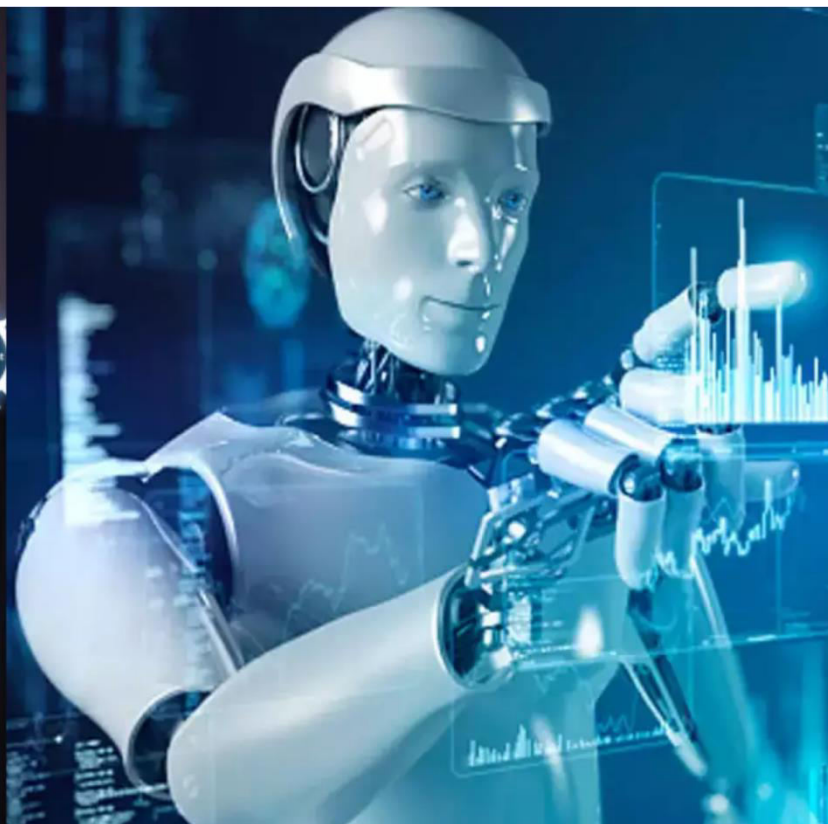




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Design and Implementation of a Mobile-Based Farm Labour Management System

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ABSTRACT: Agricultural productivity in many developing regions is often hindered by inefficient labour management practices, lack of coordination between farm owners and workers, and poor record-keeping. This paper presents the design and implementation of a Mobile-Based Farm Labour Management System aimed at improving the organization, monitoring, and communication of farm labour activities through a user-friendly mobile platform. The system enables farm owners to register workers, assign tasks, track attendance, and record payments digitally, while labourers can view assigned duties, update task progress, and receive notifications about schedules and wages. The mobile application was developed using Android Studio with Firebase/SQL it as the backend database to ensure real-time data synchronization and offline accessibility. The system architecture follows a client-server model, ensuring scalability and secure data handling. Functional and usability tests demonstrate that the system effectively streamlines farm operations, reduces administrative workload, and enhances transparency between farm owners and labourers. Overall, the mobile-based solution offers a cost-effective, portable, and efficient tool for modernizing agricultural labour management

KEYWORDS: Farm Management, Mobile Application, Labour Scheduling, Android, Agriculture Technology, Task Monitoring.

