



RED BOX

Lab project-report

Group number: one.

Project's name: Red Box

Student Name	Student ID	Task Accomplished by student	Mark (by instructor)
1. Mjd Alamri	443007585	One interview, Users of the system, Task analysis, two requirements, The file, Work on prototype, Usability testing.	
		Project Purpose, one interview, two requirements, Work on prototype, Usability testing, testing results.	
		Project Analysis, Field study, two requirements, Design and describe logo, Work on prototype, interaction styles, Usability testing.	
		Project idea, one interview, Two requirements, Work on prototype, Usability Testing.	
		Key findings, one interview, 2 requirements, work on prototype, System tasks, Design improvement, interaction styles, Usability testing.	

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Abstract:

The Red Box project aims to provide a streamlined method for viewing properties without the need for a real estate agent. Users can search the property or use the map in the system, request access, and open a red box containing the key to the property. After viewing, the key is returned to the box using a mobile application. This eliminates the need for appointments, coordination with agents.

Introduction:

The Red Box project is about a developed and simplified way to view houses and apartments without a real estate agent. There is a red box on the door handle of the house, which means that this property is for sale/rent. The property registered in the system is selected through the map and send a request to view the property and the box is opened. The client takes the key from the box and begins viewing the property. Without making any appointments with the real estate agent, when they leave, they return the key to the red box and close it by using the application on the phone.

Our project aims to solve a frequent problem in the real estate field by providing a secure and convenient solution for property tours. The traditional approach of physically meeting clients at the property and providing access can be time-consuming and inconvenient for both the real estate agent and the client.

By implementing this system, it provides several benefits. Firstly, it enhances convenience for both the real estate agent and the client. Clients can request tours at their preferred time without the need for real estate presence. Real estate agents, on the other hand, can efficiently manage the tour requests, saving time and optimizing their schedules.

Secondly, the system improves security. There will be cameras on the property so if the client leaves without returning the key the real estate will get notified.

Moreover, the application can provide additional features such as property information, scheduling options, making it a comprehensive tool for real estate professionals and clients alike.

Overall, the project offers a solution to the inefficiencies and security concerns associated with traditional property tours, providing a more convenient and secure experience for both real estate agents and clients.

Where project is applicable and its limitations:

Our project in real estate serves as secure containers on properties, holding keys for authorized access by agents or prospective buyers. They are convenient for property showings, eliminating the need for the seller's presence. However, they pose security risks, including unauthorized access and potential misuse. Sellers sacrifice direct control over property access, relying on agents' discretion. Despite these limitations, lock boxes streamline property access and are widely used in real estate transactions, with precautions in place to mitigate associated risks.

Background Information & Related Work:

Project Analysis:

Real estate lockboxes revolutionized the way real estate marketers operate by introducing unparalleled convenience, safety, and efficiency into their daily operations. They have changed the way agents manage properties and communicate with clients, eliminating the time-consuming task of coordinating key exchanges or waiting for access to homes.

We acknowledge that there are other systems like ours, such as Supra and Toor, which have their own strengths, such as streamlining access for agents and potential buyers, thereby expediting the sales process, and improving convenience. However, they also have identified weaknesses in terms of security vulnerabilities, particularly unauthorized access to the lockbox or potential misuse by individuals. In contrast, our system utilizes advanced encryption and authentication protocols to ensure secure access. Agents can grant access to authorized individuals, track who enters the property, and receive real-time notifications. This additional layer of security not only protects the property but also instills confidence in customers using our application.

Gathering information techniques:

We used two different ways, interviews, and questionnaires.

For the interviews, we interviewed four people and here is what we gathered:

- All of them had problems because of their busy schedules.
- they all had diverse types of issues with traditional real estate offices, like delay, limited options or if they wanted to buy a property in a different city it would be hard to set an appointment.
- All of them agreed that it will make their life easier.
- They also agreed that it is a time and money saver since it can be done in one trip.
- They suggested great ideas that we will be implementing soon.

