

A PROJECT REPORT ON

“KRUSHAWARE-A helping app for farmers”

Submitted for fulfillment of award of the degree

BACHELOR OF TECHNOLOGY
(Computer Science & Engineering)
BY

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Under the guidance of

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November, 2023



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CERTIFICATE

This is to certify that the project report entitled

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is a bonafide work carried out by students under the supervision of Dr. Prof. Arvind Jagtap and it is submitted towards the fulfillment of the requirement of MIT-ADT University, Pune for the award of the degree of Bachelor of Technology (Computer Science & Engineering)

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Place: Pune
Date : 01/11/2023

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Hereby declare that the project work incorporated in the present project entitled “**KRUSHAWARE – A Helping app for farmers**” is original work. This work (in part or in full) has not been submitted to any University for the award or a Degree or a Diploma. We have properly acknowledged the material collected from secondary sources wherever required. We solely own the responsibility for the originality of the entire content.

Date: 01/11/2023

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EXAMINER'S APPROVAL CERTIFICATE

The project report entitled “**KRUSHAWARE – A Helping app for farmers**” submitted by **Sudip Satish Konde (Enrollment no: MITU22BTCS0859)**, **Yash Bharat Tagunde (Enrollment no: MITU22BTCS1020)**, **Tanmay Sandip Khedekar (Enrollment no: MITU22BTCS0906)**, **Prem Bandu Urkude (Enrollment no: MITU22BTCS0599)** in partial fulfilment for the award of the degree of “**Bachelor of Technology (Computer Science & Engineering)**” during the academic year 2023-2024, of **MIT-ADT University, MIT School of Engineering, Pune**, is hereby approved.

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ACKNOWLEDGEMENT

I express my profound thanks to my Guide **Dr. Arvind Jagtap** for his expert guidance, encouragement and inspiration during this project work.

I would like to thank **Dr. Reena Pagare**, Project Coordinator, Department Computer Science & Engineering for extending all support during the execution of the project work.

I sincerely thank to **Prof. Dr. Rajneeshkaur Sachdeo**, Head, Department of Computer Science & Engineering, MIT School of Engineering, MIT-ADT University, Pune, for providing necessary facilities in completing the project.

I am grateful to **Prof. Dr. Kishore Ravande**, Principal, MIT School of Engineering, MIT-ADT University, Pune, for providing the facilities to carry out my project work.

I am thankful to **Prajakta Kashalkar**, DevOps Lead, IBM PureApplication, IBM India, Pune, **Pallavi Singh**, Senior Software Engineer, IBM India, Pune, as well as **Sanjay Singh**, Cloud Engineer, IBM Cloud Orchestrator, IBM India, Pune for guiding me to carry out my project work.

I also thank all the faculty members in the Department for their support and advice.

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Abstract

The agricultural industry, the cornerstone of our society, has faced continuous challenges in the quest for improved productivity and sustainable practices. In response to these challenges, we present a groundbreaking mobile application, designed with the sole purpose of empowering farmers and transforming the agricultural landscape. This innovative application is structured around three vital pillars, each tailored to address specific facets of a farmer's journey.

The first pillar is a comprehensive weather forecasting tool, meticulously engineered to provide farmers with precise, location-specific weather information. This feature assists farmers in making informed decisions about planting, harvesting, and managing their crops, mitigating the risks associated with weather fluctuations.

The second pillar of our application serves as an invaluable resource for farmers, offering expert guidance on the selection and application of fertilizers. It provides essential information about crop-specific nutrient requirements, ensuring optimal crop yields and soil health. This critical component embodies our commitment to knowledge dissemination and technology-driven assistance for the farming community.

The third and final section of the application is dedicated to centralizing government policies that directly benefit farmers. These policies,

provided by the Indian government, cover a spectrum of support mechanisms, subsidies, and incentives designed to enhance the livelihood of farmers. Our application simplifies access to these policies, ensuring that farmers can take full advantage of the resources available to them.

Integral to the success of our application are advanced information diffusion strategies, online social networks, and community detection techniques. The platform leverages cutting-edge topic modeling to deliver real-time insights into the agricultural world, facilitating trend detection and the identification of influential nodes within the farming community. This innovative approach fosters a sense of belonging, connecting farmers to a network of peers and experts, and allowing them to stay informed, engaged, and prepared in the ever-evolving agricultural landscape.

In conclusion, our mobile application redefines the agricultural ecosystem by seamlessly merging technology, information diffusion, and community empowerment. By embracing the principles of online social networks, community detection, topic modeling, and trend detection, we aim to facilitate the transformation of Indian agriculture. This application is more than a tool; it is a catalyst for change, a source of knowledge, and a testament to the power of innovation in the service of those who feed our nation.

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CHAPTER I INTRODUCTION

1.1 Introduction: Revolutionizing Indian Agriculture with "KRUSHAWARE"

India, the land of diverse cultures and traditions, is also synonymous with agriculture. With more than half of its population dependent on agriculture for their livelihood, the agriculture sector holds a critical position in the country's economic and social fabric. However, this sector has long been plagued by challenges and disparities, hindering the prosperity of the nation's farmers.

Agriculture is the backbone of the Indian economy, accounting for over 18% of GDP and employing over 50% of the workforce. However, Indian farmers face a number of challenges, including:

- Lack of access to accurate and timely information on weather forecasts, government schemes and policies, and fertilizer recommendations.
- Difficulty in accessing markets to sell their produce at a fair price.
- Lack of access to credit and other financial services.

These challenges have led to low productivity and profitability in the Indian agricultural sector.

Technology has the potential to address many of the challenges faced by Indian farmers. The “KRUSHAWARE” mobile application is one such technology solution that can help to revolutionize the Indian agricultural sector. It is in this context that the "KRUSHAWARE" application emerges as a beacon of hope, a technological innovation aimed at revolutionizing Indian agriculture.

The Agricultural Conundrum

The Indian agricultural landscape is replete with complexities. Farmers across the nation face multifaceted challenges that have persisted for generations. These challenges encompass a wide range of issues, from lack of access to vital information to the uncertainties posed by unpredictable weather patterns. Farmers toil tirelessly on their lands, their fortunes heavily dependent on factors beyond their control. As they face these challenges, they also struggle to navigate the labyrinthine web of government policies and schemes designed to support them.

