**Initial Project Specification Document**

**of**

**Level 6 Production Project**

**BSc (Hons) Computing Course 2023/24**

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**BSC(Hons) Computing**

**Final Project Individual Aim and Objectives**

**Title:**

**Sentiment-based Chatbot using Machine Learning for mental health.**

**Aim:**

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:**

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 recommendations.

**Specification:**

**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:**

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:**

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:**

Graphical user interface, text, application

Description automatically generated

**Gantt chart:**

**Graphical user interface, text, application

Description automatically generated**

**Graphical user interface, text, application, email

Description automatically generated**

**Graphical user interface

Description automatically generated with low confidence**

**Graphical user interface, application, Word

Description automatically generated**

**Resources:**

* Software:
* Python Pl with relevant libraries for Natural Language Processing
* Flask or Django web framework to host or could use Dialogflow
* Version Control to maintain the codebase.
* Microsoft Word Excel
* Microsoft Powe-point
* MS- Project
* Web Browers
* Hardware:
* A high-speed internet connection
* Cloud Services to host the chatbot.
* Human Resources:
* Name: Ekata Ghimire
* Role: Planner, Designer, and Implementer
* Supervisor – Sukant Kumar Sahu

**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 19Feb 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 19Feb 2023].