**Agri/food Tech- “Crop Smart and Location-Specific Farming Recommendations for Agricultural Sustainability”**

1. **Theme:** Agriculture/ Food Tech
2. **Problem statement**:

How might we develop a solution to reduce pesticide and fertilizer usage by integrating Soil Health Card data, weather data, and the Leaf Color Chart method? This app should provide farmers with precise, location-specific recommendations to optimize input usage, enhance crop health, and promote sustainable agricultural practices.

1. **College Code & College Name:** 4216 & MAILAM ENGINEERING COLLEGE
2. **Guide Name, Designation, Mobile No. & Email id:**

Mrs.E.Lavanya,---Assistantprofessor/CSE---9751499987---lavanyacse@mailamengg.com

1. **Student Team details**:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sl.No. | Student reg.no. |  | Name of the Student | Branch | Mobile No. | email id |
| 1 | 421621104070 |  | KOWSALYA J | CSE | 8925319197 | cmikowsalyaj@gmail.com |
| 2 | 421621104120 |  | ROSELINE PRINCY V | CSE | 9345800242 | roselineprincyv2003@gmail.com |
| 3 | 421621104073 |  | LATHIKA V | CSE | 9150617656 | lathikavelu04@gmail.com |

1. **Project Summary:**

We're working on a project to create a digital platform designed specifically for farmers. This platform will combine information from Soil Health Cards (SHC), real-time weather updates, and the Leaf Color Chart (LCC) method to provide farmers with precise, locations-specific recommendations. The app will guide farmers on optimal

fertilizer and pesticide usage, improving crop health, reducing input costs, and promoting sustainable agricultural practices.

1. **Proposed solution with methodology:**

**Proposed Solution:**

Develop a mobile app integrating soil health card data, weather data, and the leaf color chart method to provide precise, location-specific recommendations for optimized pesticide and fertilizer usage. This app will promote sustainable agriculture by improving input efficiency, enhancing crop health, and reducing environmental impact.

**Methodology**

**1. Data Integration:**

* Collect soil health data (nutrient levels, pH) and real-time weather data from reliable sources. Use the leaf color chart to assess crop nutrient requirements.

**2. Algorithm Development:**

* Design algorithms to analyze combined data and generate specific input recommendations tailored to crop type and location.

**3. User Interface:**

* Build a simple, multilingual app interface for farmers, ensuring accessibility and usability.

**4. Farmer Feedback Loop:**

* Integrate a feedback system to continuously improve recommendations based on user inputs and results.

**5. Education and Training:**

* Partner with local organizations to train farmers on app usage and sustainable practices.The optimize high crop and reduce environment harm

1. **Workplan / time schedule indicating the project mile stone :**

|  |  |
| --- | --- |
| Milestone | Timeline |
| Research and Data Collection | Week 1–2 |
| Algorithm Development | Week 3–4 |
| User Interface Design | Week 5–6 |
| App Development | Week 7–8 |
| Testing and Debugging | Week 9–10 |
| Farmer Feedback Collection | Week 11 |
| Education and Training | Week 12 |
| Pilot Launch & Final Refinement and Rollout | Week 13-14 |

**9**. **Plan of action of implementation** :

| **Month 1** |

Collaborate with agricultural departments to collect Soil Health Card (SHC) data. Identify reliable weather data sources (e.g., APIs like OpenWeather or Skymet) for integration. Gather and digitize Leaf Color Chart (LCC) guidelines. Research farmer needs and app design preferences through surveys and interviews. Develop AI-based algorithms to analyze SHC, weather, and LCC data for location- and crop-specific recommendations. Begin designing the app interface, focusing on multilingual support and user-friendly navigation.

| **Month 2** |

Build the app prototype, integrating SHC, weather, and LCC functionalities with the developed algorithms. Conduct internal testing of algorithms to ensure recommendation accuracy. And Finalize the app’s interface design, ensuring compatibility with low-data usage environments. Conduct pilot testing with a small group of farmers in one district to evaluate usability and effectiveness. then Gather feedback from pilot users to identify areas for improvement.