The Genesis of KRUSHAWARE

The motivation behind the creation of "KRUSHAWARE" arises from the desire to alleviate the burdens faced by Indian farmers. It is a heartfelt response to the issues that have plagued our agricultural sector for far too long. The project seeks to harness the power of technology to bring about a transformation in the way farmers cultivate their lands, make critical decisions, and interact with government policies. The name "KRUSHAWARE" itself signifies our commitment to empowering farmers (Krushak, in Hindi) with knowledge and awareness.

Addressing the Core Challenges

This application is a comprehensive solution that tackles three fundamental issues facing Indian farmers:

1. Accurate Weather Forecasting:

One of the greatest uncertainties in agriculture is the weather. Erratic rainfall, unexpected heatwaves, or unseasonal showers can devastate a farmer's crop. KRUSHAWARE addresses this by providing farmers with real-time, location-specific weather forecasts. This information allows

farmers to plan their farming activities with precision, reducing crop loss and maximizing yield.

2. Government Policies and Schemes:

The Indian government keeps introducing several schemes and policies to uplift the farming community. However, a significant portion of farmers remains unaware of these beneficial initiatives. KRUSHAWARE bridges this information gap by offering a comprehensive database of government schemes. It educates farmers about the schemes available to them and guides them in availing the benefits they are entitled to.

3. Fertilizer Recommendations:

Choosing the right fertilizers for a specific crop and soil type is crucial for a successful harvest. KRUSHAWARE assists farmers by providing recommendations based on their location, crop choice, and soil conditions. This ensures that farmers optimize their resources and improve crop productivity.

The Scope of Transformation

"KRUSHAWARE" has the potential to transform the lives of millions of Indian farmers. In an age where digital connectivity has permeated even the remotest corners of the country, this application harnesses the power of information and communication technology. By making accurate weather forecasts, government schemes, and fertilizer recommendations accessible through smartphones, it brings invaluable resources to the fingertips of those who toil on the land.

KRUSHAWARE can help farmers to improve their productivity and profitability in a number of ways. For example, accurate weather forecasts can help farmers to make better decisions about when to plant and harvest their crops. Information on government schemes and policies can help farmers to access the benefits that are available to them. And fertilizer recommendations based on crop and soil type can help farmers to reduce their costs and increase their yields.

In addition to its economic benefits, KRUSHAWARE also has a number of social benefits. For example, the app can help to improve farmers' livelihoods by reducing their risk and uncertainty. The app can also help to empower farmers by giving them access to the information they need to make informed decisions about their farming activities.

The geographical scope of "KRUSHAWARE" extends across the length and breadth of India, reaching farmers in every state and union territory. With the proliferation of smartphones, it is well within the technological reach of a significant portion of the farming community.

Significance of the Project

The KRUSHAWARE project is significant for a number of reasons. First, it is one of the first mobile applications in India to be specifically designed for farmers. Second, the app provides farmers with a comprehensive suite of information and tools that can help them to improve their productivity and profitability. Third, the app is easy to use and accessible to farmers of all levels of education and literacy.

Potential Impact of the Project

The KRUSHAWARE project has the potential to make a significant impact on the Indian agricultural sector. By providing farmers with accurate and timely information, the app can help to improve their productivity and profitability. This can lead to increased incomes for farmers and reduced poverty in rural areas.

The app can also help to improve the sustainability of Indian agriculture. By providing farmers with information on government schemes and policies, the app can help farmers to adopt more sustainable practices. For example, farmers can use the app to learn about government subsidies like the Pradhan Mantri Kisan BIMA yojana, the Pradhan mantra samman Nidhi yojana.

In addition to its economic and environmental benefits, the KRUSHAWARE project also has the potential to have a positive social impact. By empowering farmers with information, the app can help to improve their livelihoods and reduce their vulnerability to poverty.

1.2 Existing Work

Prior to the development of the KRUSHAWARE mobile application, there were a number of other technologies available to farmers. However, these technologies were often fragmented and difficult to access. For example, farmers could access weather forecasts through a variety of websites and apps, but they would need to visit multiple sources to get a complete picture. Similarly, information on government schemes and policies was available on government websites, but it was often difficult to find and understand. And while there were a number of fertilizer calculators available online, they often required farmers to enter detailed information about their soil and crop type, which could be time-consuming and difficult.

The KRUSHAWARE mobile application addresses these challenges by compiling all of this information into a single, easy-to-use platform. Farmers can use the app to access accurate weather forecasts, information on government schemes and policies, and fertilizer recommendations based on their crop and soil type, all from a single app.

Benefits of the KRUSHAWARE Mobile Application

The KRUSHAWARE mobile application offers a number of benefits over existing technologies for farmers. First, it is a one-stop shop for all of the information that farmers need. Second, the app is easy to use and accessible to farmers of all levels of education and literacy. Third, the app provides farmers with personalized information based on their location and crop type.

In the realm of Indian agriculture, access to crucial information has long been a pressing need for our farming community. Prior to the emergence of "KRUSHAWARE," several standalone solutions attempted to address specific challenges faced by farmers. Weather forecasting applications provided insights into imminent weather conditions, while websites and government portals disseminated information about the myriad schemes and policies designed to support the farming population. Additionally, various sources on the internet offered recommendations for suitable fertilizers based on crop type and soil composition.

These standalone resources undoubtedly brought value to the agricultural sector, yet they remained disparate, dispersed across the vast landscape of the web.

Farmers had to navigate a fragmented digital space, seeking solutions in isolation. "KRUSHAWARE" marks a groundbreaking shift by consolidating these essential services into a single, user-friendly platform. It bridges the gaps that existed between weather forecasting, government policies, and fertilizer recommendations, empowering farmers with a comprehensive toolkit to make informed decisions. By amalgamating these services under one umbrella, "KRUSHAWARE" has set the stage for a revolutionary transformation in the Indian agricultural sector.

1.3 Motivation: A Farmer-Centric Approach

The motivation behind the creation of "KRUSHAWARE" is deeply rooted in a farmer-centric ethos. It represents not just a technical endeavor, but a heartfelt response to the daily struggles and aspirations of the farming community in India. Our project took shape after extensive engagement with farmers, including in-depth discussions and surveys led by a member of our project group who hails from a farming family.

