

PIP2001 Capstone Project  
Review-4 (VIVA-VOCE)

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**AgroTrack**  
**Batch Number: CIT-G33**

Roll Number	Student Name
20211CIT0110	S P BRAHMA CHAITANYA
20211CIT0156	BHUVANESHWAR Y
20211CIT0147	SHREYANKA B L
20211CIT0069	DHANUSH M

Under the Supervision of,  
Dr. Nihar Ranjan Nayak  
Associate Professor  
School of Computer Science and Engineering  
Presidency University

**Name of the Program: Capstone Project-PIP2001**

**Name of the HoD: Dr. Anandaraj S P**

**Name of the Program Project Coordinator: Dr. Sharmasth Vali Y**

**Name of the School Project Coordinators: Dr. Sampath A K / Dr. Abdul Khadar A / Mr. Md Ziaur Rahman**

# Introduction

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- Agriculture remains the backbone of many economies worldwide, but traditional farming methods face challenges due to climate variability, soil degradation, pest infestations, and inefficient use of resources.
- How can farmers gain access to all farming cycle elements through a single platform that integrates retailing, leasing, and access to mandi prices, providing seamless transactions and agri-credit options.

# Literature Review

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This section highlights ten relevant research papers from IEEE on the intersection of agriculture and technology, focusing on smart farming, IoT solutions, and machine learning.

## 1. IoT-Based Smart Agriculture: An Overview

- **Advantages:** Real-time monitoring, predictive analytics, and better crop management.

**Limitations:** Requires high infrastructure investment, limited access in rural areas.

## 2. Application of Machine Learning in Crop Yield Prediction

- **Advantages:** Early prediction allows for better planning and resource allocation.

**Limitations:** Requires high-quality datasets and computing power.

# Literature Review

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## 3. Blockchain-Based Traceability Systems for Agriculture Supply Chains

- **Advantages:** Improves trust and transparency among stakeholders.  
**Limitations:** Requires digital literacy and complex infrastructure.

## 4. Weather Prediction Models for Agriculture Applications

- **Advantages:** Helps in planning sowing and harvesting periods.  
**Limitations:** Weather models are prone to inaccuracies.

## 5. Big Data Analytics in Agriculture: Case Studies and Applications

- **Advantages:** Insights from big data can boost farm efficiency.  
**Limitations:** Challenges in managing large datasets.

# Research Gaps Identified

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1. **Poor Usability:** Complex interfaces and navigation hinder farmer adoption.
2. **Intermediary Dependence:** Lack of direct farmer-consumer connections.
3. **Incomplete Data:** Limited access to real-time market, weather, and crop insights.
4. **Technical Issues:** Poor offline functionality, bugs, and slow performance.
5. **Limited Technology:** Minimal use of AI, analytics, and tailored recommendations.
6. **Security Risks:** Inadequate data privacy and protection measures.
7. **Sustainability Gaps:** Few tools to reduce food waste and optimize distribution.

## Opportunity:

AgroTrack addresses these gaps with a farmer-first platform offering user-friendly design, direct connections, real-time data, and advanced technologies for a sustainable agricultural ecosystem.

# Proposed Methodology

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1. **User-Centric Design:** Intuitive, multilingual, and offline-accessible interface for diverse users.
2. **Real-Time Data Integration:** Weather updates and market trends for informed farming decisions.
3. **Advanced Technologies:** Machine learning for crop recommendations and supply chain optimization.
4. **Direct Farmer-Consumer Interaction:** Secure marketplace with verified farmer profiles to eliminate middlemen.
5. **Financial Assistance:** Predictive analytics for credit assessment and microloan facilitation.
6. **Sustainability Focus:** Tools to minimize food waste and promote eco-friendly farming.
7. **Robust Security:** Encryption and fraud detection for data safety.
8. **Continuous Improvement:** Feedback loops and scalable architecture for adaptability and growth.

# Objectives

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## 1. Information Accessibility

Provide farmers with real-time access to market prices, expert farming advice, and crop recommendations based on weather and soil conditions.

AgroTrack aims to address the knowledge gap that many farmers face by delivering critical information directly to their mobile devices. This includes up-to-date market prices, tailored farming advice, and scientifically backed crop recommendations that consider local weather and soil conditions. By making data and expert insights readily available, AgroTrack empowers farmers to make informed decisions that enhance crop health, productivity, and profitability.

