Flavour Fusion: AI-Driven Recipe Blogging

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1. INTRODUCTION

Project Overview:

Flavour Fusion is an AI-powered web application that automatically generates detailed recipe blogs based on user input. The platform allows users to enter a recipe topic and desired word count, and it generates a complete blog post including ingredients, preparation steps, cooking tips, and a friendly introduction.

The system uses **Google Generative AI (Gemini API)** for content generation and **Streamlit** for building the interactive web interface.

This project demonstrates the integration of Generative AI into real-world applications for content automation.

Purpose

The purpose of this project is to:

- Automate recipe blog generation using AI.
- Reduce manual effort in food content writing.
- Provide personalized and creative recipe suggestions.
- Demonstrate practical implementation of Generative AI in web applications.

2. IDEATION PHASE

Problem Statement:

Many food bloggers and content creators spend significant time writing recipe blogs manually. Writing engaging, SEO-friendly, and structured recipe articles requires creativity and effort.

There is a need for:

- Automated recipe blog generation
- User-friendly interface
- Fast content creation
- AI-based intelligent text generation

Empathy Map Canvas

User Thinks:

- Writing recipes takes time.
- Needs creative and engaging content.

User Feels:

- Pressured to post regularly.
- Needs inspiration.

User Says:

- "I want quick recipe ideas."
- "I need blog-ready content."

User Does:

- Searches for recipe ideas online.
- Manually drafts blog posts.

Brainstorming

Possible solutions discussed:

- AI-based recipe generator
- Template-based blog writing system
- Personalized content recommendation system
- Integration of AI for automatic content generation
- Final solution chosen: **AI-driven automated recipe blogging platform.**

Objectives:

The main objectives of the project are:

- To develop an AI-based recipe blog generator.
- To integrate Google Gemini API for content creation.
- To design a clean and interactive UI using Streamlit.
- To allow users to specify recipe topic and word count.
- To generate structured blog content automatically.

3. REQUIREMENT ANALYSIS

Customer Journey Map

- User visits the application.
- User enters ingredients and preferences.
- System processes input using AI model.
- Recipe blog is generated.
- User reads, edits, and downloads content.

Solution Requirement

Functional Requirements:

- User input form for ingredients and preferences.
- AI-based content generation module.
- Blog formatting feature.
- Output display and download option.

Non-Functional Requirements:

- Fast response time.
- User-friendly interface.
- Scalability.
- Data security.

Data Flow Diagram

Level 0 (Context Diagram):

User → Flavour Fusion System → Generated Recipe Blog

Level 1:

User Input → Input Processing → AI Model → Content Formatting → Output

Technology Stack

1. Programming Language: Python
2. Frontend: HTML/CSS / Streamlit
3. Backend: Flask / Django
4. AI Integration: Generative AI API
5. Database: MySQL / MongoDB
6. Deployment: Cloud Hosting Platform

4. PROJECT DESIGN

Problem Solution Fit

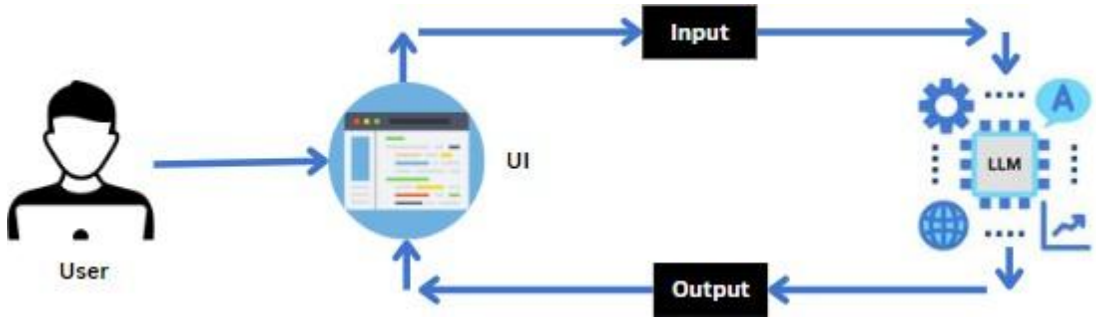
The system addresses the need for fast and personalized recipe blog creation by integrating AI-powered content generation, ensuring quality and customization.