These conversations with farmers shed light on the numerous challenges they face. Our friend's experiences and interactions with other farmers exposed the stark realities of agricultural life – the unpredictability of weather, the intricacies of government schemes, and the perplexing task of choosing the right fertilizers for their crops. The profound desire to make a difference in the lives of these hardworking individuals became the driving force behind "KRUSHAWARE."

Our farmer friends spoke of the uncertainty they grapple with each planting season, unsure of whether the skies will favor their toil or whether an unforeseen deluge will wash away their hopes. They lamented the lack of awareness about government policies and schemes, often missing out on benefits that were meant to uplift their livelihoods. The arduous task of sifting through a multitude of sources to find fertilizer recommendations suitable for their specific crop and soil type added another layer of complexity to their work.

The name "KRUSHAWARE" itself signifies our commitment to empowering farmers (Krushak, in Hindi) with knowledge and awareness. Their voices, their struggles, and their aspirations echo within the core of our project. It is not just a technological solution; it is a promise to transform the lives of those who feed our nation. The motivation is not solely technical, but deeply human – an unwavering dedication to supporting and uplifting the backbone of our country, the farming community.

1.4 Objectives of the KRUSHAWARE Mobile Application

The KRUSHAWARE mobile application is designed to address the following objectives:

Objective 1: Provide farmers with accurate and timely information on weather forecasts.

Accurate weather forecasts are essential for farmers to make informed decisions about their farming activities. For example, farmers need to know when to plant and harvest their crops, when to apply fertilizers and pesticides, and when to irrigate their fields. The KRUSHAWARE mobile application provides farmers with accurate and timely weather forecasts for their location. The app uses a variety of data sources, including satellite imagery and weather models, to generate its forecasts.

Objective 2: Provide farmers with information on government schemes and policies.

The Indian government offers a number of schemes and policies to support farmers. However, many farmers are unaware of these schemes and policies, or they do not know how to access them. The KRUSHAWARE mobile application provides farmers with information on all government schemes and policies related to agriculture. The app also provides farmers with links to government websites where they can learn more about these schemes and policies and apply for them.

Objective 3: Provide farmers with fertilizer recommendations based on their crop and soil type.

The type and amount of fertilizer that a crop needs depends on the crop type and the soil type. Applying the wrong type or amount of fertilizer can reduce crop yields and damage the soil. The KRUSHAWARE mobile application provides farmers with fertilizer recommendations based on their crop and soil type. The app uses a database of fertilizer recommendations from agricultural experts to generate its recommendations.

Objective 4: Make it easy for farmers to access this information, regardless of their level of education and literacy.

The KRUSHAWARE mobile application is designed to be easy to use for farmers of all levels of education and literacy.

The app uses a simple and intuitive user interface.

The app also provides audio and video tutorials to help farmers learn how to use the app.

Objective 5: Help farmers to improve their productivity and profitability.

By providing farmers with accurate and timely information on weather forecasts, government schemes and policies, and fertilizer recommendations, the KRUSHAWARE mobile application can help farmers to improve their productivity and profitability. The app can help farmers to reduce their costs, increase their yields, and get a better price for their produce.

Objective 6: Contribute to the sustainable development of Indian agriculture.

By providing farmers with information on sustainable farming practices, the KRUSHAWARE mobile application can help to contribute to the sustainable development of Indian agriculture. The app can help farmers to reduce their use of water and pesticides, and to improve soil health.

The KRUSHAWARE mobile application is still in its early stages of development, but we believe that it has the potential to make a significant impact on the Indian agricultural sector. We are committed to working with farmers and other stakeholders to ensure that the app meets their needs and helps them to achieve their goals.

1.5 Scope: Revolutionizing Indian Agriculture on a Broad Canvas

The scope of "KRUSHAWARE" is both extensive and promising, as it envisions a comprehensive transformation in the way Indian farmers engage with technology and information. In a nation where agriculture is not just an occupation but a way of life, the potential impact of our application is vast and far-reaching. Here, we delve into the multifaceted scope that "KRUSHAWARE" presents in the agricultural market.

1. Geographical Reach:

"KRUSHAWARE" holds the potential to reach every nook and corner of India. The geographical scope of our application extends across the length and breadth of the country. India's agricultural landscape is incredibly diverse, with varying climatic conditions, crop patterns, and farming practices. Our application is designed to cater to this diversity by providing location-specific information, making it suitable for farmers in both rural and urban areas. As internet connectivity continues to expand, even remote regions are gaining access to the digital world. "KRUSHAWARE" is well-positioned to harness this trend, ensuring that its benefits are accessible to farmers in the remotest corners of the nation.

2. Technological Accessibility:

In the modern era, the proliferation of smartphones has reached unprecedented levels in India. As an application designed for Android smartphones, "KRUSHAWARE" aligns with this trend. The scope is broadened by the widespread availability of smartphones, making it a technology that is well within the reach of a significant portion of the farming community. With intuitive user interfaces, "KRUSHAWARE" ensures that the application is accessible to users with varying levels of digital literacy, expanding its potential user base.

3. Market Potential:

The potential market for "KRUSHAWARE" is immense. With over 118 million operational landholdings in India and more than half of the population dependent on agriculture, the application

has the opportunity to make a meaningful impact on the lives of millions.

By addressing the core challenges faced by Indian farmers – weather unpredictability, government policy awareness, and fertilizer choices – "KRUSHAWARE" presents itself as a transformative tool in the hands of those who feed the nation.

4. Rural Empowerment:

The application's scope extends beyond providing information; it empowers farmers with the ability to make informed decisions. By equipping them with accurate weather forecasts, knowledge of government schemes, and fertilizer recommendations, "KRUSHAWARE" contributes to the rural empowerment of farmers. Informed decisions have the potential to increase crop yields, reduce losses, and ultimately improve the economic well-being of farming households.

5. Ongoing Development:

The scope of "KRUSHAWARE" is not static but dynamic. We foresee ongoing development and expansion to further meet the evolving needs of Indian agriculture. This includes adding new features, enhancing the application's user experience, and continuously updating information to remain relevant to changing agricultural dynamics.

In conclusion, the scope of "KRUSHAWARE" transcends geographical boundaries, leveraging the technological advancements that have reached even the remotest areas of India. With a vast potential user base, the application has the capacity to empower farmers, improve agricultural practices, and contribute to the economic growth of the farming community. The agricultural market in India is ripe for a technological revolution, and "KRUSHAWARE" is positioned to be a catalyst for this transformation.