# Objectives

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## 2. Financial Empowerment

Enable secure financial transactions and provide access to credit facilities tailored for farming needs.

Recognizing the financial challenges faced by smallholder farmers, AgroTrack incorporates financial tools that simplify access to credit and payment options. Through partnerships with financial institutions, the platform allows farmers to secure microloans and make seamless transactions for purchasing inputs like seeds, fertilizers, and equipment. This financial integration supports sustainable agricultural investment, helping farmers grow their operations and improve yields with essential resources.



# Objectives

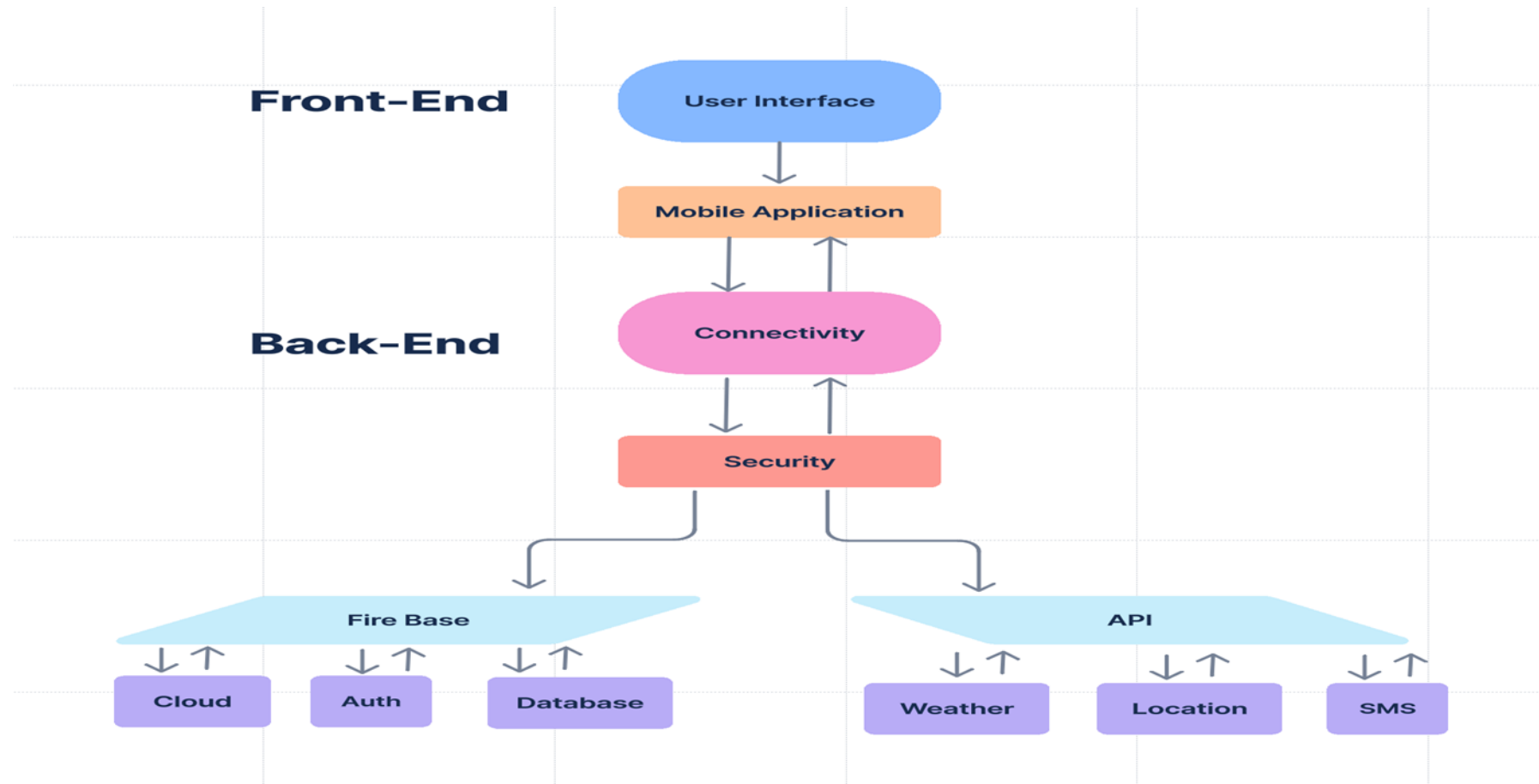
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## 3. Market Integration & Evaluation

Connect farmers to a network of local and international markets and conduct field trials to assess and refine the platform's effectiveness.