Proposed Solution

Flavour Fusion allows users to input ingredients, dietary restrictions, and preferred cuisine. The system generates:

- Recipe Title
- Ingredients List
- Preparation Steps
- Cooking Tips
- Nutritional Insights
- Blog-style Description

System Architecture:



Architecture Flow:

User Input → Streamlit UI → Gemini API → Generated Content → Display to User

Components:

- **Frontend** – Streamlit
- **Backend** – Python
- **AI Model** – Google Gemini 1.5 Flash
- **Environment Variables** – dotenv

Technologies Used:

Technology	Purpose
1. Python	Core programming
2. Streamlit	Web interface
3. Google GenAI	Content generation
4. Dotenv	API key management

Folder Structure:

```
Flavour-Fusion/
├── app.py
├── .env
├── requirements.txt
├── README.md
└── assets/
    └── chatbot_image.png
```

Methodology:

Step 1: User Input

User enters:

- Recipe Topic
- Word Count

Step 2: Prompt Engineering

A structured prompt is created such as:

“Write a detailed, engaging, SEO-friendly blog post about Malai Kofta including ingredients, preparation steps, cooking tips, and conclusion.”

Step 3: API Request

The prompt is sent to **“**Gemini 1.5 Flash Model”.

Step 4: Content Generation

AI generates a complete recipe blog.

Step 5: Output Display

The generated blog is displayed in Streamlit UI.

Implementation:

1) Installing Required Libraries:

```
pip install google-generativeai

pip install python-dotenv

pip install streamlit
```

2) Main Code Structure:

```
import streamlit as st

import google.generativeai as genai

import os
```

```
import random
from dotenv import load_dotenv
```

3) Load API Key:

```
load_dotenv()
api_key = os.getenv("GOOGLE_API_KEY")
genai.configure(api_key=api_key)
```

4) Model Configuration:

```
generation_config =
{ "temperature": 0.75,
"top_p": 0.95,
 "top_k": 64,
"max_output_tokens": 2048,
}
```

5) Creating Model:

```
model =
   genai.GenerativeModel( model_name=
   "gemini-1.5-flash-latest",
   generation_config=generation_config
)
```

6) Generate Recipe Function:

```
def generate_recipe(topic, word_count):
   prompt = f"""
   Write a detailed recipe blog about {topic}.
   The blog should be approximately {word_count} words.
   Include:
```

- Introduction

- Ingredients

- Step-by-step preparation

- Tips

- Conclusion

"""response = model.generate_content(prompt)

return response.text

7) User Interface Design:

Features:

- Clean heading
- Chatbot-style introduction
- Input fields:
  - Recipe topic
  - Word count
- Generate button
- Joke section while generating
- Styled background

8) Output:

When user enters:

Topic: Malai Kofta ,**Word Count:** 500

The system generates:

- Introduction
- Ingredients list
- Cooking steps

- Pro tips
- Conclusion

5. PROJECT PLANNING & SCHEDULING

Phase	Activity	Duration
Phase 1	Requirement Gathering	1 Week
Phase 2	System Design	1 Week
Phase 3	Development	2 Weeks
Phase 4	Testing	1 Week
Phase 5	Deployment	1 Week

6. FUNCTIONAL AND PERFORMANCE TESTING

Performance Testing

✧ Tested response time for content generation.

✧ Verified accuracy of structured output.

✧ Tested system with multiple input combinations.

