UNIVERSITY OF MOHAMED BOUDIAF - MSILA

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE
DEPARTMENT OF COMPUTER SCIENCE

Thesis submitted in partial fulfillment of the requirements
for the degree of

Master in Computer Science

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Development of a Web Application Dedicated to the Sale and Rental of Real Estate

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June, 2025

الملخص

يتمثل العمل في دراسة الجوانب النظرية المتعلقة بالعقار والتي تشمل المفاهيم الأساسية للعقار ,أنواعه,أهميته الاقتصادية والاجتماعية إضافة إلى دور التخصص الرقمي في توطين وتطوير هذا القطاع. وقد تم استرجاع هذه المعلومات النظرية من دراستنا العملية بكون تطبيق دارفوو يعتبر نموذج تطبيقي يعبر عن اهم المفاهيم التي تمت دراستها من خلال السوق الجزائري. التطبيق هو رقمنة للعمليات التسويقية والتحكمية للاسكان كذلك التفاعلية منها عن طريق ادوات كالخرائط وسنفارة متقدمة ومراجعة الاطارات العقارية الكترونيا. أظهرت النتائج أن التطبيق يُسهم في تجاوز بعض
الإشكاليات التقليدية مثل غياب الشفافية وصعوبة الوصول إلى المعلومة العقارية الدقيقة، مما يعكس أهمية التوافق بين الجانب النظري والممارسات التكنولوجية الحديثة.

الكلمات المفتاحية: العقار، النظرية العقارية، التحول الرقمي، التسويق العقاري، التطبيقات الذكية، دارفو، السوق العقارية الجزائرية.

Abstract

The study examines theoretical aspects related to real estate, including the basic concepts of real estate, its types, and its economic and social importance, in addition to the role of digital specialization in localizing and developing this sector. This comprehensive theoretical information was retrieved from our practical study, as the Darvoo application is an applied model that expresses the most important concepts studied in the Algerian market. The application digitizes the marketing and control processes for housing, as well as the interactive ones, through tools such as maps, advanced sanding, and electronic review of real estate frameworks. The results showed that the application contributes to overcoming some traditional problems, such as the lack of transparency and the difficulty of accessing accurate real estate information, reflecting the importance of compatibility between theoretical aspects and modern technological practices..

Keywords: Real estate, real estate theory, digital transformation, real estate marketing, smart applications, Darvoo, Algerian real estate market...etc

Dedication

For my dad, continuously, and my mom, with love and reverence, in gratitude for their sacrifices, encouragement, and prayers for our lives.
Special Thanks First and foremost would be to our family, for standing by and encouraging us throughout our studies.
To all of our good friends and the class of 2025.
To all my friends who have helped me and said encouraging things.
To those who love me fiercely.
To all who stand up for injustice and ignorance.
Thanks for joining us along the way.

salhi chaima

Dedicated to my dear parents

To those whose prayers were the secret to my success...
To those who toiled so that I could rest, stayed up late so that I could dream, and sacrificed so that I could reach my goal...
To my father, the unshakable support and role model I am always proud of.
And to my mother, the source of compassion, the voice of reassurance in my heart, and the angel who accompanied me with her prayers every step of the way.
No matter how much I write, I will never be able to do you justice...
This achievement is the fruit of your hard work, a simple gift with which I repay a portion of your kindness.

bakour Abdelali

Acknowledgements

I solemnly thank ”Allah”, for giving me courage, patience and good health, which were important during my years of studies and also in completing this humble work.

My thanks also extend to begiven to my supervisor ”Professor Samir Akhrouf” for his supports, guidance, motivation, and understanding in the course of preperation this work.

I also would like to thank all of my professors at the department, and the teaching and administrative members of the the ”Computer Science Department” who have directly or indirectly contributed to my education.

Finally, I wish to extend my heartfelt gratitude and respect to those serving in the jury.

salhi chaima

I extend my sincere thanks and gratitude to the esteemed examination committee for accepting to discuss this work and for their valuable comments, which will enrich and develop this research. Your presence and guidance are greatly appreciated and valued.