AgroTrack opens up direct market access by connecting farmers to potential buyers locally and internationally, reducing reliance on intermediaries and maximizing profit potential. This feature enables farmers to explore demand trends and align their crops with market needs. To ensure the platform's usability and impact, AgroTrack will undergo real-world field trials in agricultural environments, gathering feedback from users and refining features to better meet farmers' needs. These trials are essential for validating AgroTrack's effectiveness in empowering farmers and fostering agricultural growth.

# System Design & Implementation



# Algorithm

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## STORAGE FOR USER DATA

- **Firestore:** Utilizes Firestore as a NoSQL database for real-time data storage and synchronization.
- **Data Structure:** User information is stored in collections and documents, allowing for easy retrieval and updates.

## SORTING DATA

- **OrderBy Queries:** Implements sorting capabilities using the orderBy method to retrieve user data based on specific fields (e.g., name, date).
- **Efficiency:** Sorting is performed server-side, optimizing data retrieval and minimizing network load.

# Algorithm

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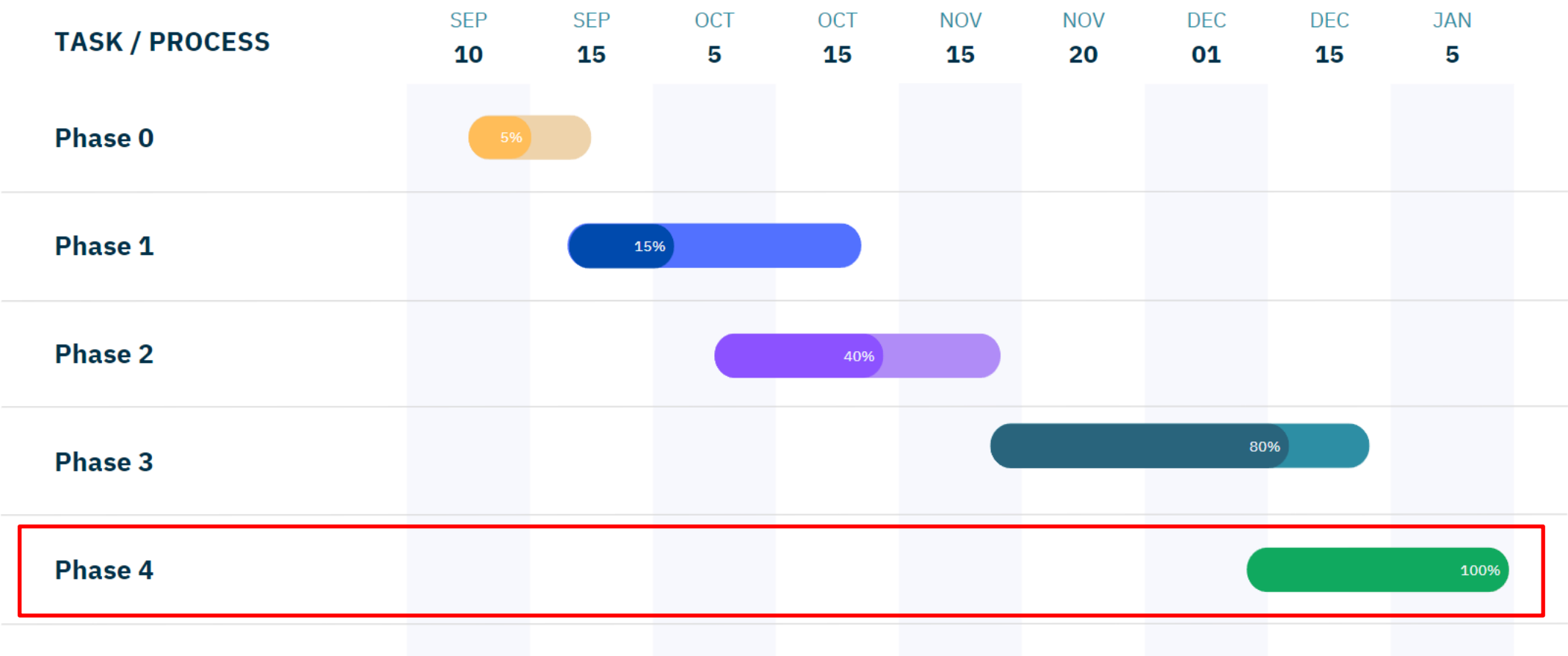
## FINDING DATA

- Where Queries: Uses the where method to filter user data based on specific criteria (e.g., email, status).
- Targeted Retrieval: Allows efficient searches for specific records without fetching unnecessary data.

