

Firestore-Powered Smart Tool Rental Management System

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Abstract — The Tool Rental Android application is a mobile application designed to enhance the rental process and management of tools by providing users with a reliable and easy to use tool renting platform. The application is designed to work by sending the current tool details, provider information, and rental status when the user places a rental request. This information is then sent automatically to the respective provider, ensuring that they can manage rental operations with just one click. Additionally, the application also includes a feature that allows users to save their favorite tools, including mechanical, gardening, and repair tools, facilitating easy access and quick rental requests.

INTRODUCTION

In today's world, it is difficult for businesses and professionals to easily access expensive tools when needed, especially for short-term use. It will be challenging to purchase all tools individually because tools for mechanical, gardening, and repair works are costly and not always used frequently. The good way to reduce expenses and improve resource utilization is to identify and access rental services to help users get the right tools at the right time. Whether you are in instant need of a tool for a project, having this app on your phone can diminish the need for ownership and bring access to tools whenever required.

This application created by MIT App Inventor is an intuitive, cloud-based platform that enables users to create mobile apps for Android devices without the need for extensive coding skills. It was developed by the Massachusetts Institute of Technology (MIT) as part of an educational initiative to introduce computer programming to young people and non-

technical users. The platform provides a drag-and-drop interface that simplifies the app-building process and allows users to create functional apps in a matter of hours.

MIT App Inventor uses block-based programming, which is a visual programming language that enables users to create code by assembling graphical blocks that represent code functions. The platform offers a range of features and components that enable users to create apps like social media apps, games, and productivity tools. It also includes built-in features for data storage, media playback, and sensor-based inputs such as GPS, accelerometer, and camera inputs. MIT App Inventor is open-source and free to use, which makes it accessible to anyone who wants to create an Android app.

The platform has a vibrant community of users who share their experiences, resources, and knowledge to help others build better apps. It is a powerful tool for promoting digital literacy and innovation, and it has the potential to inspire a new generation of mobile app developers.

This application is created on Android. Android is a mobile operating system developed by Google. It is the most widely used mobile operating system in the world and is used by billions of people on smartphones, tablets, and other mobile devices. Android is based on the Linux kernel and is designed primarily for touch screen mobile devices such as smartphones and tablets. It is open-source, meaning that the source code is available for anyone to use and modify. One of the key features, including voice commands, gesture controls, and support for multiple user profiles. Additionally, Android devices can be customized with themes, launchers, and other tools to change the look and feel of the device.

LITERATURE SURVEY

This application focuses on facilitating the rental of mechanical, gardening, and repair tools for short-term use. The system is designed primarily for B2B (Business-to-Business) interactions where service providers can list their tools, and businesses or professionals can rent them easily. The core functionality includes user authentication, tool listing, real-time availability checking, secure payment systems, and rental management — all powered by Firebase backend services.

This system provides a smart solution for managing tool inventory in real-time. It enables providers to update the availability status of tools dynamically through the application. Admins have complete control to approve provider listings, monitor transactions, and generate reports. Notifications are sent to users regarding tool status, rental requests, and payment confirmations ensuring smooth communication between providers and buyers.

Firebase-Based Rental Management System: The use of Firebase as a backend helps in real-time database management, secure user authentication, and seamless cloud storage. Role-based access control ensures security and data privacy. The Firestore database is used to store tool details, user profiles, rental history, and inquiry logs. The platform also provides real-time alerts and updates for admins, providers, and buyers to ensure operational efficiency.

AI-Powered Provider Module for Rental Operations: The provider module integrates an AI-driven plugin that automates processes like listing tools, updating availability, and managing rental approvals under the supervision of the Admin. Providers can handle customer inquiries effectively while ensuring timely dispatch and return of tools.

Buyer-Friendly Tool Search and Secure Payment Integration: Buyers can search for tools categorized based on their needs, view detailed specifications, check availability, and make secure payments through the integrated payment gateway. This ensures a hassle-free rental experience while maintaining transaction security.

SYSTEM ARCHITECTURE

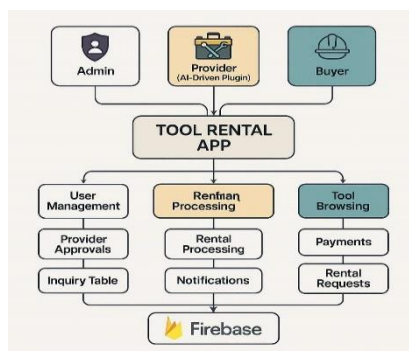


Fig.a.Proposed Architecture on creating application for tool rental management

EXISTING SYSTEM

The existing system available in the market for equipment rental is very limited and primarily focused on basic location tracking of equipment or emergency alert systems. Such systems are equipped with location sensors that allow users to obtain the geographical location of tools or equipment through SMS alerts. In case of emergencies, users can press a button, and a message along with the location link will be sent to predefined contacts added in the application.

Disadvantage

- No dedicated platform for renting tools online
- Lack of secure payment integration
- It behaves abnormally

PROPOSED SYSTEM

In the proposed Tool Rental App system, the complete tool rental process is digitized and automated, providing a platform where users can easily rent tools without any manual communication or dependency on network-based emergency systems.

This system is designed with three major roles: Admin, Provider, and Buyer. Providers can list tools with details like name, description, price, and availability. Buyers can search and rent tools based on their requirements. All data like tool details, user profiles, and rental history are stored securely using Firebase Firestore.

Firebase Authentication ensures secure login for all users. The app also provides real-time notifications regarding rental requests, approvals, payments, and tool availability. The platform supports secure online payments through an integrated payment gateway.

