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# **CAPSTONE PROJECT**

## **RECIPE PREPARATION AGENT**

**Presented By:**  
**Kandi Seema-Rajiv Gandhi University of Knowledge and  
Technologies ,IIT Basar- Electronics and Communication  
Engineering**

# OUTLINE

- **Problem Statement** (Should not include solution)
- **Proposed System/Solution**
- **System Development Approach** (Technology Used)
- **Algorithm & Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

# PROBLEM STATEMENT

- A Recipe Preparation Agent helps users cook meals using only the ingredients they have on hand. By inputting available groceries, users receive tailored recipe suggestions using a RAG-based AI system. The agent retrieves relevant recipes and generates step-by-step instructions adapted to ingredient limitations. It offers substitutions, cooking tips, and dietary adjustments based on user preferences or restrictions. Designed to reduce food waste and save time, it turns pantry items into practical meal solutions. This AI assistant makes everyday cooking smarter, simpler, and more sustainable.
- Users struggle to prepare meals with the ingredients they already have.
- Lack of personalized recipe suggestions leads to food waste or repetitive meals.
- Difficulty finding substitutions for missing ingredients or adapting to dietary restrictions.
- Need for an AI-powered solution to simplify cooking while minimizing waste.

# PROPOSED SOLUTION

- ***AI-Powered Recipe Preparation Agent.***
- **Solution:** An AI agent that:
  - Accepts user's available ingredients as input.
  - Retrieves and suggests tailored recipes using **RAG (Retrieval-Augmented Generation)**.
  - Provides step-by-step instructions, substitutions, and cooking tips.
  - Adapts to dietary preferences (vegan, gluten-free, etc.).
- **Value Proposition:**
  - Reduces food waste.
  - Saves time and effort in meal planning.

# SYSTEM APPROACH

## *Tech Stack & Development:*

- **Mandatory Tools:**
  - **IBM Cloud Lite** (For hosting and APIs).
  - **IBM Granite** (Foundation models for RAG-based retrieval/generation).
- **Additional Technologies:**
  - Python/Flask for backend logic.
  - Vector Database (e.g., Chroma/FAISS) for recipe embeddings.
  - UI: Streamlit/React for user input/output.

# ALGORITHM & DEPLOYMENT

*How It Works:*

- **Workflow:**
  - **Input:** User uploads available ingredients.
  - **Retrieval:** RAG system fetches matching recipes from a curated dataset.
  - **Generation:** IBM Granite models refine recipes + suggest substitutions.
  - **Output:** Step-by-step instructions with tips.
- **Deployment:**
  - Backend hosted on **IBM Cloud Lite**.
  - CI/CD via IBM Toolchains.