## TRANSFERRING DATA TO USERS

- Real-Time Listeners: Sets up listeners with Firestore's snapshots() method to automatically update the UI when data changes.
- User Experience: Provides instant feedback to users about changes in their data without needing manual refreshes.

# Project Timeline (Gantt Chart)



**Phase 0:**  
Understanding the  
Problem Statement

**Phase 1:**  
Project Proposal and  
Design

**Phase 2:**  
Mid-Term  
Implementation and  
Functional Prototype

**Phase 3:**  
Final Development,  
Testing, and System  
Validation

**Phase 4:**  
Final Viva-Voce and  
Submission



# Application Main Features

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1. **Buy and Sell:** Seamless marketplace for agricultural goods.
2. **AgroCredit:** Easy access to farming loans and credits.
3. **Crop Recommendations:** Weather-based suggestions for optimal farming.
4. **AI Chatbot:** Integrated assistant for instant support.
5. **Tool Rentals:** Platform for leasing farming equipment.
6. **Learning Resources:** Educational content for modern farming techniques.
7. **Fertilizer Guide:** Recommendations for efficient crop nutrition.

# Conclusion

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- AgroTrack bridges the gap between traditional farming methods and modern technology, providing farmers with a comprehensive platform accessible via both web and mobile applications.
- By integrating IoT solutions, secure financial transactions, and expert guidance, AgroTrack empowers farmers to make informed decisions, optimize their resources, and achieve higher productivity. This dual-platform approach ensures seamless access to critical tools and information anytime, anywhere, fostering the adoption of smart farming practices and contributing to sustainable agricultural growth.

# Source Code

```
class Page2Model extends FlutterFlowModel<Page2Widget> {
  /// State fields for stateful widgets in this page.

  // State field(s) for TextField widget.
  final textFieldKey1 = GlobalKey();
  FocusNode? textFieldFocusNode1;
  TextEditingController? textController1;
  String? textFieldSelectedOption1;
  String? Function(BuildContext, String?)? textController1Validator;
  // State field(s) for TextField widget.
  FocusNode? textFieldFocusNode2;
  TextEditingController? textController2;
  String? Function(BuildContext, String?)? textController2Validator;

  @override
  void initState(BuildContext context) {}

  @override
  void dispose() {
    textFieldFocusNode1?.dispose();

    textFieldFocusNode2?.dispose();
    textController2?.dispose();
  }
}
```

```
class Page3Model extends FlutterFlowModel<Page3Widget> {
  /// State fields for stateful widgets in this page.

  // State field(s) for PinCode widget.
  TextEditingController? pinCodeController;
  String? Function(BuildContext, String?)? pinCodeControllerValidator;
  // State field(s) for Timer widget.
  final timerInitialTimeMs = 60000;
  int timerMilliseconds = 60000;
  String timerValue = StopwatchTimer.getDisplayTime(
    60000,
    hours: false,
    milliSecond: false,
  );
  FlutterFlowTimerController timerController =
    FlutterFlowTimerController(StopwatchTimer(mode: StopwatchMode.countDown));

  @override
  void initState(BuildContext context) {
    pinCodeController = TextEditingController();
  }

  @override
  void dispose() {
    pinCodeController?.dispose();
    timerController.dispose();
  }
}
```