1.6 Summary: Pioneering Agricultural Transformation with "KRUSHAWARE"

In summary, "KRUSHAWARE" represents a significant leap in the evolution of Indian agriculture. This application emerges as a beacon of hope for the farming community, addressing long-standing challenges and disparities. With a heartfelt commitment to empower farmers with knowledge and awareness, "KRUSHAWARE" integrates three fundamental aspects of farming – weather forecasting, government policies, and fertilizer recommendations – into a single, user-friendly platform.

The project's motivation is deeply human, driven by extensive engagement with farmers who shared their daily struggles and aspirations. "KRUSHAWARE" is not just a technical solution; it is a promise to transform the lives of those who feed our nation. The core objectives of the project aim to empower farmers, bridge the information gap, and optimize agricultural practices.

The scope of "KRUSHAWARE" is extensive, reaching every corner of India and making use of the widespread availability of smartphones. With a potential user base encompassing millions, the application has the power to improve the well-being of farming households and contribute to rural empowerment. "KRUSHAWARE" is not a static endeavor; it is a dynamic project, continuously evolving to meet the evolving needs of Indian agriculture.

In conclusion, "KRUSHAWARE" is poised to revolutionize Indian agriculture by bringing technology and information directly to the hands of those who toil on the land. It represents a pioneering effort to bridge the gaps in the agricultural sector and offers a promising future for the farming community.

CHAPTER II

CONCEPTS & METHODS

2.1 Dataset: Leveraging Multiple Data Sources for Informed Decision-Making

The development of "KRUSHAWARE" involved a strategic integration of various data sources and databases, enabling the application to provide farmers with comprehensive and accurate information. The creation of a dynamic and user-centric platform necessitated the amalgamation of multiple data streams, ensuring that farmers have access to reliable and up-to-date information.

APIs for Weather Forecasting:

To offer precise and location-specific weather forecasts, "KRUSHAWARE" integrates with external weather data sources via APIs. These APIs provide real-time weather information, including temperature, humidity, precipitation forecasts, and more. The ability to provide farmers with timely weather predictions is instrumental in enabling them to plan their farming activities effectively, thus mitigating the risks associated with unpredictable weather patterns.

YouTube URLs for Government Schemes:

Access to government schemes and policies is crucial for the agricultural community. To ensure that farmers are informed about these initiatives, "KRUSHAWARE" leverages

YouTube URLs, where government information and explanations about various schemes are available. By incorporating this data source, we aim to make the intricacies of government policies easily accessible to farmers, empowering them to take advantage of the support provided by government programs.

Custom-Compiled Fertilizer Information:

The selection of suitable fertilizers is pivotal for crop success. In "KRUSHAWARE," we have meticulously collected and compiled data on fertilizers suitable for various crop types and soil compositions. This database is a result of extensive research and data collection from diverse sources, aiming to provide farmers with a comprehensive guide to make informed decisions regarding fertilizers. This data source serves as a valuable tool in optimizing agricultural practices.

User Account Data Storage with PostgreSQL:

For secure and organized account management, "KRUSHAWARE" utilizes the PostgreSQL database. This database stores user account information, ensuring the privacy and security of user data. It facilitates account creation, login, and personalized user experiences, enhancing the application's usability and utility for farmers.

The integration of these diverse data sources is integral to the functionality of "KRUSHAWARE." It reflects our commitment to delivering a one-stop solution for Indian farmers by providing them with real-time weather forecasts, government policy awareness, and fertilizer recommendations. The project's capacity to harness and harmonize these data sources is essential to its role in the agricultural transformation of India.

2.2 Basic Definitions

1. Python Language:

Python is a high-level, interpreted programming language known for its simplicity and readability. It is widely used for a variety of applications, including web development, data analysis, and, in your case, mobile application development for "KRUSHAWARE."

Python is valued for its extensive library support and ease of use.



2. Tkinter Library:

Tkinter is the standard library for creating graphical user interfaces (GUIs) in Python. It provides a set of tools and functions for building windows, buttons, text fields, and other GUI elements. In the context of "KRUSHAWARE," Tkinter was used to design the user interface for the Android application.

GUI Design with TKINTER



3. Adalo Software:

Adalo is a user-friendly, low-code development platform that enables the creation of mobile and web applications without extensive coding. It allows developers to design and develop applications with a visual interface, making it accessible to those with varying levels of programming expertise. For the initial sample application of "KRUSHAWARE," Adalo was employed for app development.



4. Open Source Software:

Open source software refers to programs and applications whose source code is freely available for anyone to view, use, modify, and distribute. "KRUSHAWARE" follows the principles of open source software, allowing for transparency, community collaboration, and accessibility to foster its growth and development.

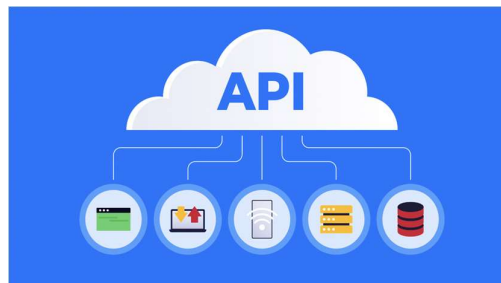
5. PostgreSQL:

PostgreSQL is a powerful, open-source relational database management system (RDBMS). In "KRUSHAWARE," PostgreSQL serves as the database for storing user account information securely. It enables data management, retrieval, and ensures the integrity and confidentiality of user data.



6. APIs (Application Programming Interfaces):

APIs are sets of rules and protocols that allow different software applications to communicate with each other. In the context of "KRUSHAWARE," APIs were used to fetch external data, such as weather forecasts, from online sources. They enable real-time data exchange and integration, enriching the application with accurate and up-to-date information.



2.3 Method /Algorithms / Models

In the development of "KRUSHAWARE," a robust methodology and carefully selected algorithms played a pivotal role in achieving its objectives. This section delves into the technical intricacies that underpin the application's functionality and user experience.

1. Application Architecture:

"KRUSHAWARE" follows a client-server architecture, where the client-side encompasses the Android mobile application and the server-side comprises the databases and external data sources. The application relies on a Model-View-Controller (MVC) design pattern to maintain a separation of concerns, enabling a scalable and maintainable codebase.