And here is the result of the field study (questionnaire):

- Most people's responses were that the time to get viewing takes between 2 and 4 weeks.
- opinions differed about which factor influences decision. Most people choose reasonable prices and others choose to check experiences before choosing and communication skills. In our system, our goal is to provide all three of these factors in one place.
- half the people have had communication problems with real estate agents, and they took advantage of certain situations.
- most people agreed that it eliminates the need for clients to meet agent for key handovers and improves customer service
- recommended to create a unique pin number to maintain adequate security
And change after each showing so guests cannot use the code previously entered.
And to ensure lockbox can withstand any weather or forceful impact.

User Interface, Implementation and Testing:

Key findings from the previous techniques:

Based on the provided project idea of the Red Box, which aim to simplify the process of viewing houses and apartments without a real estate agent, it is important to evaluate existing technologies and systems to understand user satisfaction and identify any inadequacies or interface problems.

Existing systems for viewing properties without an agent have generally received mixed reviews from users. Some users have expressed satisfaction with the convenience and flexibility offered by these systems, as they can view properties at their own pace without the need to schedule appointments with real estate agents. This increased autonomy and independence can be seen as a significant advantage.

However, there are some shortcomings and interface problems that have been identified in previous techniques. One common issue is the lack of information or inaccurate details about the properties. Users have reported instances where the information provided did not match the actual condition or features of the properties they viewed. This discrepancy can lead to frustration and wasted time for users who are genuinely interested in finding a suitable property.

Users of the system:

Primary users:

1. Real estate agents: They use the app to manage property access, including setting up access codes, tracking access history, and coordinating property showings with potential buyers.
2. Homeowners: They utilize the app to grant access to their property to real estate agents and potential buyers while maintaining security and control over who can enter their home.
3. Property managers: They may use the app to oversee multiple properties, monitor access activity, and ensure the security of vacant properties.

Secondary users:

1. Potential homebuyers: They might use the app to request access to view properties listed for sale and receive access codes or instructions from real estate agents.
2. Maintenance personnel: They may use the app to access properties for repairs or maintenance tasks, authorized by property owners or managers.
3. Real estate brokers or agencies: They could use the app to oversee the activities of their agents, track property listings, and monitor access to properties under their management.

Task analysis:

The system should play a key position inside the home showing procedure for real estate agents providing a convenient and secure way to get admission to a property.

We have provided the necessary services to make it easier for customers:

1. User Registration and Authentication:

- Users register with the Redbox system, providing necessary information like name, contact details, and authentication credentials.

2. Redbox Assignment:

- Real estate agents or property owners request the assignment of a Redbox to a specific property.

3. Access Configuration:

- Authorized users configure access parameters for the Redbox, such as PIN codes or digital keys.

4. Redbox Installation:

- Agents physically install the Redbox on the property, typically on a door handle or other secure location.

5. Access Monitoring:

- The system records access attempts and successful openings of Redbox.

6. Notification and Alerts:

- The system sends notifications to property owners or agents when the Redbox is accessed.

7. Redbox Removal:

- Once the property is sold or the need for the Redbox diminishes, authorized users remove the Redbox from the property.

8. Maintenance and Support:

- The system provides support for troubleshooting Redbox issues.

9. Reporting and Analytics:

- The system generates reports on Redbox usage, including access frequency, duration, and user statistics.

10. Security and Compliance:

- The system adheres to industry standards and regulations regarding data security and privacy.

Requirements:

Functional:

1. User will be able to create an account within the system.
 - 1.1- Users must be able to register with the system using their personal information and create authentication credentials (username/password).
 - 1.2-The system must authenticate users before granting access to system features and data.
2. authorized users will be allowed to request the assignment of a Redbox to a specific property and automate the assignment process.
 - 2.1- Authorized users should be able to request the assignment of a Redbox to a specific property through the system.
 - 2.2-The system must automatically assign a Redbox to the requested property and associate it with the requesting agent or owner.
3. The system will Provide users with the ability to configure access parameters for Redbox.
 - 3.1-Users must be able to configure access parameters for the Redbox, including setting PIN codes or digital keys and specifying access duration.
 - 3.2-The system should allow users to define access permissions for potential visitors or prospective buyers.
4. The system will Enable agents to physically install the Redbox on the property and securely attach it to a designated location.
 - 4.1-Agents should be able to physically install the Redbox on the property and securely attach it to a designated location.
 - 4.2- The system must provide guidance or instructions for proper Redbox installation procedures.
5. The system will Record and monitor access attempts and openings of the Redbox, providing a log of activity for auditing purposes.
 - 5.1- The system should record access attempts and successful openings of the Redbox, including timestamp and user information.
 - 5.2- Users should be able to view access logs and monitor Redbox activity in real-time.
6. The system will be able to send notifications and alerts to property owners or agents when the Redbox is accessed.
 - 6.1-The system must send notifications to property owners or agents when the Redbox is accessed.
 - 6.2- Users should have the option to receive real-time notifications or daily summaries of Redbox activity via email or SMS.
7. The system will Allow authorized users to take the Redbox from the property.
 - 7.1- Authorized users will be able to remove the Redbox from the property once it is sold or no longer needed.
 - 7.2- The system must update its records to reflect the removal of the Redbox from the property.

8. The system should provide support for any issue that might happen.

8.1-The system should provide support for troubleshooting Redbox issues, including remote management capabilities.

8.2-Users should be able to check Redbox status, battery levels, and perform firmware updates remotely.

Non-Functional Requirements:

1.the system will be secure.

1.1-The system must encrypt sensitive user data and communications to ensure data security and privacy.

1.2-Access to the system should be protected by strong authentication mechanisms and access controls.

2. The System will be able to manage more users and assignments without performance issues.

2.1- The system should be able to manage many concurrent users and Redbox assignments without performance degradation.

2.2-It should be scalable to accommodate growth in the number of properties and users over time.

3. The system will be highly dependable.

3.1- The system should have minimal downtime and robust error handling mechanisms.

3.2- It should be able to recover gracefully from system failures or unexpected events.

4. The System should provide an intuitive and user-friendly interface.

4.1-The user interface should be intuitive and easy to use, requiring minimal training for users to perform tasks effectively.

4.2- The system should provide clear instructions and guidance for users during Redbox installation and configuration processes.

5. The system should follow the necessary guidelines and best practices to ensure that user data is appropriately protected, and privacy and security requirements are met.

5.1- The system must comply with industry standards and regulations related to real estate data management and security.

5.2- It should adhere to privacy laws and regulations governing the handling of personal information and access logs.

Logo:



Describing logo and how it presents system:

We chose this design for our project after adhering to the five logo design principles. Red represents the Red Box, and blue represents the meanings of depth, trust, loyalty, sincerity, wisdom, confidence, stability, faith, and intelligence. At the center of the logo, a sleek and stylized key silhouette stands out, symbolizing the primary focus on safety, security, and privacy. The font we chose for our logo is Proxima Nova, which is very versatile. It takes inspiration from other widely used sans-serifs, like Futura and Akzidenz Grotesk, merging their geometric and modern styles into one clean look. The overall composition of the logo is clean and modern, reflecting the company's professionalism.

System Tasks:

1-Account Creation and User Authentication: Users create a personal account with the system and authenticate themselves to gain access to system features.

2-Redbox Assignment Request: Authorized users request a Redbox to be assigned to a specific property, automating the process through the system.

3-Redbox Access Configuration: Users set and manage access parameters for the Redbox, such as creating PIN codes or digital keys and specifying the duration of access.

4-Installation and Monitoring: Agents install the Redbox at the property and the system records and monitors all access attempts, providing a log for security and auditing purposes.

5-Notifications and Remote Management: The system sends notifications and alerts to property owners or agents upon Redbox access, and users remotely manage any issues with the Redbox, including status checks and firmware updates.

6-customer service: users can communicate with customer service through live chat

User interface:

The UI would feature a clean and user-friendly design, with intuitive navigation menus for accessing various functionalities. It would include options for agents to view and manage properties, set up access codes, and track access history. The app may also integrate with GPS to locate nearby lockboxes and provide real-time updates on their status. Additionally, it could include push notifications for access requests or alerts, along with in-app messaging for communication between agents and clients. Overall, the UI would prioritize ease of use and efficient property management for real estate professionals.