# Source Code

```
class Page5HomeModel extends FlutterFlowModel<Page5HomeWidget> {  
  /// State fields for stateful widgets in this page.  
  
  // State field(s) for PageView widget.  
  PageController? pageViewController;  
  
  int get pageViewCurrentIndex => pageViewController != null &&  
    pageViewController!.hasClients &&  
    pageViewController!.page != null  
    ? pageViewController!.page!.round()  
    : 0;  
  
  @override  
  void initState(BuildContext context) {}  
  
  @override  
  void dispose() {}  
}
```

```
bool isDataUploading = false;  
FFUploadedFile uploadedLocalFile =  
  FFUploadedFile(bytes: Uint8List.fromList([]));  
String uploadedFileUrl = '';  
  
// State field(s) for TextField widget.  
FocusNode? textFieldFocusNode1;  
TextEditingController? textController1;  
String? Function(BuildContext, String?)? textController1Validator;  
// State field(s) for TextField widget.  
FocusNode? textFieldFocusNode2;  
TextEditingController? textController2;  
String? Function(BuildContext, String?)? textController2Validator;  
// State field(s) for TextField widget.  
FocusNode? textFieldFocusNode3;  
TextEditingController? textController3;  
String? Function(BuildContext, String?)? textController3Validator;  
// State field(s) for TextField widget.  
FocusNode? textFieldFocusNode4;  
TextEditingController? textController4;  
String? Function(BuildContext, String?)? textController4Validator;  
// State field(s) for TextField widget.  
FocusNode? textFieldFocusNode5;  
TextEditingController? textController5;  
String? Function(BuildContext, String?)? textController5Validator;  
  
@override  
void initState(BuildContext context) {}  
  
@override  
void dispose() {  
  textFieldFocusNode1?.dispose();  
  textController1?.dispose();  
  
  textFieldFocusNode2?.dispose();  
  textController2?.dispose();  

```

# Results

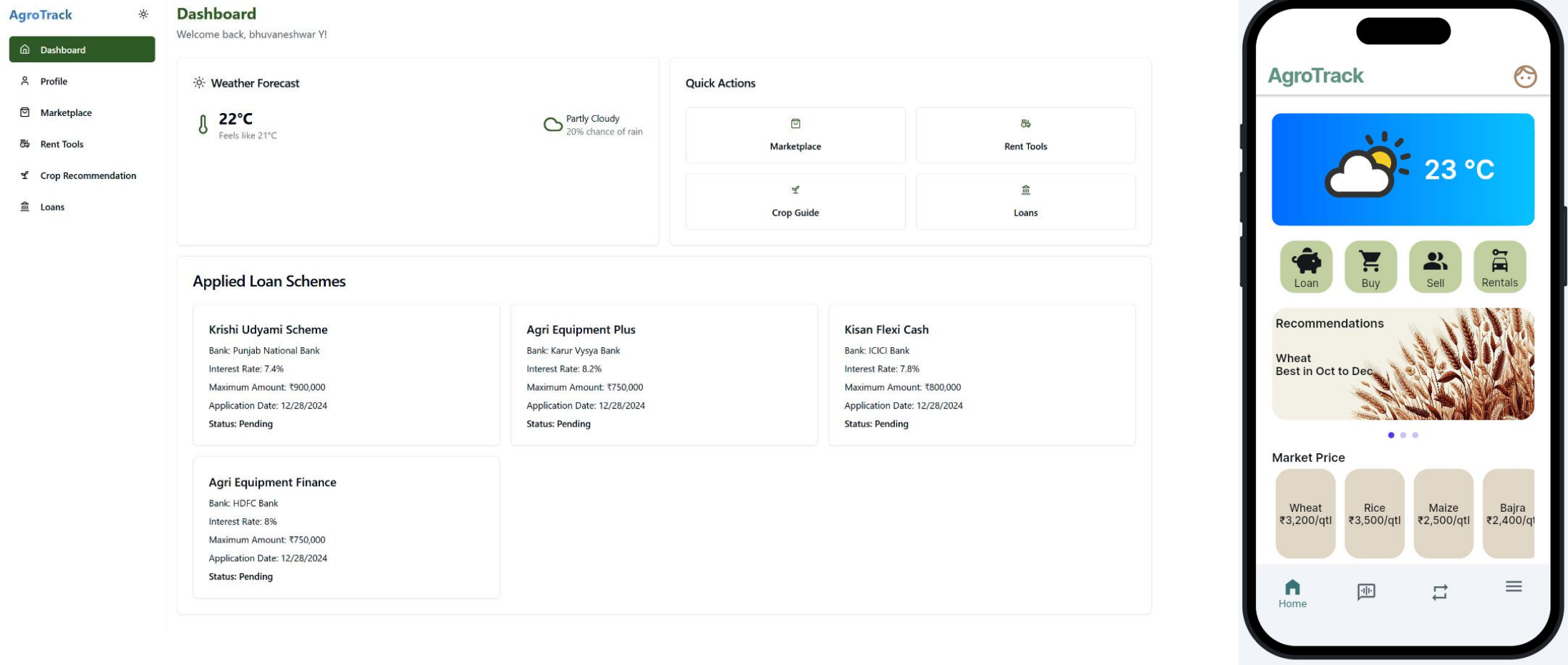


Fig 1: AgroTrack Home (WEBPAGE AND MOBILE APPLICATION)