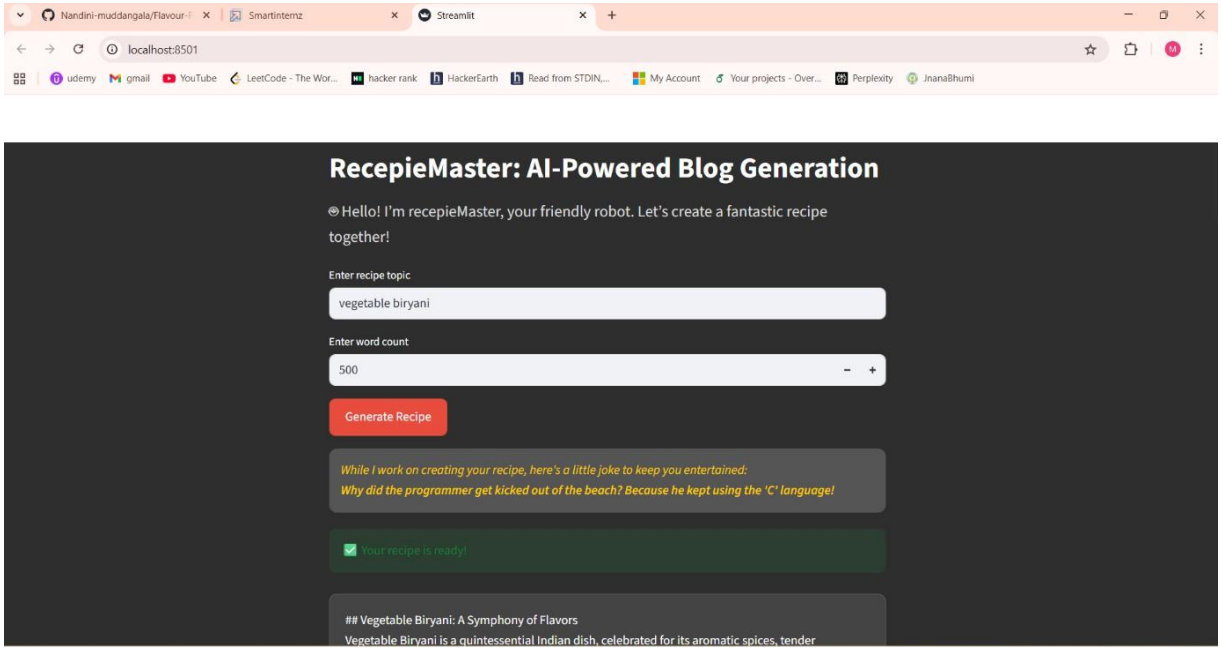
✧ Ensured scalability under multiple users.

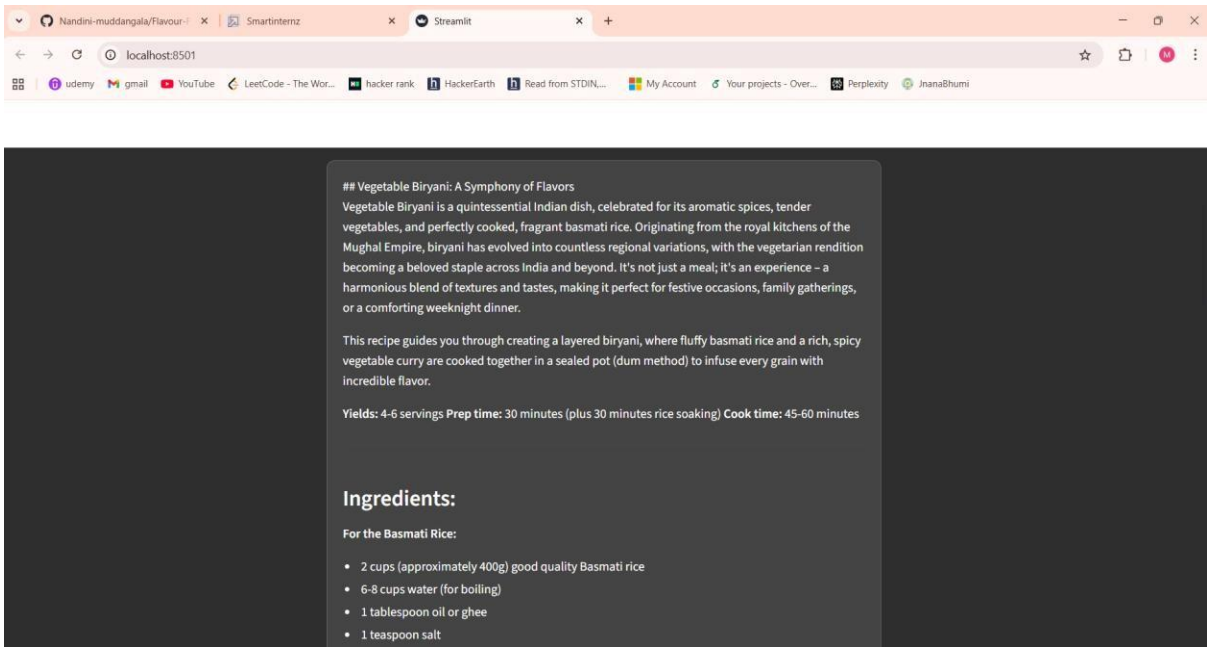
Results showed:

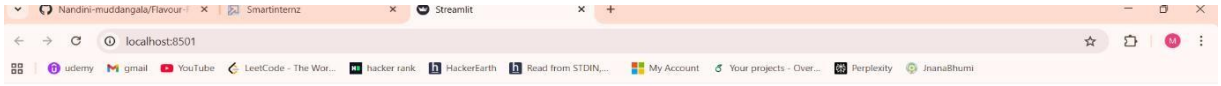
- Fast response generation.
- Structured and readable blog outputs.
- Stable performance.

7. Results

Output Screenshots:



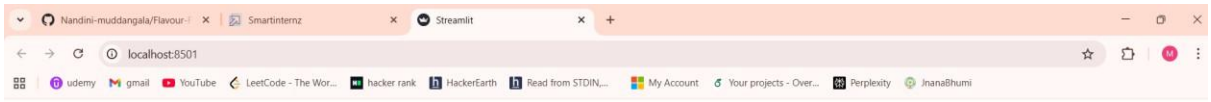




- 2 bay leaves
- 4 green cardamom pods
- 2-inch cinnamon stick
- 4 cloves

For the Vegetable Gravy (Curry):

- 2 tablespoons oil or ghee
- 1 large onion, thinly sliced
- 1 tablespoon ginger-garlic paste
- 2-3 green chilies, slit lengthwise (adjust to taste)
- 1 large tomato, finely chopped
- 1 cup mixed vegetables (carrots, green beans, potatoes, cauliflower florets – all diced into 1-inch pieces)
- ½ cup fresh green peas
- ½ cup plain yogurt, whisked smooth
- 1 teaspoon turmeric powder
- 1 teaspoon red chili powder (or Kashmiri chili for color)
- 1 tablespoon coriander powder
- 1 teaspoon cumin powder
- 2 tablespoons Biryani Masala (store-bought or homemade)
- Salt to taste
- ¼ cup water (if needed)



For Layering and Garnish:

- ½ cup fried onions (birista) – store-bought or homemade
- ¼ cup fresh mint leaves, chopped
- ¼ cup fresh coriander leaves, chopped
- 2 tablespoons ghee, melted
- A pinch of saffron strands soaked in 2 tablespoons warm milk (optional, for color and aroma)

Instructions:

1. Prepare the Basmati Rice: * Rinse the basmati rice thoroughly under cold running water until the water runs clear. Soak it in fresh water for 30 minutes. Drain well. * In a large pot, bring 6-8 cups of water to a rolling boil. Add the oil/ghee, salt, bay leaves, green cardamom, cinnamon stick, and cloves. * Add the drained basmati rice and cook uncovered for about 5-7 minutes, or until the rice is 70% cooked (al dente, with a slight bite). It should not be fully cooked. * Immediately drain the rice in a colander and set aside. Remove the whole spices if preferred, or leave them in for extra flavor.