To check Prototype, click Here:

<https://www.figma.com/proto/vYwX9IUvNEFxfkTf58cEj2V/HCI-project?type=design&node-id=1->

Implementation process:

In the implementation process for the app, we began by researching user needs and identifying key features such as access management. This involves defining modules such as authentication, property management, access control, GPS integration, notifications, messaging, and reporting. Interfaces include the user interface, application programming interface (API), and database interface. Data structures include property data, access code data, access log data, and user data. This systematic approach ensures the development of a robust and functional app that meets the needs of agents and property owners. Continuous feedback refinement and thorough testing were integral to the process, resulting in a user-centric prototype with user-friendly interfaces. We chose primary colors black and white to ensure that our app design is clear, simple, and meets industry standards.

System interaction styles:

1-Direct Manipulation: Users directly interact utilizing common touch gestures like tapping, swiping, and pinching to navigate through the app to select properties and manage Redbox assignments.

2-Text box: Users create accounts and request tours by entering personal and property information.

3-Menu Selection: Users navigate through the app using menus to access different functionalities such as the Redbox configuration, access logs, and support.

4-Radio button: to select customer or owner/agreement to guidelines.

5-Point and click: click button/icon to make specific actions like traveling between pages and make selection Redbox/add/ remove and show interfaces.

6-Question and form: to take input from user to present professional help with frequently asked questions.

7-Title bars: to describe the name of each window and inform user where he/she is.

8-Icons: to clarify services and make it easier to understand application ex: house represents homepage.

9-Scanning: integrate barcode or barcode scanning functionality to quickly input access codes or register new properties into the app.

10-Map interaction: incorporate map-based interaction to help users locate properties visually and provide navigation assistance to nearby listings with Redboxes.

Usability Testing-Task Sheet:

Participant 1:

Task name	Task time	Number of errors	comments	Suggestions to improve task design
Signup for customer and owner	5s	None	-	No need
Login for customer and owner	5s	None	-	No need
Add Red Box	1m	None	It was exceptionally smooth to add a Red Box	No need
Show Red Box Details	4s	None	-	No need
Send a Request to enter property	4s	None	-	No need
Property Search	6s	None	-	No need
View Requests for customer and owner	7s	None	-	No need
Red Box Removal	5s	None	-	No need
Customer service live chat	3s	None	-	No need
Logout for customer and owner	6s	None	It was easy to logout	No need

Participant 2:

Task name	Task time	Number of errors	comments	Suggestions to improve task design
Signup for customer and owner	20s	0	Easy to understand, good UI	-
Login for customer and owner	10s	0	Successful login	-
Add Red Box	2m	0	Noticeably clear	-
Show Red Box Details	15s	0	Unambiguous details	-
Send a Request to enter property	10s	0	All aspects of task were clear	-
Property Search	3m	1	Some frames have different exit button alignment	Add area to more properties and format the exit button alignment
View Requests for customer and owner	2m	0	Clear	-
Red Box Removal	10s	0	Extremely easy	-
Customer service live chat	20s	0	Easy and many ways to contact	-
Logout for customer and owner	10s	0	Fast and easy	-

Participant 3:

Task name	Task time	Number of errors	comments	Suggestions to improve task design
Signup for customer and owner	15s	None	Easy	-
Login for customer and owner	9s	None	Easy	-
Add Red Box	1.3m	None	-	-
Show Red Box Details	9s	None	-	-
Send a Request to enter property	6s	None	Clear	-
Property Search	1m	None	-	-
View Requests for customer and owner	1m	None	Easy	-
Red Box Removal	6s	None	-	-
Customer service live chat	15s	None	-	-
Logout for customer and owner	8s	None	Fast	-

Participant 4:

Task name	Task time	Number of errors	comments	Suggestions to improve task design
Signup for customer and owner	15s	None	Easy to sign up and clear request	-
Login for customer and owner	10s	None	Fast and easy	-
Add Red Box	3m	None	Integrated requests	-
Show Red Box Details	5s	None	A good addition to times of entry and out	-
Send a Request to enter property	6s	None	Effortless way to enter	-
Property Search	3s	None	The types of properties in the search are clearly divided	-
View Requests for customer and owner	10s	None	It is clear	-
Red Box Removal	6s	None	Removal is safe	-
Customer service live chat	10s	None	Modern technology for communication	-
Logout for customer and owner	3s	None	Easy to logout	-