I also extend my sincere thanks and respect to my supervisor, ”Professor Samir Akhrof”, who has been a valuable guide throughout my research journey.

I have learned a great deal from you, not only in knowledge and methodology, but also in patience, ethics, and dedication to work.

Thank you for your time, guidance, and trust in me.

bakour Abdelali

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General introduction

The real estate sector is one of the most important sectors that has contributed to the development of the economy in most countries around the world. The sector has witnessed rapid growth recently thanks to technology and digitization. The real estate sector is a fundamental pillar of most countries' economies, generating lucrative returns on investments, making it a source of numerous jobs in fields such as construction, marketing, and real estate services. The massive growth in population and urbanization has made the need to improve the real estate transaction process critical, requiring transparency and access to transaction information.

Many people seem to be living in this digital age in which the electronic mode of buying or renting real estate has become the best option to keep up with the changes in the market and, at the same time, cater to the needs of the customers who are looking for very fast and on time solutions. Methods like advertising homes in newspapers and searching for the property manually have become obsolete and are good for no further as they cannot satisfy the customers who are looking for digital solutions, allowing them to have richer and more flexible choices within an easier period of time. Henceforth, web applications and digital platforms come in as the necessary tools for easing the real estate market, making transactions quicker and living off not only the time but also the energy spent on the search for and negotiation of the property.

Current web applications present numerous newly offered features, which take many of the problems out of the process of buying and renting. Apart from that, these apps allow for live customer service and on-site support which leads to immediate interaction and clients quickly getting their matters settled. In addition, it is possible to view the properties together with ample information supported by the highest quality images and videos, so that customers can have a pre-look on the properties from their homes via the internet before they actually go there.

Platforms use user feedback and ratings to create transparent real estate markets that improve both reliability and user trust. These platforms enable users to participate in transparent real estate markets through their review and rating systems which apply to both properties and sellers. The platform's integration with electronic payment systems allows users to conduct secure financial transactions that simultaneously enhance market efficiency and build trust in digital services.

The real estate industry now faces an urgent requirement of web application development for real estate transactions because of increasing digital dependency among consumers. Our study will investigate the real estate market while assessing existing technological solutions

to create a secure and user-friendly web platform that enhances the digital real estate market in Algeria.

Problematic

Real estate platforms in Algeria do not provide users with applications that deliver complete functionality for their market needs because such solutions are not available yet. The Algerian real estate market faces various issues which users must overcome including:

- **Difficulty accessing reliable information:** The process of obtaining dependable information about real estate properties becomes complex due to the presence of untrustworthy and unconfirmed listings.
- **Weak interaction between stakeholders:** The real estate market suffers from restricted collaboration between its participants which leads to communication delays and hampers negotiation processes while extending timeframes for completing transactions.
- **Lack of effective mechanisms for data verification:** The current real estate market lacks efficient procedures for verifying data which leads to higher risks of fraudulent listings and untrustworthy sellers thus decreasing market confidence.

The development of a specialized web application for real estate buying and renting represents an essential solution to connect these two market segments while enhancing user satisfaction.

Project Objectives

This project aims to build an all-in-one web-based platform that covers real estate sales and rentals, utilizes the newest technologies in software, and offers advanced platforms for searching for properties and listings; to increase the transparency of the real estate transaction process and reduce the time and distance involved when undertaking sales and rentals. It will also facilitate a secure and user friendly environment and experience for all products and services offered as a buyer or seller; aligning with the growing real estate market and digital transformation of Algeria.

Chapter 1: Concepts and Foundations of the Real Estate Sector

1.1 Introduction

The real estate sector is a significant economic sector with residential, commercial, industrial, and service properties. The real estate sector acts as a basic component of economic activity. The real estate market has changed many times over the years due to economic influences, government policies, and technological advances. This chapter will include an overview of real estate and the role it has in economies, as well as historical and current forces affecting the real estate market and sector. It will also discuss how modern technologies including digital transformation, artificial intelligence, and virtual reality are helping the sector operate more effectively, and allow access to transactions and investments.