# Results

## Marketplace

Buy Products Sell Products



### onions

Vegetables

Quantity: 40 kg

Price: ₹30/kg

Location: bangalore

Description: pune onions

Buy Now



### tomatos

Vegetables

Quantity: 5 quintal

Price: ₹10/quintal

Location: Bijapur

Description: good quality tomatos

Buy Now



### balehannu

Fruits

Quantity: 60 kg

Price: ₹20/kg

Location: tumkur

Description: balehannu good quality

Buy Now



### apples

Fruits

Quantity: 2 ton

Price: ₹140/ton

Location: nagpur

Description: apple gara Imported

Buy Now



### banana

Fruits

Quantity: 100 kg

Price: ₹30/kg

Location: mysuru

Description: good quality bananas

Buy Now



### apple

Fruits

Quantity: 30 kg

Price: ₹110/kg

Location: bangalore

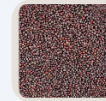
Description: kashmir apple A1 quality

Buy Now

## ← AgroSelect



December  
Wheat  
Sown in the rabi season



December  
Mustard  
Thrives in cool temperatures



January  
Chickpea  
Grows in well-drained soil



January  
Barley  
Matures quickly in winter



February  
Sunflower  
Thrives in sunny climates



February  
Lentil  
Nitrogen-fixing crops

Fig 2: Crop Recommendation Page (WEBPAGE AND MOBILE APPLICATION)



# Results

## Rent Tools

Rent Tools List Tools



**sprayer with high speed**  
Sprayer

Duration: 30 days  
Price: ₹80/day  
Location: Bijapur  
Description: high speed spray

[Rent Now](#)



**plough**  
Plough

Duration: 45 days  
Price: ₹300/day  
Location: pune  
Description: red soil plough

[Rent Now](#)



**good red**  
Harvester

Duration: 19 days  
Price: ₹110/day  
Location: tumkur  
Description: good harvester

[Rent Now](#)



**blue tractor**  
Tractor

Duration: 21 days  
Price: ₹310/day  
Location: tumkur  
Description: good high torque

[Rent Now](#)



**tractor**  
Tractor

Duration: 8 days  
Price: ₹210/day  
Location: nagpur  
Description: old tractor

[Rent Now](#)



**Mahiendra**  
Tractor

Duration: 5 days  
Price: ₹200/day  
Location: bangalore  
Description: good tractor

[Rent Now](#)



← AgroRentals

If you would like to add rental vehicle details to our page, please contact us at [agrotrack\\_support@gmail.com](mailto:agrotrack_support@gmail.com)