# RESULT

Projects / final\_project / Recipe



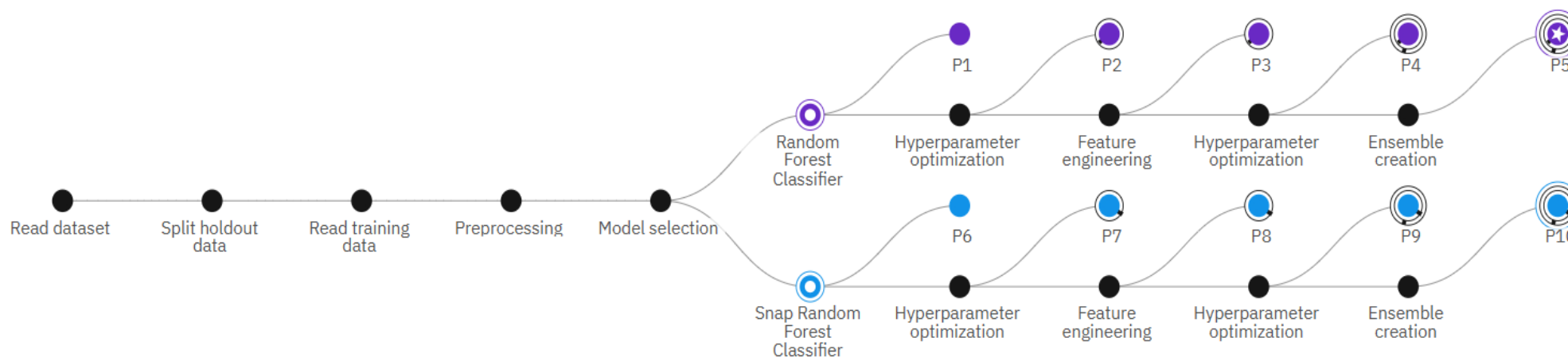
Experiment summary

Pipeline comparison

★ Rank by: Accuracy (Optimized) | Cross validation

## Progress map ⓘ

Prediction column: TranslatedRecipeName



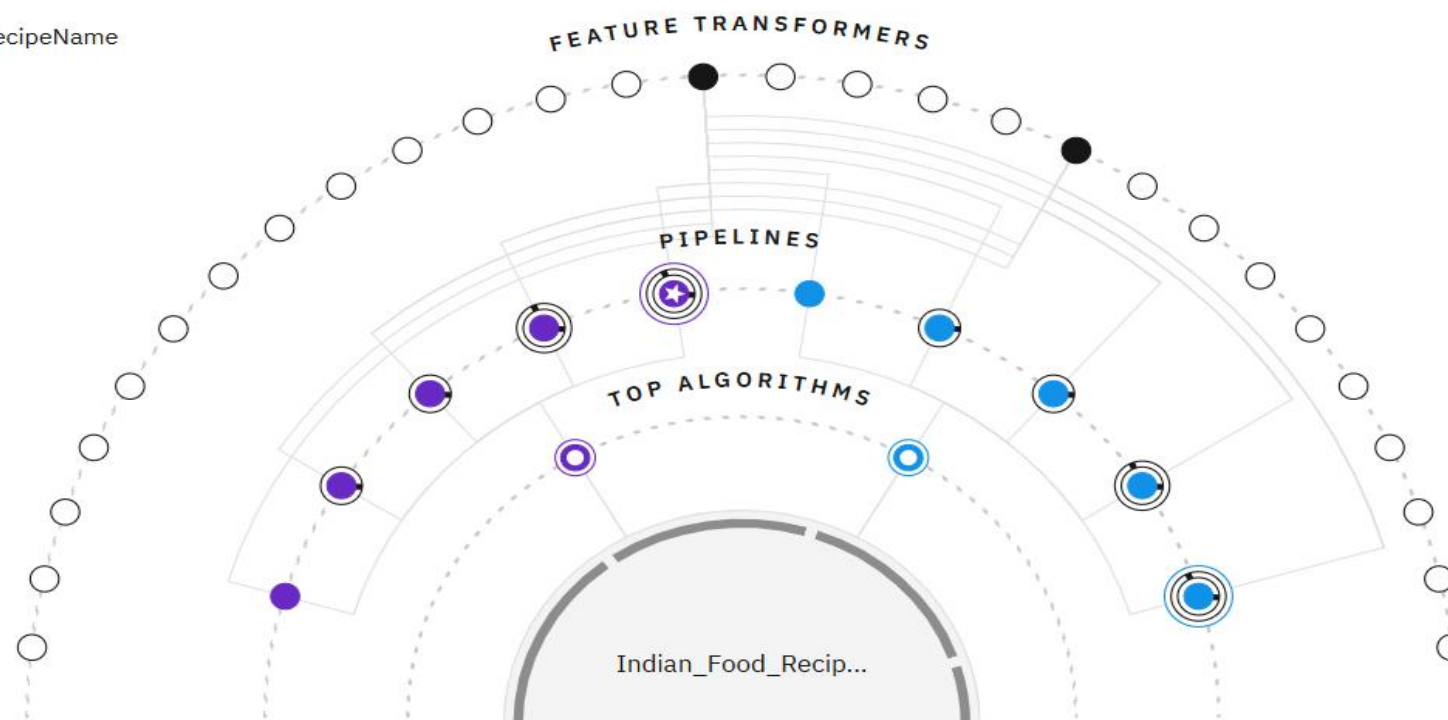
[Projects](#) / [final\\_project](#) / [Recipe](#)

Experiment summary

Pipeline comparison

## Relationship map ⓘ

Prediction column: TranslatedRecipeName





[Projects](#) / [final\\_project](#) / P5 - Random Forest Classifier: Recipe

## Input (1)

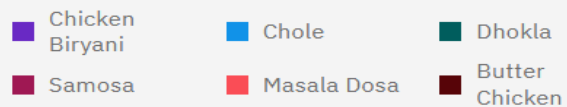
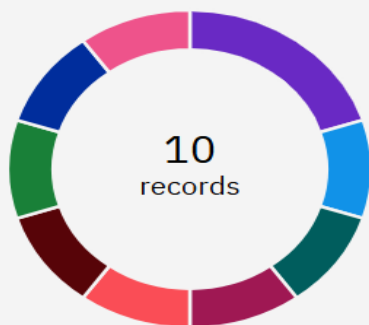
Column	↑	Type
Cleaned-Ingredients		other
Cuisine	Cleaned-Ingredients	other
image-url		other
Ingredient-count		double
TotalTimeInMins		double
TranslatedIngredients		other
TranslatedInstructions		other
URL		other

## Prediction results

Prediction type

Multiclass classification

Prediction percentage



Display format for prediction results

☒ Table view ☐ JSON view

	Prediction
1	Chicken Biryani
2	Chole
3	Dhokla
4	Chicken Biryani
5	Samosa
6	Masala Dosa
7	Butter Chicken
8	Upma
9	Naan
10	Rajma
11	

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# CONCLUSION

- AI agent simplifies cooking with limited ingredients.
- Leverages IBM Cloud/Granite for scalable, sustainable solutions.
- Reduces food waste and enhances user experience.

# FUTURE SCOPE

## *Enhancements Ahead*

- Voice-enabled input (e.g., via Watson Speech-to-Text).
- Multi-language support.
- Integration with grocery delivery APIs.
- Community-driven recipe sharing..

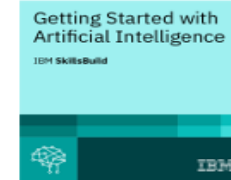
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# REFERENCES

- IBM Granite documentation.
- Research papers on RAG for recipe generation.
- IBM Cloud Lite services.

# IBM CERTIFICATIONS

In recognition of the commitment to achieve  
professional excellence



## Kandi Seema

Has successfully satisfied the requirements for:

### Getting Started with Artificial Intelligence



Issued on: Jul 24, 2025  
Issued by: IBM SkillsBuild

Verify: <https://www.credly.com/badges/bef34b0c-23bb-4e33-8df0-6bd967396721>



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Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution



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Issued by: IBM SkillsBuild

Verify: <https://www.credly.com/badges/50496b0e-3f9e-4699-9810-9cf0908863b1>



# IBM CERTIFICATIONS

IBM **SkillsBuild**

Completion Certificate



This certificate is presented to

Seema Kandi

for the completion of

## **Lab: Retrieval Augmented Generation with LangChain**

(ALM-COURSE\_3824998)

According to the Adobe Learning Manager system of record

**Completion date:** 24 Jul 2025 (GMT)

**Learning hours:** 20 mins





**THANK YOU**