1.2 Real Estate Concept

Real estate is immovable property which cannot be moved, or cannot be moved damaged. Real estate consists of land, buildings and other types of structures. Properties and land use (operating or non operating) is the leading investment asset for Individuals and Organizations that want to hold a property for a long time and receive profit. The high value of real estate, especially when is developed, remains to be relatively stable over time. Even though developing a property (or renting) may take years, real properties will produce ongoing income[1].

1.3 Types of Real Estate

1.3.1 Land

Land refers to undeveloped land, vacant land, farmland, such as farms, orchards, pastures, and plantations[1].

1.3.2 Residential Real Estate

Residential real estate includes any property that is utilized for residential purposes[1]:

- **Apartments:** Located in either building or residential complexes.

- **Villas and Detached Houses:** Standalone homes that allow more privacy and space.
- **Townhouses:** Connected homes within the same residential community.

1.3.3 Commercial Real Estate

Commercial real estate consists of all land or building utilized exclusively for any commercial purpose, including Take from here or provide explanation here, gas stations, grocery stores, hospitals, hotels, office buildings, parking lots, restaurants, shopping malls, retail stores, and theatres[1].

1.3.4 Industrial Real Estate

Industrial real estate consists of real estate that is used for industrial/production purposes, including:

- **Factories:** used for manufacturing goods and products.
- **Warehouses and Storage Facilities:** used for storing goods.
- **Workshops:** used for performing industrial services or maintenance[1].

1.3.5 Recreational and Service Real Estate

Recreational and service real estate includes real estate that is publicly available, including: cemeteries, government buildings, libraries, parks, recreational areas, places of worship, and schools[1].

1.4 Overview of Real Estate Market Trends in Algeria

According to Nour El-Din Manasra, President of the National Federation of Real Estate Agencies, the Algerian real estate market is undergoing significant changes that could cause prices to drop by up to 15%. This decline is attributed to an increase in supply following the delivery of a quarter-million new housing units and the launch of the “AADL 3” housing program, which has expanded the number of available properties in the market[2].

1.4.1 Factors Behind the Price Decline

- More housing unit supply.
- A 10% price decrease since COVID-19 hit.
- Government commitment to providing housing for country citizens.

1.4.2 Rental Prices

- Average rental price for a three-room apartment in Algiers is roughly 40,000 DZD.
- Demands for rent price caps to stabilize the market and avoid price manipulation.

1.4.3 Real Estate Market Regulation

- Economist Abdelrahman Hadef has called for the establishment of a public agency to regulate the real estate market by ensuring transparency.
- Suggestion to practice digital technology for registering property transfers decreasing price modification.
- Policies of incentives via sustainable real estate for investment notably The High Plateaus .

1.4.4 Major Market Shifts

- MPAhmed Rebhi used the term “real estate earthquake”,to convey the upheaval and changes in the housing market. The new housing unit geography across urban and suburban settings resulted in decreased demand and increased supply[2].
- In totality, there has been decreased price points, but there are still some categories of properties that remain expensive, especially for population density metropolitan regions, and luxury or aspirational markets[2].

1.5 The Importance of Real Estate in the Economy

Real estate is an important part of any economy and is a significant sector of economic development, and socio economic development. The category of real estate properties is vast and includes residential real estate (homes), commercial real estate (office buildings), agricultural land (farmland), and industrial properties (factories). Because real estate exists as a fasten- able asset with significant indirect impact on both the economy and society, the importance of this sector can be seen in several important areas[3] [4]:

1.5.1 Contribution to Gross Domestic Product (GDP)

- The real estate industry makes some of the largest contributions to GDP from construction, development, and investment activities.
- It stimulates the development of other industries, such as building materials, engineering, logistics services, and tourism.

1.5.2 Job Creation

- The industry offers numerous employment opportunities in construction, real estate brokerage, management, and development.
- The real estate industry also provides support to many associated professions, such as legal, engineering, and accounting.