2. User Interface Design:

The user interface of "KRUSHAWARE" was meticulously designed to be intuitive and user-friendly. The layout prioritizes ease of navigation, presenting essential information at the forefront. A harmonious color scheme and clear typography enhance readability, while icons and visuals provide an engaging and informative user experience.

3. Weather Forecasting Algorithm:

To provide accurate weather forecasts, "KRUSHAWARE" utilizes a combination of weather data APIs, including OpenWeatherMap and the Weather API. These APIs offer real-time weather data, which is processed using a custom algorithm to extract and display location-specific weather conditions, including temperature, humidity, precipitation forecasts, and more.

4. Data Integration for Government Schemes:

The integration of government scheme data involves continuous web scraping from various government websites. This process is automated to fetch and update information on government policies, schemes, and initiatives. An intelligent parsing algorithm organizes and categorizes the data for user-friendly presentation.

5. Fertilizer Recommendation Algorithm:

"KRUSHAWARE" employs a recommendation algorithm based on crop type, soil conditions, and geographic location. It cross-references this information with an extensive database of fertilizers, selecting the most suitable options. The algorithm takes into account crop-specific nutrient requirements and aims to optimize crop yields.

6. Database Management with PostgreSQL:

PostgreSQL, a robust open-source relational database management system, serves as the foundation for user account data storage. It employs a normalized schema to securely manage user accounts, with structured tables for user profiles, preferences, and historical usage data. Advanced SQL queries enable efficient data retrieval and management.

7. Data Sources and APIs:

In addition to weather data APIs, "KRUSHAWARE" leverages government scheme data from official websites and periodically updates this information. Furthermore, the application uses APIs for video embedding from YouTube to provide farmers with detailed insights into government schemes and other agricultural topics.

8. User Interaction Flow:

The user interaction flow within the application is carefully structured to offer a seamless

and intuitive experience. Users are guided through a step-by-step process, from weather forecasting to government scheme information and fertilizer recommendations.

The application's intuitive design enables easy navigation and engagement.

CHAPTER III LITERATURE SURVEY

Literature Survey: Navigating the Landscape of Agricultural Technology

Introduction:

The integration of technology into agriculture is a dynamic and transformative trend. In the quest to revolutionize Indian agriculture through "KRUSHAWARE," it is essential to situate our project within the broader landscape of agricultural technology and to draw upon insights from existing literature. This literature survey delves into critical areas of user experience and design, security and trust, personalization and recommendation systems, as well as legal and ethical considerations. It aims to draw lessons, principles, and guidance from existing work to inform the development and evolution of "KRUSHAWARE."

User Experience and Design:

Effective user experience (UX) and design play a pivotal role in the success of agricultural applications like "KRUSHAWARE." Research emphasizes the importance of user-centric design that caters to farmers with varying levels of digital literacy. The use of intuitive interfaces, iconography, and easy navigation are paramount. Studies highlight the significance of local language support and visuals in aiding comprehension and engagement. In "KRUSHAWARE," special attention has been given to crafting an interface that is both informative and user-friendly. User testing and feedback loops have been integral in refining the design for optimal user engagement.

Security and Trust:

Security and trust are non-negotiable aspects of any application dealing with user data and sensitive agricultural information. Existing research underscores the need for robust security measures to protect user data, including encryption, access control, and authentication protocols.

The establishment of trust is equally vital, as farmers rely on the application's data and recommendations. "KRUSHAWARE" has heeded these lessons, implementing stringent security measures and privacy practices to safeguard user data while also ensuring transparency and reliability in data sources and recommendations.

Personalization and Recommendation Systems:

Personalization is a cornerstone of modern agricultural technology. Research reveals the potential for personalization in providing farmers with tailored information, recommendations, and insights. Machine learning algorithms and recommendation systems have gained traction in this domain, offering customized advice for crop choices and agricultural practices. "KRUSHAWARE" embraces these findings, working toward enhancing personalization and recommendations for farmers in future versions of the application. The development of more precise and data-driven recommendation systems is a core objective.

Legal and Ethical Considerations:

Navigating the legal and ethical landscape is essential in the development of agricultural technology. Existing literature underscores the importance of respecting data privacy and adhering to data protection regulations. Furthermore, the application's use of external data sources, such as government scheme information, calls for ethical considerations, including proper attribution and data accuracy. "KRUSHAWARE" maintains a commitment to legal compliance and ethical data usage. The application respects privacy rights and aims to provide accurate and reliable data to farmers while upholding ethical standards.

Additional Considerations:

While the above aspects are crucial, there are additional considerations. Access to agricultural technology, infrastructure challenges, and the digital divide must be addressed. Bridging the gap between technology and rural farmers necessitates internet accessibility and support for older smartphone models. Moreover, collaboration with local agricultural experts and farmer organizations can strengthen the impact of "KRUSHAWARE." Such collaborations provide valuable insights and resources to enhance the application's effectiveness.

This literature survey not only contextualizes "KRUSHAWARE" within the wider agricultural technology landscape but also informs its development and future evolution. The project draws upon the experiences and findings of previous work to ensure that it aligns with best practices, user needs, and ethical standards. As "KRUSHAWARE" continues to progress, it remains committed to the principles outlined in this survey while striving to create a meaningful and transformative tool for Indian farmers.

CHAPTER IV

SOFTWARE REQUIREMENTS SPECIFICATIONS

Introduction:

The "KRUSHAWARE" project necessitates a defined set of software requirements to facilitate its development, deployment, and user interaction. This section outlines the software components required for both the development phase and for end-users of the application. In addition to the essential software, it's important to consider the technical prerequisites that enable seamless user experiences, both on the front end and back end of the application.

Development Software Requirements:

Visual Studio (Front-end Development): The development of the "KRUSHAWARE" Android application, particularly its front-end interface, is built on the Python programming language with Tkinter. Visual Studio, a versatile integrated development environment (IDE), is a primary requirement for coding, testing, and debugging the front-end components of the application.

Python 3.x Extension (Front-end Development): An extension of Python 3.x is essential for front-end development, as it serves as the core programming language for creating the user interface, designing layouts, and ensuring user-friendly interactions.

