

# LeKeDe: Online Rental System

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**Abstract:** - The motivation behind this application is to provide a platform for users and rental products owners to communicate in an effective and efficient manner. The growing popularity and usage of online applications has led to a need to explore the industrial services who could tap into and enhance their services to the customers. Nowadays, there is online rental system curated for things like furniture, car, house etc. which benefits the user. A rental service is a service in which customers arrive to request the hiring of the rental unit. It is more convenient than carrying the cost of owning and maintaining the unit. In this paper we are introducing an Application - LeKeDe, which provides services like renting out day-to-day products like furniture, books, car, clothes, accessories, fitness gadgets, mechatronics etc. Our target audience is mainly anyone who prefers renting out products rather than buying them, they may be either localities, or non-localities or the ones who are up to date. This application aims to rent out products for duration ranging from an hour to a week or a month. It is an extended form of giving out things often organized with numerous local branches and complemented by an application allowing online reservations.

*Index Terms— Online rental system, Retailing, Digitalization, Recommendation system, Android application.*

## I. INTRODUCTION

Nowadays many people are shifting from one city to another for education purpose or for jobs. This has resulted in the creation of a complex and multi-organizational system of management that includes food, cars, books, furniture and other accessories. Current scenario presents you the system for rentals or buying as a very strenuous work. With the massive expansion of Internet and e-commerce technology, Internet platform is providing a lot of services and advantages for online businesses, especially for online shopping portal. Online shopping has expanded in business more effectively and online services are collaborating with customers and other associations. This study uncovered the needs and expectations of current and potential users of virtual marketplaces of the products on temporary basis. This paper constructs the measurement of four-dimensional models that are appropriate for measuring customer satisfaction of online rentals information platform's security. This paper also conducts the factor and multiple regression analysis to verify the measurement model. There has been a long standing debate of whether to buy or rent, there are many applications in today's competitive digital environment. Existing service performance which provides various rental platforms, starting with MagicBricks, Cardekho.com, RentMojo, OLx, Furlenco and this list is endless. These applications are domain specific like MagicBricks is concerned with only renting out property, estate or ZoomCar is concerned with renting

cars, OLx is concerned with buying or selling the products or objects used on a daily basis. So, we have added a new dimension, and come up with an application LeKeDe which will deal with the entire gamut rather than a particular category.

## II. PROPOSED SYSTEM

LeKeDe is an application which is based on very simple ideology, we as humans tend to believe more on what we see rather than what is told to us. This is the same ideology used here, this application has two main characters the seller and the buyer, these are two individuals located at different locations who don't know each other, and it provides a common platform for them the seller and buyer to interact. The seller can put up any product on rent, the buyer will view the product, its specifications and will then contact the seller for further information. LeKeDe allows creation of a unique account for every individual buyer and seller, the buyer can directly contact the seller through email or over a phone call or meet in person.

The need for such an application has become very crucial, time value of money is a concept greatly accepted by majority of the target audience, and money received in the present time is worth more than the same amount received in the future due to the potential earning capacity, wherein money can earn interest. In the evolving market where we are fascinated with brands and tag names we too need to consider the price tags that come with it, the buzzwords like Digitalization, Online Marketing, Sale, Discounts, Trends have completely taken over the market, we wish to have the best of all but going on buying things and stocking them up as One Time Use products or show pieces isn't viable instead we rent out.

Renting is like a win-win situation for both the buyer and seller, products which aren't used much but can still be beneficial to another individual must be rented out, in this way the products will act as an investment for the seller and the buyer too gets to switch his tastes and the major problems like time, space and money have been solved efficiently. LeKeDe is a mobile based android application with which easy monitoring and renting tasks can be performed in an efficient and centralized manner.

## III. PRODUCT FUNCTIONALITY

LeKeDe outlines the various functionalities the main aspects are as follows:

- (a) *Upload Products.*
  - The buyer would be able to upload the specifications of the products to be rented out.

- Once a specific product has been selected, the buyer and seller can decide on further information like renting amount, renting duration and place to meet.
  - A brief product history can be viewed by both the buyer and seller.
  - A delete option has been provided, in order to remove the product, this can be done by the seller.
- (b) *View Products.*
- The buyer would be able to see the products which could be currently rented out.
  - The main advantage for the buyer is the product category, which helps him or her to set filters and get the desired product with minimum clicks.
  - Once the buyer has decided on which product is to be bought, he can directly contact the seller, a call service has been provided and location sharing is made available.
- (c) *Additional Features.*
- The buyer would be able to send an email to the seller through the app, this way a secure connection has been established.
  - The sellers and buyers would be able to access the inbuilt camera which has been provided with the LeKeDe application.