I. INTRODUCTION

Agriculture remains the backbone of many developing economies, providing food, employment, and raw materials for industries. However, despite technological advancements in crop production and mechanization, the management of farm Labour continues to pose significant challenges. Traditional Labour management systems often rely on manual record keeping, paper-based scheduling, and verbal communication, which are prone to errors, miscommunication, and inefficiencies. These challenges lead to poor coordination, reduced productivity, and difficulty in tracking workers' performance and payments. In many farms, especially small- and medium-scale agricultural enterprises, the farm owner or manager must manually assign daily tasks, monitor labour progress, and handle payment records. This manual process not only consumes valuable time but also lacks transparency and accountability. As mobile technology becomes increasingly accessible, there is a growing opportunity to leverage smart phones as tools for improving agricultural management practices. A Mobile-Based Farm labour Management System offers a digital solution to these problems by providing a platform where farm owners and labourers can interact seamlessly. The system allows farm owners to register workers, assign specific tasks, track attendance, monitor work progress, and manage wage payments through an integrated interface. Contrarily, workers can view assigned duties, update task completion status, and receive notifications regarding payments or new assignments. The use of a mobile-based system enhances efficiency, reduces paperwork, and improves communication within the farm environment. Furthermore, by incorporating cloud-based databases such as Firebase or SQL it, the system ensures real-time data storage, accessibility, and security. The system also supports offline functionality, making it suitable for rural areas with limited internet connectivity. This paper focuses on the design and implementation of such a system using Android technology. It explores the

architecture, functional components, and user interfaces that support both farm managers and labourers. The ultimate goal is to develop a reliable, scalable, and user-friendly mobile application that simplifies labour management and promotes digital transformation in agriculture.

II. LITERATURE SURVEY

A farming labour management system (FLMS) is designed to optimize the allocation, scheduling, and monitoring of farm labour to improve productivity and reduce costs. Literature on this topic highlights that effective labour management is crucial due to agriculture's seasonality, labour scarcity, and dependence on both hired and family labour. Studies show that mechanization and digital technologies influence labour demand, yet comprehensive, ICT-based labour management systems for small farms remain limited. Research such as Forbade et al. (2022) proposed mobile-based labour-matching systems, while others (Ismail Kamil, 2024) reviewed farm management software that tracks daily farm activities, including labour input. Findings emphasize that most existing systems focus on general farm operations, leaving gaps in dynamic labour scheduling, productivity tracking, and integration with mechanization. Overall, the literature suggests a need for FLMS platforms that combine labour demand forecasting, cost analysis, performance monitoring, and decision support to help farmers address peak-season shortages and enhance overall farm efficiency.

III. METHODOLOGY

The study adopted a systematic methodology to design and evaluate a Farming Labour Management System (FLMS) aimed at improving labour allocation, scheduling, and monitoring in agricultural operations. The process began with requirements analysis, where data were collected through surveys and interviews with farmers and labourers to identify key challenges in labour hiring, task assignment, and payment tracking, supported by secondary data from agricultural reports. Based on these findings, a three-tier system architecture was designed using UML, consisting of a user interface, an application processing layer, and a database for storing user, task, and wage data. The FLMS was developed using technologies such as HTML, CSS, PHP, MYSQL, and Android Studio with Firebase to ensure both web and mobile accessibility. Key modules included labour registration, job posting, task scheduling, wage computation, notification alerts, and GPS-based location matching. The system was tested through unit, integration, and user acceptance testing (UAT), followed by a pilot implementation involving farmers and labourers to assess usability and effectiveness. Performance evaluation was conducted using descriptive statistics and comparative analysis to measure improvements in task efficiency, labour utilization, and cost reduction compared to traditional methods. This integrated methodology ensured the development of a reliable, user-friendly, and scalable FLMS tailored to the needs of the farming community.

IV. EXPERIMENTAL RESULTS



Fig:-UI of farming labour management system

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The development of the Mobile-Based Farm Labour Management System has demonstrated the potential of mobile technology in transforming traditional farm management practices. The system effectively addresses the major challenges faced in labour organization, task allocation, attendance tracking, and payment management by providing a centralized and efficient digital platform. Through the use of mobile devices, farm owners can now easily manage their workforce, monitor daily activities, and maintain accurate labour records, while workers benefit from improved communication and transparency in task assignments and wage payments. The implementation of the system using Android technology and a real-time database such as Firebase or SQL it ensures accessibility, reliability, and data security. Its user-friendly interface and offline capabilities make it suitable for rural environments where internet connectivity may be limited. Testing and evaluation of the system showed significant improvements in record accuracy, time management, and overall productivity on the farm.

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