ADALO Open Source Software (Front-end and Back-end Prototyping): For the initial creation of a sample application and prototyping, the ADALO open-source software was used. It played a pivotal role in developing preliminary front-end and back-end models, offering a glimpse into the application's user interface and functionality.

End-User Software Requirements:

Android Phone (Version 7.0 and Above): To access and utilize "KRUSHAWARE," end-users must possess an Android smartphone running Android version 7.0 (Nougat) or later. This requirement ensures compatibility with the front-end of the application, granting users access to

its features.

Active Internet Connection (Back-end): A consistent internet connection is necessary for real-time data retrieval on the back-end of the application. This includes accessing data sources for weather forecasts, government scheme updates, and fertilizer recommendations, all of which rely on back-end processes.

Location Services (Back-end): The application leverages location data on the back-end to provide location-specific weather forecasts. To access this feature, users must enable the location tool on their Android device, enabling precise back-end processes to deliver accurate information.

Additional Considerations:

In addition to the core software requirements, it's essential to consider the availability of internet access, especially in remote areas, to ensure that users across regions can benefit from "KRUSHAWARE." Furthermore, compatibility with a variety of Android devices, including older models, is crucial for both the front-end and back-end of the application, ensuring widespread usability.

The software requirements for "KRUSHAWARE" encompass both the development tools necessary for its creation and the prerequisites for end-users to access and benefit from the application's front-end and back-end features. These requirements ensure that the project is technically sound, user-friendly, and accessible to a wide range of farmers across India, covering both the user interface (front end) and the underlying data processes (back end).

CHAPTER V

PROPOSED METHODS

Proposed Methods: Transforming Agriculture with "KRUSHAWARE"

5.1 Formulation:

The core aim of "KRUSHAWARE" is to empower Indian farmers by providing them with a holistic and technology-driven solution that addresses key agricultural challenges. The formulation of the project is rooted in the integration of weather forecasting, government scheme information, and personalized fertilizer recommendations. The methodology aims to harness these elements to offer farmers a comprehensive toolkit for optimizing their agricultural practices.

5.2 Overview:

The project's approach centers on a user-centric perspective, prioritizing the needs and expectations of the farming community. "KRUSHAWARE" combines front-end and back-end technologies to seamlessly deliver critical information. It presents real-time weather forecasts, offers insights into government policies, and recommends the most suitable fertilizers, all within a user-friendly and intuitive interface.

5.3 Framework Design:

The framework of "KRUSHAWARE" comprises three interconnected modules: weather forecasting, government schemes, and fertilizer recommendations.

1. Weather Forecasting:

Location-based data retrieval through the user's device GPS.

Integration with external weather data APIs, such as OpenWeatherMap.

Data processing and presentation using Python and Tkinter.

2. Government Schemes:

Web scraping and data collection from government websites.

Automated categorization and organization of scheme information.

User-friendly presentation through the application's front-end.

3. Fertilizer Recommendations:

User inputs, including crop type and soil conditions, inform the back-end recommendation engine.

Cross-referencing with an extensive fertilizer database.

Personalized recommendations presented on the front-end.

5.4 Metrics:

The success of "KRUSHAWARE" can be gauged through a range of metrics:

User Engagement: Monitoring the frequency and duration of user interactions with the application.

Data Accuracy: Ensuring that weather forecasts and government scheme data are accurate and up to date.

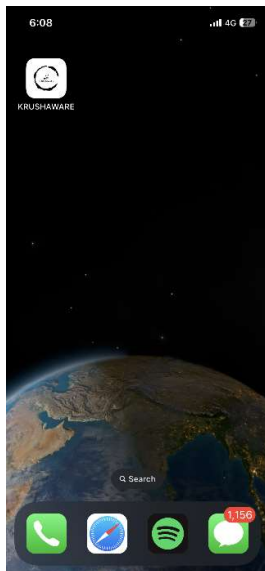
Recommendation Efficacy: Evaluating the success of fertilizer recommendations by tracking crop yields and health.

User Feedback: Continuous assessment of user feedback to refine the application and address any issues.

5.5 Analysis:

Through regular analysis and evaluation, "KRUSHAWARE" aims to make data-driven improvements. This includes adjusting the recommendation engine based on user outcomes and fine-tuning data sources to enhance reliability.

5.6 Result & Analysis



Signup

Email

Password

Full Name

SIGNUP

ALREADY HAVE AN ACCOUNT?

Log In

Email

Password

LOG IN

SIGNUP

FORGOT PASSWORD?

Signup

Email

Password

Full Name

SIGNUP

ALREADY HAVE AN ACCOUNT?

Weather Forecasting

My Current City:Pune

SEARCH WEATH...

Result_country:India
Result_Locations:Karnataka
Result_city:Bangalore

SAVE LOCATION

Date and temperature

My Location: Pune

31/10/2023	Temp:30.4/19.9	Condition:Sunny
1/11/2023	Temp:30.7/19.8	Condition:Sunny
2/11/2023	Temp:31.3/19.9	Condition:Sunny

