
CAPSTONE PROJECT

FARMING AI AGENT

Presented By

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OUTLINE

- Problem Statement
- Technology used
- Wow factor
- End users
- Result
- Conclusion
- Git-hub Link
- Future scope
- IBM Certifications

PROBLEM STATEMENT

Farmers often struggle to make timely and informed decisions about crop selection, fertilizer use, cost estimations, and maintenance tasks due to variable weather, fluctuating input prices, and limited access to expert advice. This leads to suboptimal yields, wasted resources, and reduced profitability.

- **Proposed Solution:**

Develop an AI-powered farming assistant that responds exclusively to agriculture-related queries. The agent will deliver clear, actionable recommendations on crop selection, fertilizer types and dosages, input cost estimates, and crop maintenance procedures. All advice will be personalized based on real-time weather data and local market prices, ensuring farmers receive up-to-date, practical guidance tailored to their specific conditions and needs.

TECHNOLOGY USED

IBM cloud lite services

Natural Language Processing (NLP)

Retrieval Augmented Generation (RAG)

IBM Granite model

IBM CLOUD SERVICES USED

- IBM Cloud Watsonx AI Studio
- IBM Cloud Watsonx AI runtime
- IBM Cloud Agent Lab
- IBM Granite foundation model

WOW FACTORS

- Personalized, location-based recommendations for crop cycles, fertilizer type, and maintenance tailored to local weather and soil conditions.
- Real-time pest and disease detection using AI-enabled image recognition, allowing early intervention and reduced crop loss.
- Cost estimation of inputs like fertilizers based on current market prices, helping farmers budget efficiently.
- Integration with live weather data to adapt planting, irrigation, and fertilizer schedules dynamically.
- Precision agriculture support through AI-powered monitoring of soil nutrients, crop health, irrigation needs, and yield prediction.
- Automated and optimized pesticide/herbicide application using drones and robotics to reduce waste and environmental impact.
- AI-powered farm surveillance and security to prevent animal or human threats.

END USERS

- Academic Researchers
- Research Institutions and Universities
- Industry R&D Teams
- Educators

RESULTS



Sasya_Saathi 06:53 PM

Welcome to Sasya_Saathi

I am a Dedicated Farming agent !!. I can help you with any Farming related Queries.



Quick start samples

How often should crops be irrigated during the summer season?



Which type of fertilizer should be used for vegetable crops, and how much does it cost locally?



What are the basic steps to prepare soil before planting a crop?



Type something...



RESULTS



You 04:35 PM

How often should crops be irrigated during the summer season?



Sasya_Saathi 04:35 PM

Irrigation frequency during the summer season largely depends on the specific crop, local climate conditions, soil type, and growth stage. However, as a general guideline:

1. **Cereals (like Maize):** These crops require moderate to high water needs. During vegetative stages in hot weather, they might need irrigation every 5-7 days if rainfall is insufficient. In reproductive stages (tasseling to grain filling), increasing this to every 3-4 days can be beneficial for maximizing yield.
2. **Pulses (like Pigeon pea or Black gram):** Pulses generally have lower water requirements compared to cereals but are sensitive to drought stress around flowering and pod development phases. Irrigating these crops once every 8-10 days during early growth stages may suffice; however, reducing this interval closer to critical developmental periods could enhance productivity significantly without causing overwatering issues that lead to root diseases or nutrient leaching.
3. **Oilseeds (such as Soybean):** Similar to pulses, oilseeds also prefer less frequent but deep irrigations rather than frequent shallow ones due to their susceptibility towards certain soilborne diseases with excessive moisture retention near the surface layer of the soil profile under warm conditions. A schedule of about once per week should typically work unless there's an extended dry spell requiring supplementary waterings twice a week at most until monsoon rains set in reliably again post midsummer heatwaves subsided.
4. **Millets & Millet Varieties:** Depending upon variety and maturity period, millets usually demand lesser amounts of water compared even pulse crops. Generally, one deep irrigation session per fortnight would often prove sufficient especially

Type something...



RESULTS



You 04:36 PM

What are the basic steps to prepare soil before planting a crop?