1.5.3 Encouraging Local and Foreign Investment

- Real estate is one of the most “stable” and attractive asset classes for investors, as real estate prices tend to appreciate over the long term.
- It also attracts foreign investment, particularly in CBDs and tourist locations.

1.5.4 Supporting Financial Stability

- Real estate functions as collateral in loan and mortgage processes which strengthens financial stability.
- It functions as both a lasting savings instrument and a protection against rising prices.

1.5.5 Meeting Residential and Commercial Needs

- The industry delivers housing facilities that satisfy both single residents and whole families.
- The sector enables commercial operations together with industrial activities through its provision of physical spaces.

1.5.6 Enhancing Infrastructure and Urban Development

- Residential, commercial, and industrial projects enable cities to expand while industrial and commercial projects support urban development and smart technology.
- Sustainable urban development receives support from modern construction technologies and smart solutions through this sector.
- The real estate industry functions as the fundamental economic engine for sustainable development and financial stability in society because it sustains various industries through its operations.

1.6 Factors Influencing the Real Estate Market

1.6.1 Environmental Factors

- **Climate Change:** Climate change alongside natural disasters alter property values through their intensified risk in specific regions[5].
- **Property Location:** The location of real estate serves as a primary determinant for its value. Places located near fundamental facilities comprising schools and hospitals plus transportation centers tend to experience greater property value appreciation[5].
- **Urban Planning and Infrastructure:** Infrastructure projects consisting of new roads and public transportation systems create substantial effects on property values within their adjacent territories[5].

1.6.2 Economic Factors

- **Economic Growth:** Economic growth generates higher demand for real estate properties which creates rising prices because of increasing purchasing power and rising investments[6].

- **Unemployment Rates:** Higher unemployment rates directly reduce real estate demand because of their negative impact on purchasing power[7].
- **Inflation:** The price of land and building materials changes because of inflation which creates variations in property values that lead to direct effects on the housing market[6].

1.6.3 Political Factors

Government Policies:

Taxes, rental laws, and housing support initiatives directly impact the real estate market[6].

Political Crises and Conflicts:

Political stability and economic reforms attract real estate investments by encouraging investors, whereas political crises or unrest reduce demand and slow market activity[7].

Legislative Changes:

Changes in laws and regulations, such as property ownership rules, taxation, and financing policies, influence the real estate sector[7].

Government Housing Policies in Algeria:

The Algerian government establishes these policies to maintain equilibrium within real estate markets while minimizing housing shortages and driving urban sustainability. The proposed strategy suggests using Singapore's housing loan financing model to subtract money from employee salaries which helps them buy homes before retirement without extra costs. The program's success depends on proper government assistance combined with a well functioning financial system for maintaining its long term operation[8].

- **Social Rental Housing (LSL Locatif Sociale Logement):**The government of Algeria handles the funding through its state treasury to run this housing program which the Public Real Estate Promotion and Management Offices (OPGI) execute.
  Target Group: Low income individuals (earning less than 24,000 DZD per month).
  Distribution Mechanism: Housing units are provided under a low-cost social rental system, with the possibility of future ownership[8].
- **AADL Subsidized Housing Program:** The Algerian government established a key housing project which allows middle income citizens to buy real estate through rent to own programs.

Financing Mechanism: The program requires beneficiaries to submit a nominal starting payment which leads to reasonable monthly payments.
Program Phases: The government has implemented multiple program iterations with the current ”AADL 3” model working to expand housing inventory while reducing market strain[8].

- **Rural Housing (Logement Rurale):**A program exists to advance rural settlement while fostering regional growth through financial support for individuals who want to construct or refurbish homes in rural locations.
  Financing Mechanism: The government extends financial support to those who hold suitable land parcels for building purposes.
  Impact: Reduces pressure on major cities and stimulates rural investments[8].

- **Assisted Promotional Housing (LPA Logement Promotionnel Aidé):**The program offers support to individuals at middle income levels through a funding system that involves equal participation from both the government and the recipient.
  Financing Mechanism: The program works by requiring participants to pay a specific amount of money while the government offers subsidies to decrease expenses.
  Recent Development: This program has replaced the Social Participatory Housing (LSP) program[8].