#### IV. OPERATING ENVIRONMENT

This system is designed to function within an application on various mobile devices. LeKeDe has been built using Google Firebase, Android, and JavaScript rather than a native language of a particular platform. This basically means that the mobile phone must be able to support Android based applications. Our system is able to detect the screen size of the target device and able to adapt to that particular screen size and pixelation is avoided. Firebase is used to communicate with the backend servers those stores and deals with the data. LeKeDe requires API level 16 i.e. ANDROID 4.1, Jelly Bean and above versions to run successfully.

#### V. DESIGN & IMPLEMENTATION CONSTRAINT

- (a) *Security.*
- Our application LeKeDe, deals with private user's information which would require greater levels of security to ensure proper safety standards. User's information includes data such as: Name, Home address, Phone number, Aadhar Card number, and Email address. The application via Google Sign in methodology is able to protect each individual user's data and data integrity is maintained as well.
- (b) *Privacy.*
- The target audience mainly includes teenagers and adults who find renting a better alternative over buying, and the one's actually renting out their products. All their information is stored in the FIREBASE database.

LeKeDe has well developed security standards to ensure that the users do not unintentionally interact and cause problems for the database and the system.

(c) *Platform Implementation.*

LeKeDe application is targeted to be used with any media device. The only constraint is, this application would be supported only for Android OS and not for iOS. To properly tailor the security and privacy requirements, the operating system must be above API 16 i.e. Android 4.1, Jelly Bean.

#### VI. MODULES OF PURPOSED PROJECT.

1. *Login/Registration Module*

The login module authenticates the user and once the authentication is done, the user can post or view the products. The login page will provide users with three separate options to login via Google account, phone number or email id.

If user is new to the LeKeDe service, and if he/she wants to register via app registered email-id, there is an option "New User? Register here..." There user can enter email id and password, then REGISTER USER button, the user will be registered to the app.

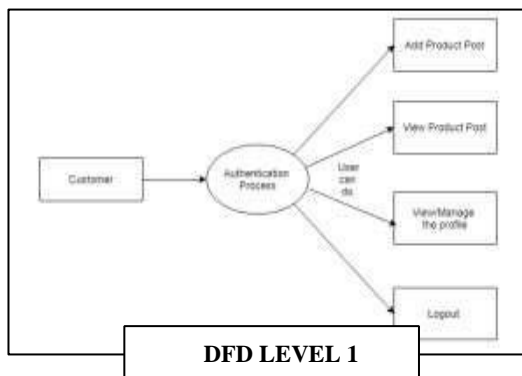
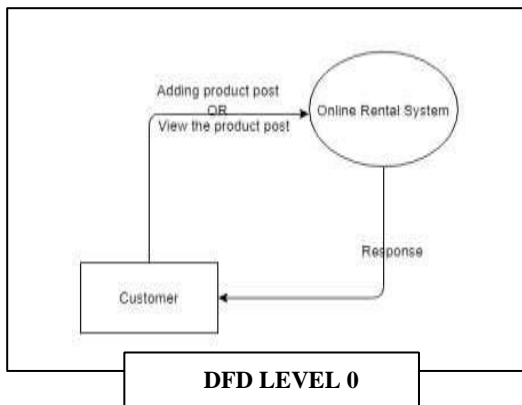
2. *User Dashboard Module*

Here, the user will be able to put products on rent or can take products on rent. That means user can view products or can put products on rent. They will also have access to camera in order to click pictures of the products within the application.

3. *Hardware Interfaces*

In terms of hardware interfaces, the system should be able to function on any device with a working operating system that supports Java and JavaScript. We can abstract out our system by directly communicating with the hardware and use the FIREBASE server as a means of communication to both backend of the system, which is a centralized server or database, and to the device itself. The communication between the applications and the backend servers will be done through JSON script. In the ANDROID mobile device, the application can be started through a respective native application.

#### 4. SOFTWARE INTERFACES

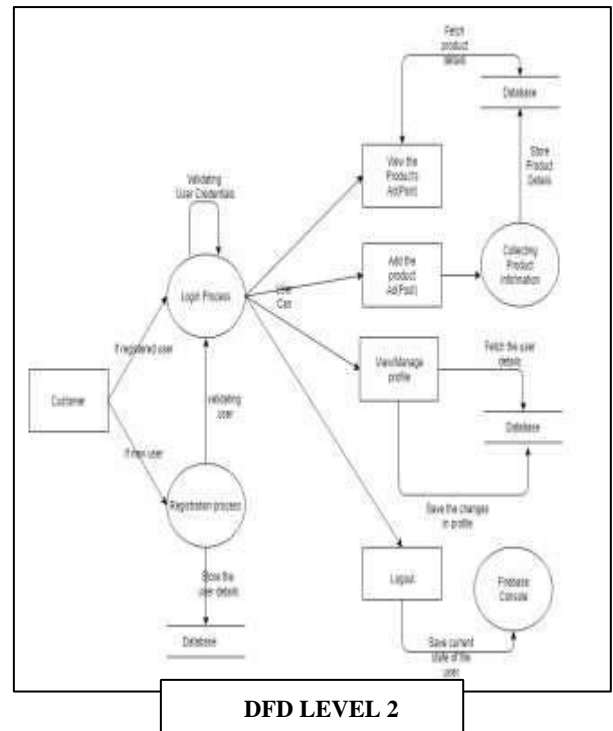


#### VII. SYSTEM DFD'S

As far as native operating systems will be making containers using the Android SDK to display the application content as a “native” application. The application will communicate with FIREBASE backend servers using JSON script while data will be stored using NoSql. Communications between the users will be based on email and call services.