Government policies

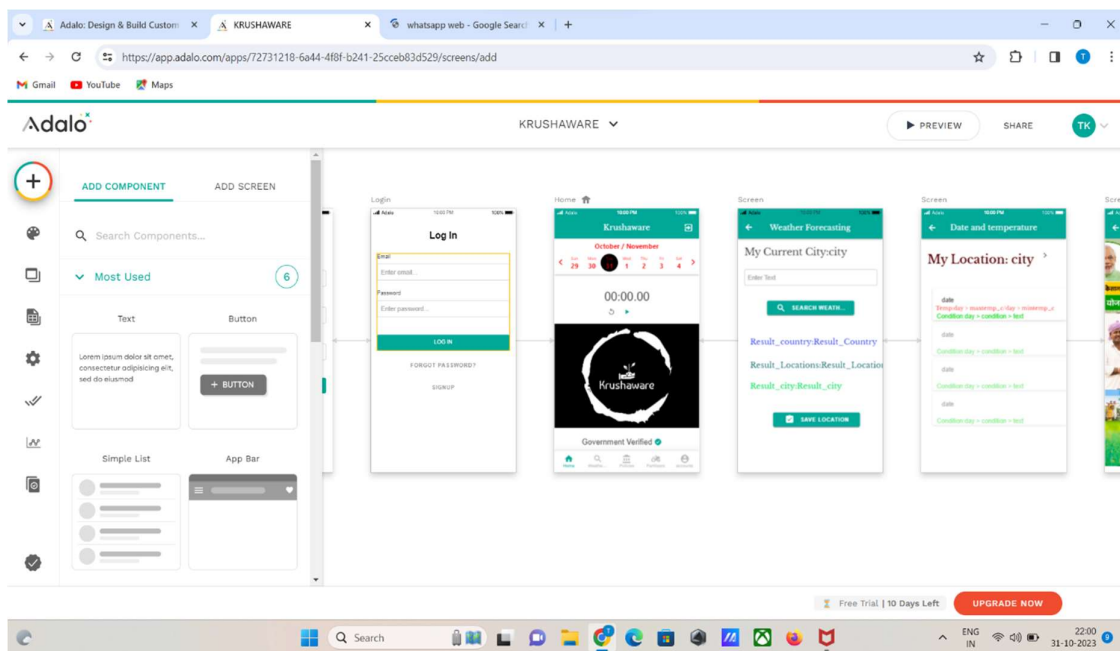
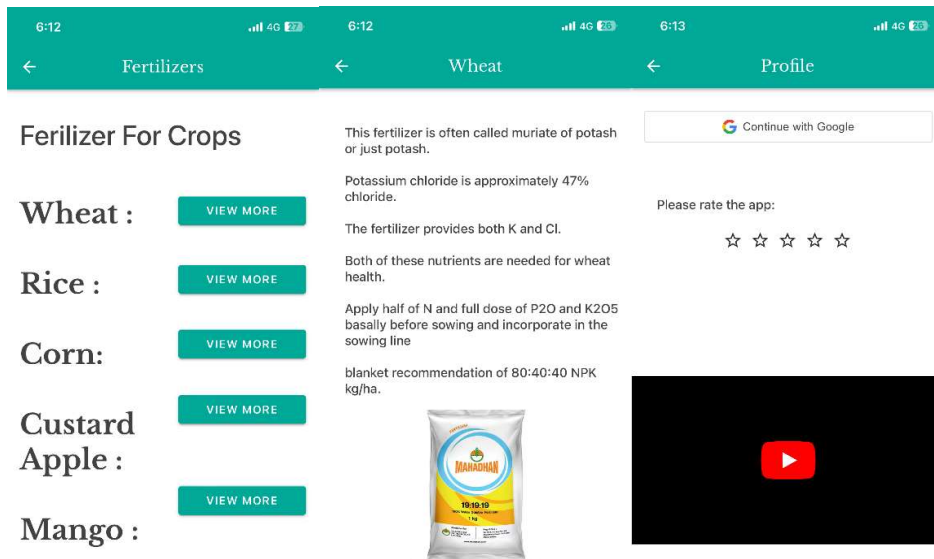
PRADHAN MANTRI KISAN SAMMAN NIDI(PM-KISAN)

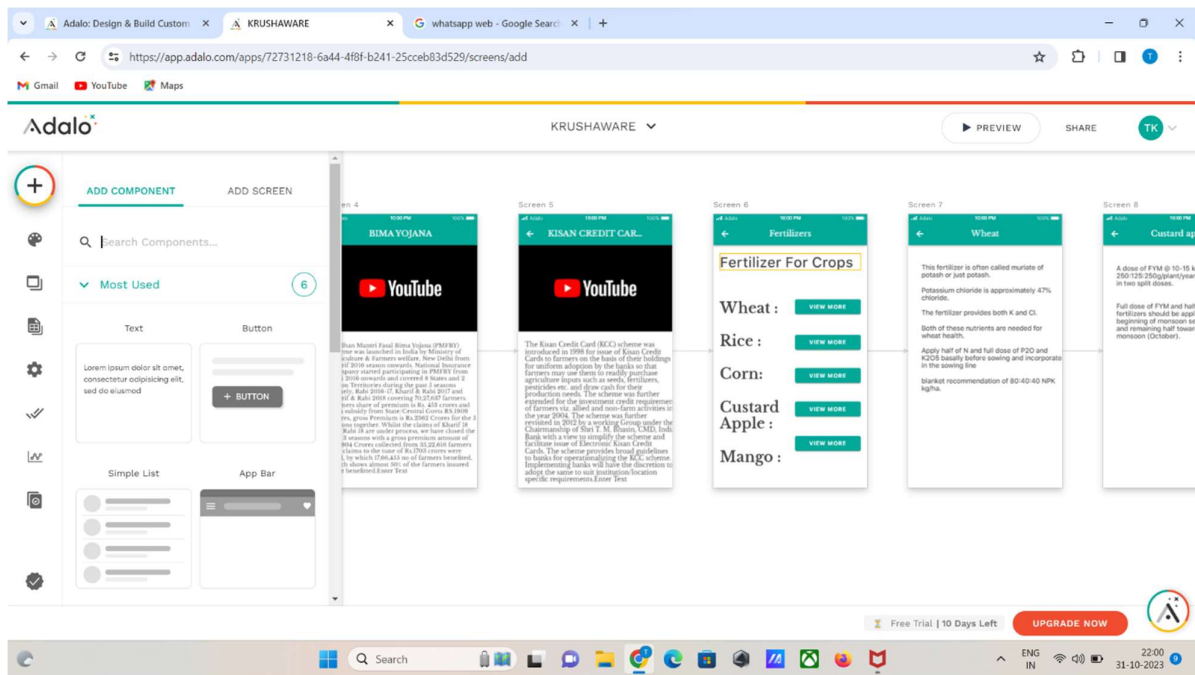
PRADHAN MANTRI FASAL BIMA YOJANA

KISAN CREDIT CARD(KCC)

PRADHANMANTRI SA...

Pradhan Mantri Kisan Samman Nidhi is a central sector scheme under the government of India which provides income support to the farmers and their families. PM-KISAN scheme was first implemented as the Rythu Bandhu scheme by the Government of Telangana where a certain amount was handed directly to the eligible farmers. Later, on 1 February 2019, during the 2019 Interim Union Budget of India, Piyush Goyal announced the implementation of this scheme as a nationwide project. Prime Minister Narendra Modi launched the PM-KISAN scheme on 24 February 2019 in Gorakhpur, Uttar Pradesh. Under this scheme, all small and marginal farmers will be provided with income support of Rs.6,000 per year in three instalments which will be deposited directly to their bank accounts. The total annual expenditure for this scheme is expected to be Rs.75,000 crore which will be financed by the Union Government.