Advantage

- Dedicated platform for tool rental services.
- Real-time tool availability and rental status updates.
- Secure user authentication using Firebase.
- Online payment facility with multiple payment options.
- User-friendly interface.

MODULES

Admin Module:

The Admin module plays a vital role in managing the overall application. Admin has complete control over the platform and manages the users, tools, and transactions. Admin can approve or reject Provider registrations, manage rental requests, handle customer inquiries, and track all transactions and reports using Firebase Firestore.

Provider Module:

The Provider module allows tool owners or businesses to register their tools for rent. Providers can upload tool details like name, image, price, availability, and description. Providers can update the availability of tools and accept or reject rental requests from Buyers..

Buyer Module:

The Buyer module is designed for customers who want to rent

tools for a specific duration. Buyers can browse the available tools, view tool details, send rental requests, and make secure payments using the integrated payment gateway.

Tool Management Module:

This module helps in managing all the tool-related operations. Providers can add new tools, update tool details, and check availability. Admin monitors and verifies tool listings to maintain quality service.

Implementation

This Android application is useful when the user wants to rent tools or needs any tool urgently. When the user opens this application, they can see a *RENT* button. Also, they can store tool details and customer contact numbers. When the user needs any tool, they simply need to open the app and click on the *RENT* button.

This application sends the tool details and contact information to the registered customer or shop owner. The total evaluation can be done in 3 major steps which are described individually. Evaluation describes the whole implementation of the application in 3 steps.

The first step is to enter the tool details and contact information in the application after it is created. These details can include tool name, type, price, availability, and customer contact number. When the application is installed on the smartphone for the first time, the above tool and contact details should be provided. The application will store these details in *TinyDB* for future use, so the user does not need to enter them every time.

When the user needs a tool or wants to rent it, they just have to click the *RENT* button in the application. The application will automatically send the tool information along with the customer details to the respective contact through a text message.

This third major step is testing, which is used to send the text message to the receiver when the user clicks the button. The message contains tool details like tool name, rent price, availability, and contact number, so that the tool can be rented easily and quickly.

RESULTS

After creating the application by MIT App 4Inventor, scan the QR code and download via MIT companion app. The Tool Rental app icon can be placed anywhere on the home screen of the smartphone so that the user can easily access the application whenever needed. It depicts the HOME page which contains options like Available Tools, Rent Tool, Add Tool and Contact Us. When you press the Available Tools button, it will display the list of tools available for rent along with their details like Tool

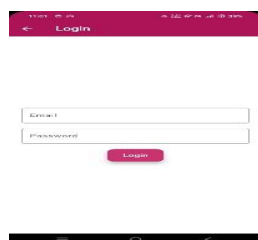


Fig.2.Login page

Name, Rent Price, and Contact Number. After pressing the Rent Tool button, the application screen appears where the user can enter their name, mobile number, tool required, and rental duration.

After entering the details, the application screen appears with the Submit button. After completion of entering the details in the application, the After completion of submitting the details, the Save button must be clicked to exit from the application and the Home button can be clicked return to the main page.

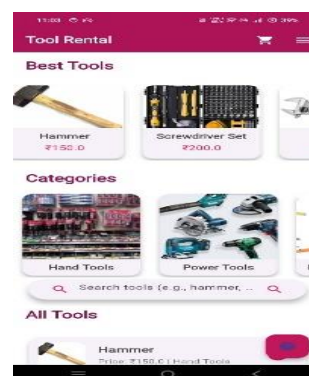


Fig.3.Home page

There is no obligation of entering the tool owner's details each and every time when we open the application. Once entered and saved, they will be registered in the application till we change them.

A confirmation message will be sent to the tool owner immediately after the tool is booked in the user's phone as shown below.

Message received by the tool owner immediately after booking the tool through the application. When we click the Rent Tool button and submit the details, the application automatically sends the user details to the tool owner for confirmation.

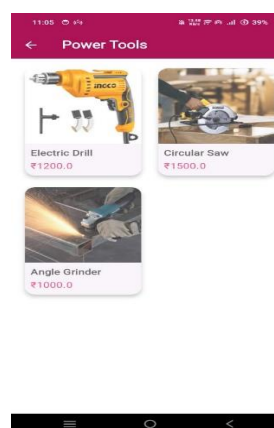


Fig.4.Categorized tool page

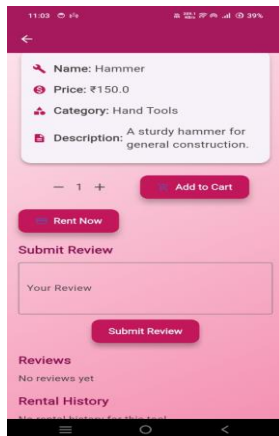


Fig.5.Details of the tool page

CONCLUSION AND FUTURE SCOPE

The development of women safety applicati The development of the *Tool Rental Application* has been a significant step towards providing an easy and efficient platform for renting tools. Such an application can provide convenience and accessibility to customers, particularly in situations where they require tools urgently for their work or personal use.

However, it is essential to recognize that this application alone cannot completely solve all the challenges related to tool rental services. The tool rental industry is vast, and proper management of tools, availability, and communication between the owner and the customer is crucial.

This application can be a useful tool in enhancing the rental process by providing quick access to tool details, availability status, and direct communication with the tool owner. It should be considered as a part of a broader strategy to digitize and improve the rental services and their limitations should also be acknowledged.

Some further upgrades can be done, like adding more tools, multiple contact options, or integrating online payment methods, which can help improve accessibility, trust, and communication — all of which are essential for creating a better tool rental experience.

Voice assistant can also be an effective feature for the tool rental application, providing quick access to rental details, tool availability, and rental instructions, making the process even more user-friendly and efficient

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