- **Public Promotional Housing (LPP Logement Public Promotionnel):** This program is aimed at high income earners and aims to provide quality housing projects while being developed using price comparable housing projects.
  Distribution Mechanism: The government sets the price of the housing and provides bank loan access to buyers.
  Target Group: Professionals and upper income earners who do not qualify for other programs[8].

- **Self Built Housing (Auto- Construction):**Targeted to families wish to build their own home and can apply for financial assistance from the state.
  Target Group: Low income families who qualify for government grants.
  Financing Mechanism: Households that have some financial ability to finance could apply to the banks for loans for their completions[8].

1.6.4 Technological Factors

Advancements in Construction Technology:
The steady development of construction technologies continues to change the fundamental manner of construction making a positive impact on construction costs, quality, and sustainability. Key changes include[9]:

- The advent of advanced building materials to provide energy efficiency with smart concrete and energy insulating materials that provide long-term sustainable performance and maintenance costs.
- Building methods, prefabrication and modularization, that provide a shortening of time of construction, require less waste of material and therefore reduces life cycle costs for the project.
- The ability of using 3D printing in construction that will provide the opportunity of getting rapid built housing units at a lower cost with less waste of the construction materials used.
- The capacity of applications of artificial intelligence (AI) and robotic tools for complex construction activities decreases human error and allow speed and efficiency.

Digital Transformation in Real Estate:

Digitalization has been a game changer for how the real estate market functions and is managed. The inclusion of digital domains within real estate has improved transparency in the market, increased speed of decision-making, and improved operational efficiencies. The aforementioned technologies also helped streamline access to information, provided security, and improved user experience altogether. Below, we share some of the more notable developments in this area[10].

Online Real Estate Platforms:

These platforms allow buyers and sellers to search for both properties and transactions online, compare properties and pricing, and conduct transactions online without intermediaries which lowers costs and increases efficiencies.

Additional Feature: Some sophisticated applications offer tools that utilize Artificial Intelligence (AI) to offer tailored property recommendations based on user preferences and historical activity[10].

AI in Real Estate Market Analysis:

AI assists investors and developers in making better decisions through the analysis of Big Data and forecasts about where and what the trends may be in the future[11].

- Analyze supply and demand trends, enabling the identification of the investment of the most profitable areas.
- Show accurate values of property listings by comparing similar listings and previous historical market data.
- Predict real estate price changes based on economic and social variables.

Internet of Things (IoT):

Smart home technologies under the Internet of Things (IoT) have improved residential life quality through various features such as[12]:

- Smart home technology enables automated lighting and temperature control systems that both enhance user comfort while minimizing energy use.
- Internet based security technology combines cameras and motion sensors to deliver real time alerts about unusual activities.
- Real time monitoring tracks resource consumption (water, electricity, gas) to reduce waste and decrease expenses.

Digital Management of Permits and Real Estate Licenses:

Digital transformation contributes to facilitating and accelerating construction and real estate development procedures through[13]:

- Issuing permits electronically, reducing bureaucratic procedures, and facilitating project approvals.
- Enhancing government transparency by enabling citizens and investors to access real estate project information through digital platforms.