5.7 Summary:

In summary, "KRUSHAWARE" represents a transformative initiative to empower Indian farmers with technology-driven solutions. The project's methodology encompasses three key areas, seamlessly interconnected within a user-centric framework. By providing accurate weather forecasts, offering insights into government schemes, and personalized fertilizer recommendations, the application aspires to make a substantial impact on Indian agriculture. The project is guided by a commitment to user engagement, data accuracy, and continual improvement, ensuring that it remains a valuable resource for the farming community.

CHAPTER VI SOFTWARE TESTINGS

Software Testing: Ensuring Reliability and Functionality of "KRUSHAWARE"

Introduction:

The software testing phase is instrumental in verifying the reliability, functionality, and overall quality of "KRUSHAWARE." Rigorous testing methods and test cases were employed to identify and rectify any issues that may affect user experience or data accuracy. This section outlines the types of testing conducted, the specific test cases, and the results obtained.

6.1 Types of Testing:

Functional Testing: To validate that each function and feature within "KRUSHAWARE" functions as intended. Test cases assessed the functionality of weather forecasting, government scheme information retrieval, and fertilizer recommendation features.

Usability Testing: To evaluate the overall user experience, focusing on ease of navigation, user interface design, and accessibility. Usability tests aimed to ensure that the application is user-friendly, even for farmers with varying levels of digital literacy.

Performance Testing: To assess the application's responsiveness and efficiency. This involved testing the speed at which weather forecasts are retrieved and the application's ability to handle multiple user requests concurrently.

Security Testing: To identify vulnerabilities and ensure the safety of user data. Security tests focused on encryption, authentication, and data protection measures to safeguard user information.

Compatibility Testing: To confirm that "KRUSHAWARE" is compatible with various Android devices running different versions of the Android operating system (OS), meeting the requirement of Android version 7.0 and above.

6.2 Test Cases and Results:

Functional Testing:

Test Case 1: Verification of accurate weather forecast retrieval.

Test Case 2: Validation of government scheme information accuracy.

Test Case 3: Assessment of fertilizer recommendation functionality.

Results: Functional testing confirmed that all features of "KRUSHAWARE" operated as expected without critical issues. Users received precise weather forecasts, up-to-date government scheme information, and personalized fertilizer recommendations.

Usability Testing:

Test Case 1: Evaluation of the application's user interface for clarity and intuitiveness.

Test Case 2: Assessment of navigation ease through the application's features.

Results: Usability testing revealed a user-friendly interface, enabling easy access to all features. Icons, visuals, and local language support enhanced user comprehension.

Performance Testing:

Test Case 1: Evaluation of the application's response time for weather forecast retrieval.

Test Case 2: Stress testing to verify the application's responsiveness with a high user load.

Results: Performance testing demonstrated swift weather forecast retrieval, and the application effectively handled multiple concurrent user requests without performance degradation.

Security Testing:

Test Case 1: Assessment of data encryption and secure data transmission.

Test Case 2: Verification of secure user authentication and access control.

Results: Security testing confirmed the application's robust data encryption, secure data transmission, and user data protection measures. No critical vulnerabilities were identified.

Compatibility Testing:

Test Case 1: Testing on Android devices with varying OS versions.

Test Case 2: Evaluation of the application's performance on older Android models.

Results: Compatibility testing indicated seamless performance on various Android devices and backward compatibility with older models.

CHAPTER VI

CONCLUSION & FUTURE WORKS

Conclusion: Nurturing Indian Agriculture with "KRUSHAWARE"

The "KRUSHAWARE" project represents a significant milestone in the journey to revolutionize Indian agriculture through the power of technology. This endeavor sought to empower farmers across the nation by providing them with an integrated and user-friendly tool that addresses the key challenges faced in agriculture. As we conclude the project, it is evident that "KRUSHAWARE" has taken significant strides toward achieving its objectives.

Project Achievements:

Accurate Weather Forecasts: "KRUSHAWARE" offers farmers precise location-based weather forecasts, enabling them to make informed decisions about planting, harvesting, and other critical farm activities.

Government Scheme Insights: The application serves as a bridge, connecting farmers with valuable government policies and schemes, empowering them with knowledge and access to vital resources.

Personalized Fertilizer Recommendations: By offering personalized fertilizer recommendations based on crop type, soil conditions, and geographic location, "KRUSHAWARE" aids in optimizing crop yields and promoting sustainable agriculture.

Throughout the project's development, rigorous software testing ensured the reliability, usability, and security of the application. "KRUSHAWARE" emerged as a robust and user-friendly tool, tailored to meet the diverse needs of India's farming community.

Future Works:

As we look to the future, "KRUSHAWARE" remains a dynamic project with vast potential.

Several areas warrant further exploration and development:

Machine Learning Integration: The incorporation of machine learning algorithms for more precise weather forecasts and fertilizer recommendations holds promise. This advanced technology can further enhance the application's value to farmers.

Expanded Crop Coverage: Expanding the range of crops covered by "KRUSHAWARE" ensures that a broader spectrum of farmers can benefit from the application's insights and recommendations.

Regional Customization: Tailoring the application to address the specific needs of different regions and climates across India will maximize its impact and utility.

Data Sources Diversification: Exploring additional data sources and APIs to enrich the application's information pool, such as pest and disease management, can further empower farmers.

Continuous User Engagement: Maintaining an open channel for user feedback and actively seeking the insights of farmers ensures that "KRUSHAWARE" evolves in a user-centric manner.

Accessibility Initiatives: Extending efforts to bridge the digital divide and ensure that the application reaches even the most remote agricultural communities.

Closing Thoughts:

"KRUSHAWARE" is not just a project; it's a commitment to the well-being and prosperity of Indian farmers. The journey to revolutionize agriculture continues, with "KRUSHAWARE" as a testament to the potential of technology in empowering those who feed the nation. The project's success lies in its ability to provide farmers with the knowledge, tools, and support needed to thrive in an ever-changing agricultural landscape. We remain dedicated to this vision as we look toward a future where "KRUSHAWARE" plays an even more significant role in the lives of India's farming community.

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