Sasya_Saathi 04:36 PM

Preparing soil before planting a crop is crucial for successful cultivation. Here are the basic steps:

- 1. Soil Testing:** Begin by testing your soil to understand its pH level, nutrient content (macronutrients like Nitrogen, Phosphorus, Potassium; micronutrients), organic matter content, and texture (clay, silt, loam). This can be done through local agricultural extension services or private labs. The cost of soil testing typically ranges from ₹200 to ₹500 in India depending on the number of tests conducted.
- 2. Amend Soil Based on Test Results:** Depending on the test results:
 - If nutrient levels are low (especially NPK), apply appropriate fertilizers based on recommendations from the lab report or an agronomist's advice. For instance, if nitrogen is deficient and you're planning to grow wheat which requires high nitrogen input during tillage phase before sowing could cost around ₹80-₹150 per kg depending upon brand and quantity needed).
 - Adjust pH using lime if it's too acidic or sulfur if it's too alkaline following specific guidelines provided with these amendments as incorrect adjustments can harm crops rather than help them. Lime costs approximately ₹3-₹4 per kg while sulfur costs about ₹14-₹16 per kg in Indian markets based on quality and quantity purchased locally.
- 3. Tillage/Plowing:** Till or plow the land to break up compacted clods into finer particles improving root access to water and air within the soil profile which enhances germination rates post sowing/transplanting activities later down the line (~₹75-₹150 for hiring tractor services including fuel charges in many rural areas across India).

Type something...



RESULTS

Deployed AI Agent

The screenshot displays the IBM Watsonx deployment interface for an AI agent named 'Sasya_Saathi'. The interface includes a top navigation bar with the IBM Watsonx logo, an 'Upgrade' button, and user account information. Below the navigation bar, the deployment path is shown as 'Deployment spaces / Farming Deployment / Sasya_Saathi'. The main section features the agent name 'Sasya_Saathi' with a 'Deployed' status and a 'Preview' button. A chat window is open, showing a user query: 'What are the basic steps to prepare soil before planting a crop?'. The AI agent's response provides a detailed guide on soil preparation, including steps for soil testing, amending soil based on test results, tillage/plowing, and incorporation of organic matter. The right sidebar contains 'About this deployment' information, including the deployment ID, serving name, software specification (runtime-24.1-py0.11), hardware specification (Extra extra small: 1 CPU and 2 GB RAM), and associated model details.

IBM watsonx

Deployment spaces / Farming Deployment / Sasya_Saathi

Sasya_Saathi Deployed Online

API reference Test **Preview**

New chat

You 04:36 PM

What are the basic steps to prepare soil before planting a crop?

Sasya_Saathi 04:36 PM

Preparing soil before planting a crop is crucial for successful cultivation. Here are the basic steps:

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 - If nutrient levels are low (especially NPK), apply appropriate fertilizers based on recommendations from the lab report or an agronomist's advice. For instance, if nitrogen is deficient and you're planning to grow wheat which requires high nitrogen input during tillage phase before sowing could cost around ₹30-₹150 per kg depending upon brand and quantity needed).
 - Adjust pH using lime if it's too acidic or sulfur if it's too alkaline following specific guidelines provided with these amendments as incorrect adjustments can harm crops rather than help them. Lime costs approximately ₹3-4 per kg while sulfur costs about ₹4-₹6 per kg in Indian markets based on quality and quantity purchased locally.
- 3. Tillage/Plowing:** Till or plow the land to break up compacted clods into finer particles improving root access to water and air within the soil profile which enhances germination rates post sowing/transplanting activities later down the line (~₹75-₹150 for hiring tractor services including fuel charges in many rural areas across India).
- 4. Incorporation of Organic Matter:** Add compost or manure (~₹15-₹30 per 25kg bag) along with green manure crops that fix atmospheric nitrogen benefiting subsequent cash crops like maize where each kilogram might require 5-8 tons of soil.

Type something...

About this deployment

Name: Sasya_Saathi

Description: I am a Dedicated Farming agent & I can help you with any Farming related Queries.

Deployment Details

Deployment ID: cca26a30-26ba-41...

Serving name: No serving name.

Software specification: runtime-24.1-py0.11

Hardware specification: Extra extra small: 1 CPU and 2 GB RAM

Copies: 1

Tags: AI-AGENT

Associated model

Sasya_Saathi

002c5282-a230-4cc8-0a3b-001603269cbe

Last modified: 2 hours ago

Created on: Aug 3, 2023

CONCLUSION

- The agents enable pest and disease monitoring and timely maintenance scheduling.
- Integration with predictive analytics, IoT sensors, and market prices enhances decision-making.
- This leads to improved resource efficiency, higher yields, and increased farmer profitability.
- Ongoing advancements in autonomous machinery, sustainability, and multilingual support will further revolutionize agriculture.
- AI farming assistants provide precise, real-time, and weather-adaptive agricultural guidance.
- They offer personalized crop recommendations and accurate fertilizer dosage with cost estimates.