##### 5. Communication Interfaces.

A user will be able to access the product through native applications. A login will be required to ensure only registered users may use the product as well as to protect their content. All the options will be conveniently located on every page of the application’s interface and all completed uploads will be logged and stored for individual users to create history of a product upload. Communication from users and server will be handled through FIREBASE. When signing up, users will be asked to fill out electronic forms requesting their information. Information will be stored in FIREBASE secure servers. To prevent incorrect information being stored from different devices, the product will only use the most recent change through all forms of access. Data will be transferred using TCP. Because the product is “data-heavy” and will require large amounts of bandwidth to transfer information.



#### VIII. APPLICATION TESTING

**Acceptance Test: Creating an Account** The user will be able to create a login Id using their email-id and password, which will eventually be entered into the login page so that the user will be able to use the applications features.

**Acceptance Test: Retrieving Lost Password** Given that the user has provided a valid email address that is already linked with LeKeDe account, when they submit their lost password retrieval request then an email containing reset password is sent. Also the user will be able to see his previous activity log.

**Acceptance Test: Upload and Remove Products** The user should be able to able to upload any products of his choice and they will get classified based on categories and further filtering can be performed on them. Using the inbuilt camera the pixelation is minimized. The products which the seller doesn’t wish to rent out can be removed at any given time, they would be deleted from the Server as well.

### Results of Testing

Testing of the application should not lead to any kind of technical error. White Box testing and Black Box testing is implemented to check the errors.

Sr.No	Test	Expected Result	Result
1	Login	The user should be able to access his account using the preset credentials	Successful
2	Sign-up	Users data to be successfully stored in the Firebase	Successful
3	Forgot-Password	A mail is sent to the registered email-id.	Successful
4	Upload Product	The user should be able to upload the pictures of the product, along with its specifications.	Successful
5	Remove Product	The product no longer exists in the Firebase.	Successful
6	Message passing	Communication is established between the buyer and seller, through email or phone or location sharing facility.	Successful
7	Logs	The products previously rented out or put on rent can be viewed along with their reviews.	Successful
8	Sign-out	Exit from the application	Successful

### FUTURE SCOPE

#### 1. Location Wise Filtering

This is the next add on we are currently working on, wherein using Google Maps services we would be connecting buyers and sellers staying in the same or nearby locality, this would be the process of renting out. This way we target to mainly saving on travelling time and enhance the process of renting out amongst the users.

#### 2. Validity Extension

When the seller keys in the product details, there is an option stating for how long does he wish to rent out his/her product, the buyer and the seller agrees upon a fixed time and price, sometimes the buyer may like to keep the product a little longer than the time agreed upon, in this scenario we would be adding new functionality of validity extension. Here, the buyer can notify the seller through a text message or an email that he or she would be renting the product a little longer than expected, the renting prices would now be negotiated accordingly.

#### 3. Recommendation

We would be extending our domain knowledge in the field of information filtering system, we would be studying the user profile, product profile, past rental purchase, the products mostly rented, its duration and make a suggestion to the buyer regarding the best deals. For this we would be using content-based filtering techniques.

#### 4. Comparisons

Another new feature which would compare the buyers filtered out product with different seller options, and provides the buyer with the best deal.

### CONCLUSION

Through this paper we conclude that:

With web-based rental management information system, hassle free renting can be provided. There is efficiency in paper procurement for charging the product. The data of all the products is stored in a centralized manner and the costs can be controlled and monitored by the operational manager and owner thus avoiding the over-budgeting. Data storage which is already computerized will ease the process for companies and the users for performing preprocessing, recognizing the buying patterns and maintaining the integrity of the data and use this information to a personal benefit. Through this application we are trying to promote renting out products used on a daily basis instead of buying and discarding them. Our application is user-friendly, open source and is Free to use. It positively impacts the environmental situation by using fewer products more number of times. Hiring products provides a simple way of collecting useful information to measure this service. Concentrating on customer satisfaction and the four dimensions,

“Reliability”, “Responsiveness”, “Tangibles” and “Quality” helps us to serve the users in a better manner and thus give us a competitive edge over the others.

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