



[www.caluniv.ac.in](http://www.caluniv.ac.in)

**A.K. CHOUDHURY SCHOOL OF INFORMATION TECHNOLOGY  
UNIVERSITY OF CALCUTTA**

University of Calcutta, JD-2 Sector-III, Saltlake, Kolkata-700106, INDIA

**Certificate**

This is to certify that the project synopsis entitled “**Healthy Recipe Suggestion Chatbot**” submitted for partial fulfillment of the requirements of 4th Semester of Master of Computer Application (MCA) under University Of Calcutta; has been carried out by Indrani Dey (Roll No- C91/MCA/232006 and Registration No- 135-1211-0394-20) and Manisha Kumari (Roll No- C91/MCA/232007 and Registration No- 224-1211-0662-20) under the supervision of Dr. Soumya Sen , Assistant Professor , A.K. Choudhury School of Information Technology, University of Calcutta.

.....  
*Chairman, board of examiner*

.....  
*Project Supervisor  
Dr. Soumya Sen  
Assistant Professor  
Department of Information  
Technology, University Of Calcutta*

.....  
*External Examiner(s)*

## Acknowledgement

I wish to express my profound sense of gratitude of my project supervisor Guide Dr. Soumya Sen, Assistant Professor of the Department of Information Technology, University of Calcutta, for his support, inspiration and guidance. He has showed me different ways to approach a problem. I have also learned from him that an approach needs to be persistent to accomplish my goal. I am immensely grateful to him for giving his valuable time and constant advice for discussing various ideas related to my project work it is being precious learning experience for me to work under tutelage.

I am also thankful to my department; A.K. Choudhury School of I.T, University of Calcutta; for providing me with the required resources for working on this project. Lastly, I like to express my heartiest gratitude to my seniors and my friends; and to all who have directly or indirectly extended their valuable guidance and advice during the preparation of this project; which will give me the continuous flow of inspiration to complete the project.

THANK YOU

Date:

.....  
Indrani Dey  
MCA 4<sup>th</sup> Semester  
Roll Number:  
C91/MCA/232006  
Registration Number:  
135-1211-0394-20

.....  
Manisha Kumari  
MCA 4<sup>th</sup> Semester  
Roll Number:  
C91/MCA/232007  
Registration Number:  
224-1211-0662-20

## Abstract

This project introduces a smart chatbot that helps people plan meals tailored to their health, diet preferences, and nutrition goals. It uses AI tools like machine learning natural language processing, and external APIs to understand what users ask in everyday language and recommend meals that fit their health needs. Built with Python and Flask, its core uses a Random Forest model to predict calorie and macronutrient needs, while Sentence Transformers and the Gemini API enhance its ability to process casual or unclear user inputs. The system extracts details like diseases, ingredient likes or dislikes, and user goals from conversations converting them into accurate health-related data using matching techniques and embedding similarity.

A vector database called Pinecone stores user details and past chats making personalized recommendations quick, secure, and scalable. Recipes come from the Spoonacular API and are adapted to fit specific health requirements, diet choices like vegan or keto, and safe ingredients. If no exact recipe works, the system suggests adjusted options without ignoring health restrictions. The chatbot's interface includes an easy-to-use chat and a user dashboard to keep things smooth and accessible.

Through conversational interactions, the chatbot works to keep users engaged while giving suggestions relevant to their needs making it helpful for people focused on healthy eating. This project highlights how using AI advanced data storage, and external resources together can create a flexible and reliable system that supports users in maintaining a healthier lifestyle with personalized meal recommendations.

## Table of Contents

Chapter No.	Title / Section	Page Number
1	Introduction	
1.1	Background	1
1.2	Motivation	1-2
1.3	Problem Statement	2
1.4	Objectives	2-3
1.5	Scope of the Project	3
2	Literature Review	
2.1	Existing Systems and Limitations	4
2.2	Research Papers and Relevant Technologies	4-5
2.3	Comparative Analysis	5-6
2.4	Identified Gaps	6
3	System Structure	
3.1	Backend Element	7-8
3.2	Data processing & Preparation	8
3.3	Frontend Element	8
4	Technologies and Tools Used	9-10
5	System Implementation	
5.1	Dataset Used	11-13
5.2	Core Modules Description	13-14
5.3	Data Preprocessing	15-16
5.4	Disease and Nutrient Mapping	16-18
5.5	Limitations of Dataset-Based Models & Transition to Spoonacular API	18-20
5.6	User Profile Vectorization	20
5.7	Recipe Filtering and Fallback logic	20-21
5.8	Integration with External APIs	21-23
5.9	Frontend Features	23-24
5.10	Algorithm	24-27
6	Results and Analysis	28-32
6.1	Model Performance Metrics	33-34
7	Challenges and Solutions	35
8	Future Improvements	36
9	Conclusion	37
10	References	38-39