Participant 5:

Task name	Task time	Number of errors	comments	Suggestions to improve task design
Signup for customer and owner	20s	0	Clear and fast	-
Login for customer and owner	13s	0	Simple and tidy interface	-
Add Red Box	4m	0	Clear requirements	Add more info about the property
Show Red Box Details	3s	0	All the details are there	-
Send a Request to enter property	6s	0	The scanner facilitates the entry process	-
Property Search	5s	0	Easy search	Add filters
View Requests for customer and owner	13s	0	Easy to read	-
Red Box Removal	7s	0	Fast removal	-
Customer service live chat	5s	0	Work 24h	-
Logout for customer and owner	6s	0	Easy	-

Description For System Usability Results:

We tested our application with five participations on ten tasks:

- Based on our analysis, tasks (1,2) were successful with comments on how easy and simple tasks were and participant four suggested we determine customer and owner by email to make easier
- Based on our analysis, task (6) the only task to have error by participant two
- Based on our analysis tasks (3,4,5,7,8) were successful. with minor suggestions of improvement
- Based on our analysis, tasks (9,10) were successful with no suggestions of improvement

Task 1: signing up for customer and owner

Errors were zero, the operation was successful and fast with all participants.

Task 2: Login for customer and owner

Errors were zero, the operation was successful and fast. But should implement an easier login by determining customer and owner by email.

Task 3: add red box

Errors were zero, the operation was successful, and it did not take more time than expected. Suggestions by participant five to add more information regarding property.

Task 4: show red box details

Errors were zero, the operation was successful with all participants and comments on how clear it was.

Task 5: Send a Request to enter property

The operation was successful and there were no errors with all participants.

Task 6: Property Search

The operation was successful for majority but with one participant there was one error for alignment which will improve with formatting and the maximum time taken by a user was 3 minutes, which is within the expected range.

Task 7: View Requests for customer and owner

The operation was successful and easy, there were no errors.

Task 8: Red Box Removal

The operation was successful, there are no errors.

Task 9: Customer service live chat

Customers loved it and it worked without errors.

Task 10: Logout for customer and owner

The operation was easy and had no errors.

Usable or not?

The first and third participants were able to accomplish 100% of tasks with no issues the second participant is up to 90%. And the fourth and fifth were able to perform 80%, therefore Red Box is usable.

Enhancements:

We will be working on our system and design to improve the overall aspects of Red Box the Design needs to be adjusted. Small details matter to us such as colors and text fields and we want to guide the users to accomplish the tasks correctly.

Conclusions and future work:

In conclusion, the Red Box system incorporates different interaction styles to enhance user engagement and successfully addresses the need for secure and convenient property access in the industry. Through robust design and implementation, it provides agents, homeowners, and buyers with a reliable solution for managing property keys remotely.

Future work could focus on enhancing the lockbox's features, such as improving the user interface, integrating with external systems, strengthening security measures, and actively seeking feedback from a diverse group of users to provide valuable insights for ongoing improvements and enhancements. Regular updates and bug fixes based on user feedback will optimize performance. Implementing these enhancements will result in a more user-friendly and efficient Red Box system. Exploring partnerships with real estate platforms to streamline the integration of the lockbox into existing workflows.

References:

- [1] "Smart Lock Box: The Key to Efficiency in Real Estate Agent's Daily Operations," The Connected Shop. <https://theconnectedshop.com/blogs/tech-talk/smart-lock-box-the-key-to-efficiency-in-real-estate-agents-daily-operations>
- [2] "Real Estate Electronic Lockbox," SentiLock. <https://www.sentrilock.com/real-estate-electronic-lockbox/>
- [3] "Advantages of a Lockbox on Your Home or Rental Property," Simple showing. <https://www.simpleshowing.com/blog/understanding-the-importance-of-using-a-lockbox-on-real-estate-properties#>