**Tractor**  
Mahindra 575 DI  
Price: ₹2,700 /day  
Ph: 987456321



**Rotavator**  
Maschio Gaspardo  
Price: ₹1,600 /day  
Ph: 857351321

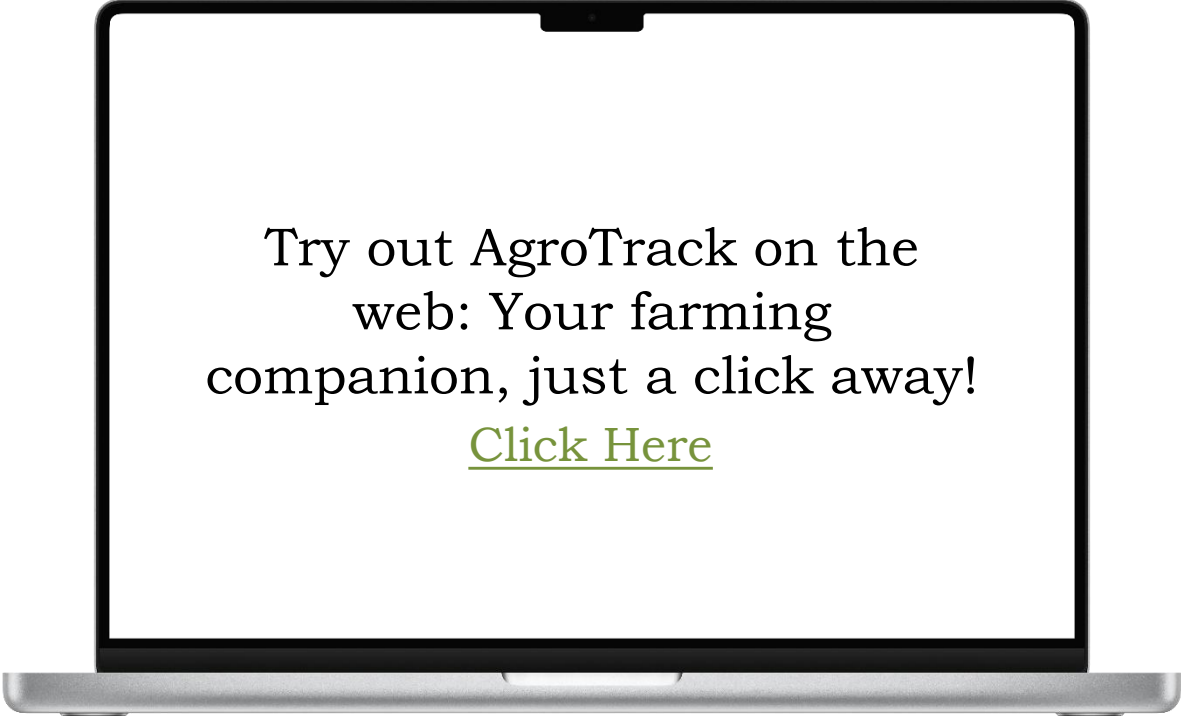


**Cultivator**  
Fieldking Extra

Fig 3: Rentals Page (WEBPAGE AND MOBILE APPLICATION)

# AgroTrack Live Demo

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Try out AgroTrack on the  
web: Your farming  
companion, just a click away!

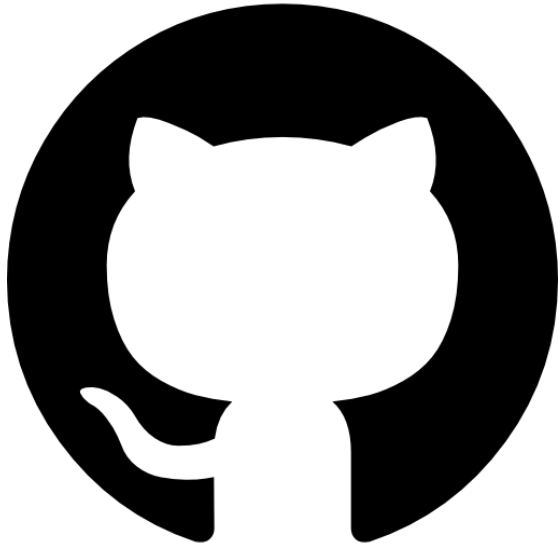
[Click Here](#)



Experience  
AgroTrack on  
mobile:  
Smart farming,  
always within  
reach!

[Click Here](#)





All files related to the **AgroTrack** project are available in this repository [\*\*CAPSTONE\\_PROJECT\\_CIT-G33\*\*](#)

# References (IEEE Paper)

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- **Magno, L. P., & Moraes, M. L. (2020). Internet-of-Things (IoT)-based smart agriculture. *IEEE Access*.**

Summary: This paper explores IoT applications in agriculture, enhancing decision-making via real-time data from sensors, aligning with your app's weather data and crop recommendations.

- **Silva, J. L., & De Souza, M. C. (2019). A farmer's mobile market: Agricultural e-commerce. *IEEE Transactions on E-Commerce*.**

Summary: This paper focuses on e-commerce solutions for agricultural products, aligning with your app's market connection features for farmers globally.

- **Sharma, A. N., & Verma, K. (2021). Smart agricultural data management system. *IEEE Systems Journal*.**

Summary: This paper discusses data management systems for agriculture, similar to your app's market listings, crop prices, and vendor details.

- **Patel, P. S., & Jain, R. K. (2018). Mobile applications for farmer market and crop forecasting. *IEEE Mobile Computing*.**

Summary: This paper covers mobile apps for connecting farmers to markets and crop forecasting, aligning with your app's functionalities for market and crop sale.

- **Singh, D. A., & Kumar, A. (2022). Machine learning and data analytics in precision agriculture. *IEEE Transactions on AI*.**

Summary: This paper focuses on the use of machine learning for crop yield predictions, relevant to your app's feature for technology-enhanced farming practices.

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*Thank  
you*



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