response	4 days	Sun 5/14/23	Wed 5/17/23	
37		6.2 Optimizing the codes (Resolving minor issue:	3 days	Thu 2/16/23	Mon 2/20/23	
38		**7 Closing**	**7 days**	**Sun 5/21/23**	**Sun 5/28/23**	
39		7.1 Final Product Finalizaiton and submission	5 days	Sun 5/21/23	Thu 5/25/23	
40		7.2 Final Report Finalization	1 day	Fri 5/26/23	Fri 5/26/23	
41		7.3 Final Report submission	1 day	Sat 5/27/23	Sat 5/27/23	
42		**8 Meeting with Supervisor**	**68 days**	**Thu 2/23/23**	**Thu 5/25/23**	

Fig 3: Project Task and Duration

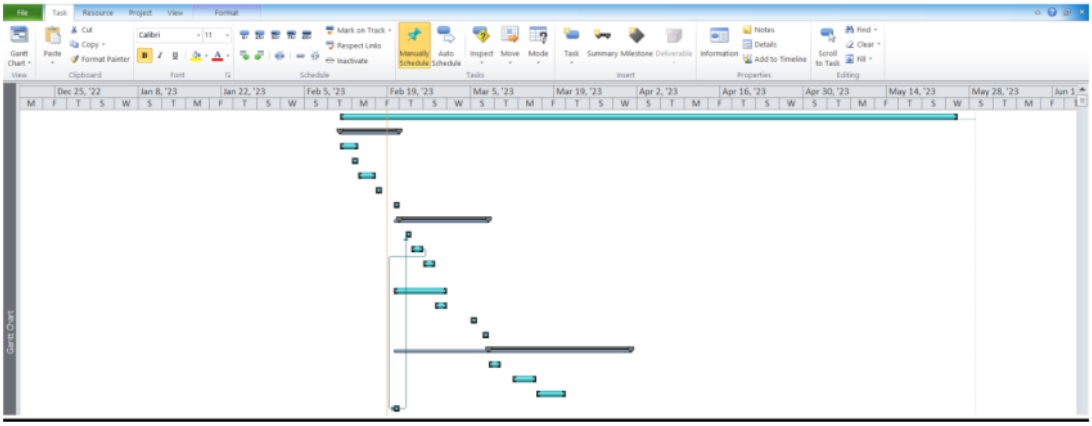

Fig 4: Project Gantt chart

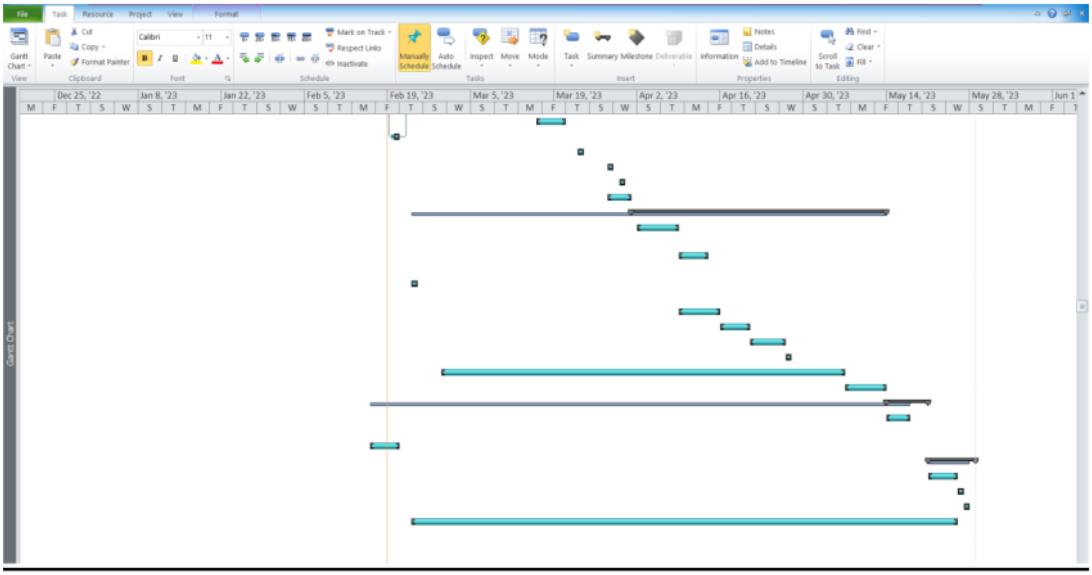

Fig 5: Project Gantt chart

Resources:

- Software:
  - Python Pl with relevant libraries for Natural Language Processing
  - Flask or Django web framework to host.
  - Version Control to maintain the codebase.
  - Microsoft Word Excel
  - Microsoft Powe-point
  - MS- Project
  - Web Browers
- Hardware:
  - Multi-core Processor with clock speed of at least 2.5 GHz
  - Minimum 8GB RAM
  - SSD with least 256 GB storage
  - A high-speed internet connection
  - Cloud Services to host the chatbot.
- Human Resources:
  - Name: Ekata Ghimire -Role: Planner, Designer, and Implementer
  - Module Leader
  - Supervisor – Rohit Raj Pandey

Initial Bibliography:

- Asim, M., van Teijlingen, E. and Sathian, B., 2020. *Coronavirus Disease (covid-19) and the Risk of Post-Traumatic Stress Disorder: A Mental Health Concern in Nepal,* Nepal journal of epidemiology, 10(2), pp. 841–844. doi: 10.3126/nje.v10i2.29761

- Gunasekara, L., Vidanage, K. and 2019 National Information Technology Conference (NITC) Colombo, Sri Lanka 2019 Oct. 8 - 2019 Oct. 10, 2019. "*2019 National Information Technology Conference (nitc),"* in Uniontbot: *Semantic Natural Language Generation Based Api Approach for Chatbot Communication*. IEEE, pp. 1–8. doi: 10.1109/NITC48475.2019.9114440.

- Moulya, S. and Pragathi, T. R., 2022. *Mental Health Assist and Diagnosis Conversational Interface Using Logistic Regression Model for Emotion and Sentiment Analysis*, Journal of Physics: Conference Series, 2161(1). doi: 10.1088/1742-6596/2161/1/012039. [online] Available at: < https://iopscience.iop.org/article/10.1088/1742-6596/2161/1/012039 > [Accessed 19 Feb 2023].

- Gifu, D. and Pop, E.,2022. *Smart Solutions to Keep Your Mental Balance,* Procedia Computer Science, 214, pp. 503–510. doi: 10.1016/j.procs.2022.11.205. [online] Available at: < https://www.sciencedirect.com/science/article/pii/S1877050922019159?via%3Dihub > [Accessed 19 Feb 2023].

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