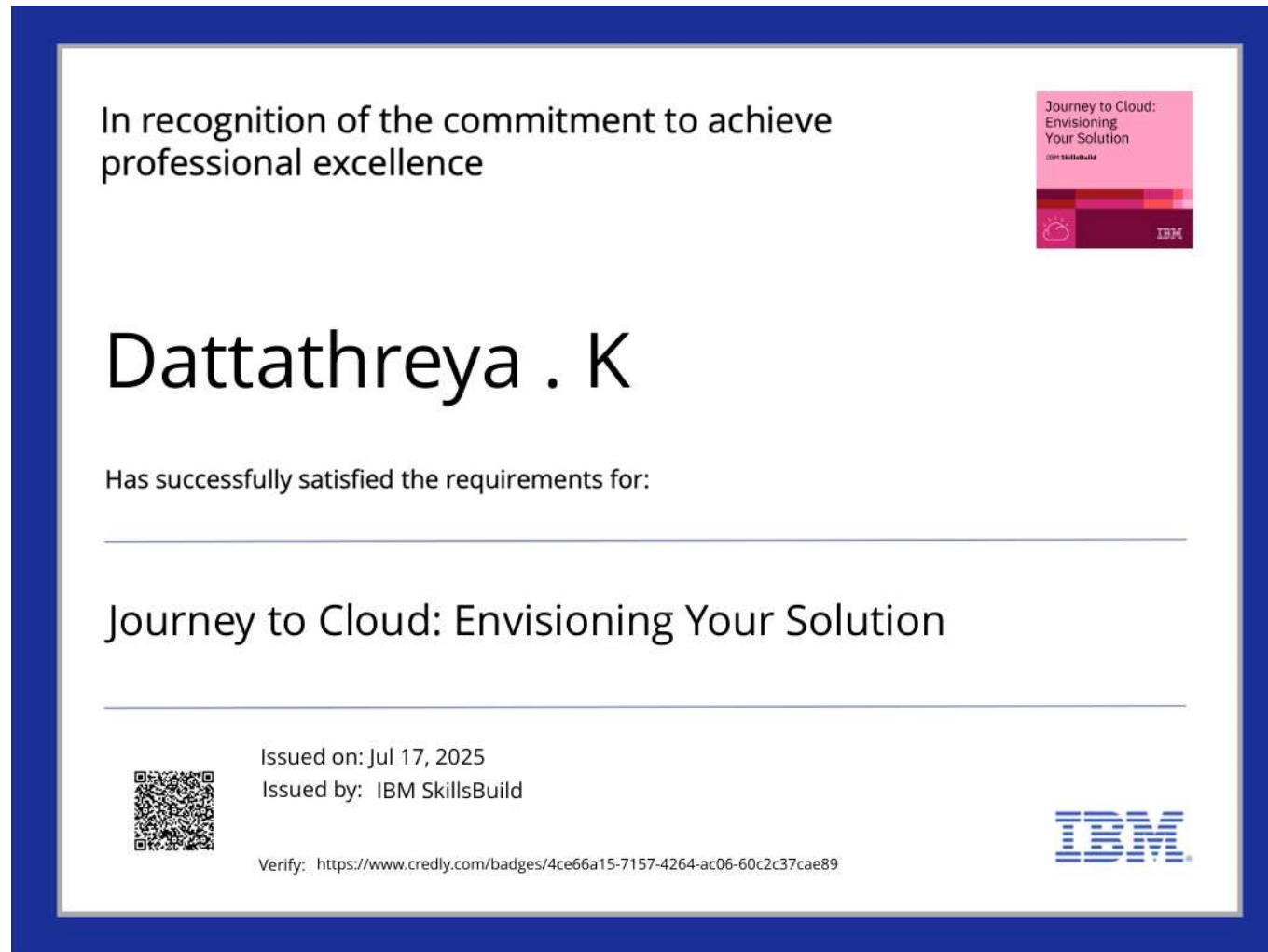
FUTURE SCOPE

- Personalized crop recommendation
- Real-time soil monitoring
- Weather API integration
- Market price estimation
- Fertilizer dosage and cost estimate
- Pest and disease detection

IBM CERTIFICATIONS



IBM Certifications



IBM Certifications

IBM **SkillsBuild**

Completion Certificate



This certificate is presented to

Dattathreya Kalva

for the completion of

**Lab: Retrieval Augmented Generation with
LangChain**

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 21 Jul 2025 (GMT)

Learning hours: 20 mins

GITHUB LINK

https://github.com/Dattathreya23/Farming_AI_Agent



THANK YOU