2. Prepare the Vegetable Gravy: * In a heavy-bottomed pot or Dutch oven (the same one you'll use for layering, if large enough), heat 2 tablespoons of oil or ghee over medium heat. * Add the sliced onions and sauté until they turn golden brown. * Stir in the ginger-garlic paste and slit green chilies. Sauté for another minute until fragrant. * Add the chopped tomatoes and cook, stirring occasionally, until they soften and the oil starts to separate from the mixture (about 5-7 minutes). * Reduce the heat to low. Add the turmeric powder, red chili powder, coriander powder, cumin

minutes until the oil separates again. * Add the mixed vegetables and green peas. Stir well to coat them with the masala. Add ¼ cup of water, cover the pot, and cook on medium-low heat until the vegetables are about 80% tender (they will finish cooking during the dum process). This should take about 10-15 minutes.

3. Layer the Biryani: * If you prepared the vegetable gravy in a separate pan, transfer it to the bottom of your heavy-bottomed pot or Dutch oven (if using the same pot, ensure the gravy is spread evenly at the bottom). * Spread half of the partially cooked rice evenly over the vegetable gravy layer. * Sprinkle a generous portion of fried onions, chopped mint, and chopped coriander over the rice. * Carefully layer the remaining rice over this, forming the top layer. * Drizzle the melted ghee over the top rice layer. If using, pour the saffron milk evenly over the top for beautiful color and aroma. * Sprinkle the remaining fried onions, mint, and coriander over the top.

4. Dum Cooking (Sealing and Steaming): * Cover the pot tightly with a lid. For an authentic dum, you can seal the edges of the lid with a strip of atta (wheat flour) dough or aluminum foil to trap the steam effectively. * Place the pot on very low heat. Cook for 15-20 minutes. The steam trapped inside will cook the rice and vegetables completely, allowing the flavors to meld beautifully. * After 15-20 minutes, turn off the heat and let the biryani rest, undisturbed, for another 10-15 minutes. This resting period is crucial for the flavors to settle and the rice grains to firm up.

5. Serve: * Gently open the pot. Using a flat spoon or fork, carefully fluff the biryani from the sides, mixing the layers without mashing the rice. * Serve hot with a side of cooling raita (yogurt dip), a fresh green salad, or papad.

Enjoy this flavorful and aromatic Vegetable Biryani, a truly satisfying meal that brings the heart of Indian cuisine to your table!

8. ADVANTAGES & DISADVANTAGES

Advantages:

- Saves time
- AI-powered automation
- Easy to use
- No writing skills required
- Customizable word count

Disadvantages

- AI output may require minor editing.
- Dependent on internet connectivity.
- Requires prompt optimization for best results.

9. Conclusion:

Flavour Fusion is an AI-driven recipe blogging platform that automates the creation of structured and engaging blog posts. By integrating Streamlit with the Gemini 1.5 Flash model, the system efficiently generates customized recipe content based on user input.

The project demonstrates the practical application of Generative AI in content automation, improving productivity while maintaining quality and flexibility. With further enhancements, the platform can evolve into a comprehensive AI-based blogging solution.

10 . FUTURE SCOPE

- Voice-enabled recipe generation.
- Multi-language support.
- AI-generated food images.
- Mobile application version.
- Integration with social media platforms.
- Smart grocery list generator.

10. APPENDIX

GitHub Link :

https://github.com/Nandini-muddangala/Flavour-Fusion-AI-Driven-Recipe-Blogging/tree/main

Project Demo Link :

https://drive.google.com/file/d/1_yWBRkLHAtOC9m4RRk1Tgs9v3FXWjKs5/view?pli=1