| **Month 3** |

Refine the app based on pilot test results, improving both functionality and user experience. Partner with local organizations to create training materials and workshops for farmers. Deploy the app in the pilot region, supported by training sessions to help farmers understand and use the app effectively. Monitor key performance metrics, such as reduced fertilizer/pesticide usage, crop health, and user satisfaction.

| **Month 4** |

Analyze pilot deployment data and farmer feedback to implement final refinements .Scale the app to other regions by partnering with state agriculture departments and farmer cooperatives .Provide ongoing technical support and roll out updates based on farmer feedback. Expand app adoption across multiple regions, promoting sustainable agriculture practices on a larger scale.

**10. List of facilities available in the college to develop the prototype of the project:**

**👉Computer Science/Engineering Lab:**

For software development, programming, and integrating weather APIs, data storage, and algorithm development.

**👉 IoT Lab (If Available):**

For experimenting with soil sensors or integrating physical sensors for real-time data collection (e.g., soil moisture, temperature).

**👉 Data Science/Analytics Lab:**

For working on machine learning models and algorithms to analyze soil and a weather data to provide actionable recommendations.

**👉 Agricultural Science Department:**For collaboration on agricultural expertise and validation of the Leaf Color Chart method, as well as understanding local soil conditions and crop requirements.

👉 **Cloud Computing Resources:**

For hosting and managing large datasets and running algorithms on cloud platforms (e.g., AWS, Google Cloud).

**11.Nature of Industry support for the project, (if any) :**

The nature of industry supports for our project comes from various sources like Software companies (Google, Amazon), weather data providers (Open Weather, Skymet), Agricultural Support from Agri-tech companies like (CropIn, Trellis), research institutions (CABI, FAO), NGOs, and government departments and Training and AwarenessSupport from Agri-tech platforms.

**12.Total Cost :**

Hardware and their costs:

|  |  |  |
| --- | --- | --- |
| **Hardware Item** | **Quantity** | **Total Cost (₹)** |
| Smartphone device | 1 | 6000 |
| Internet dongles | 1 | 1000 |
| External storage device | 1 | 2000 |
|  | **Total** | **9000** |

Software and their costs:

|  |  |
| --- | --- |
| **Software items** | **Total Cost (₹)** |
| Android Studio | Free |
| Firebase (Free Tier) | Free |
| Open Weather API | Free (up to ₹1,000/month for paid tier) |
| Heroku (Free Tier) | Free |
| Figma | Free |
| Leaf Color Chart | Free |
| GitHub | Free |
| **total** | **>1000** |

**13.Details of Financial assistance required (Limited to Rs 10,000/-)**

Hardware items = ₹9000

software items = ₹>1000

**14.Expected outcomes / results :**

By integrating Soil Health Card data, weather data, and the Leaf Color Chart method, this app is expected to create a highly effective solution for reducing pesticide and fertilizer usage, while simultaneously boosting crop health and promoting sustainable agricultural practices. The expected results include lower input costs, improved crop yields, better environmental outcomes, and greater farmer education. These outcomes will contribute to the long-term sustainability of farming while addressing critical global challenges in agriculture.

**UNDERTAKING**

1. ALL the students are studying in final year engineering. All the students are registered only once for this scheme.
2. The college will provide the basic infrastructure and other required facilities to the students for timely completion of their projects.
3. The college assumes to undertake the financial and other management responsibilities of the project. We are aware that the amount is to be utilized only for the purpose sanctioned i.e. to meet the expenses for developing the prototype and not for purchase of computer consumables, stationaries, honorarium, overhead etc. Unutilised balance amount will be returned back to the University after the time of completion of the project.

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Student 1 Student 2 Student 3

Signature of the Mentor Signature and seal of the principal