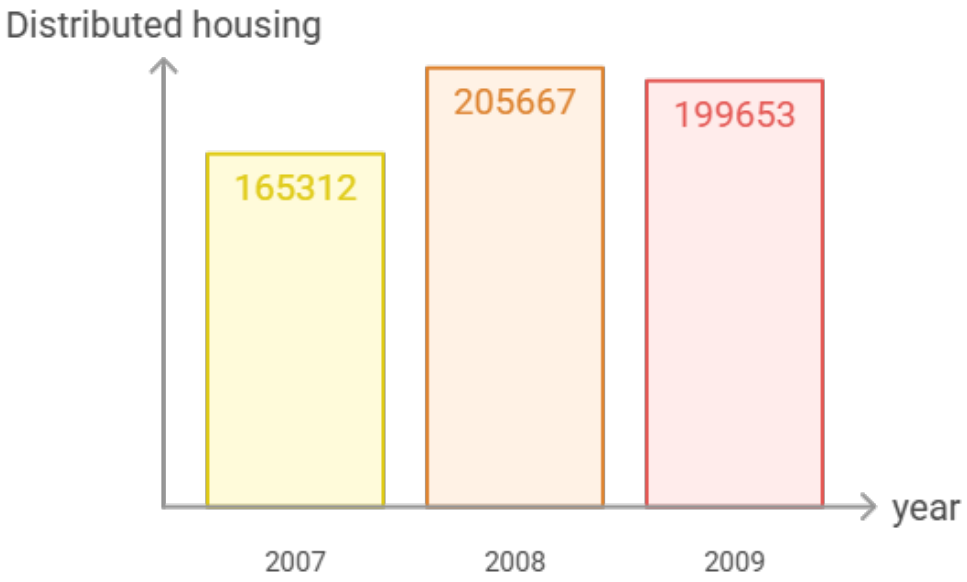


Figure 1.1: Distribution of housing deliveries to all states by year 2007, 2008, and 2009 (excluding self construction)1[14]

1.7 The Evolution of the Real Estate Market Through the Ages

1.7.1 Ancient Times

- Water influences human settlements Water has been a deciding factor in positioning early human settlements such as ancient civilizations in Egypt and Mesopotamia.
- The Berbers settled in Algeria and built permanent houses of earth and stone.
- Archaeological sites such as Timgad Djémila dating back to the Roman era also bear witness to urban development and real estate practices of the time[1].

1.7.2 The Middle Ages

- In Europe, the political system of feudalism resulted in land being given to nobles so that peasants could farm the land for protection.
- In Algeria, they were an Islamic Caliphate, cities grew, markets, and the population developed homes built from mud bricks and mud.
- Cities like the Casbah of Algiers show the greatest representation of Islamic architecture during this time[1].

1.7.3 The Industrial Revolution and Its Impact on Algeria

- Urban population growth from rural migration to industrial zones began during the 18th century Industrial Revolution. During the French colonial period in Algeria between 1830 and 1962 the real estate industry experienced a major transformation by constructing modern European urban developments which neglected traditional Algerian neighborhoods. The housing developments from the colonial period still exist today with major French style apartment buildings found in city downtown areas[1].

1.7.4 The 20th Century and the Development of the Algerian Real Estate Market

- The Algerian government directed its efforts towards social housing development as the nation achieved independence in 1962.
- Throughout the 1970s and 1980s, the government spearheaded extensive development projects which resulted in the creation of new towns such as Cheraga and Ali Mendjeli.

- The development of better transportation systems helped boost suburban construction which led to the establishment of numerous sprawling residential complexes[1].

1.7.5 The 21st Century and Digital Transformation in the Algerian Real Estate Market

- Real estate transactions have undergone digital transformation through technological innovations that have established online platforms and smart applications which now enable property purchase and sales as well as rental transactions. The contemporary housing projects that emerge as smart cities utilize Internet of Things (IoT) technology together with sustainable building systems. Globalization has opened new investment chances in real estate which have drawn international businesses to fund high-end residential properties and tourism facilities across Algeria[1].

1.8 Comparison of Popular Real Estate Platforms

In this section, a comparative analysis will be presented for the following real estate platforms: Zillow, Lkeria, Bayut, and Mubawab. This comparison evaluates several fundamental elements that property buyers and tenants and owners need to know including service diversity, pricing system and user community statistics and additional features. The analysis of similarities and differences between these platforms allows users to develop an understanding of their strengths and weaknesses so they can select the appropriate real estate platform[15][16][17][18].

Platform	**Zillow$_{US}$**	**Lkeria$_{DZ}$**	**Bayut$_{AE}$**	**Mubawab$_{MA,TN,DZ}$**
Founded	2006	2011	2008	2011
User Base	+200 million	Not available	Millions of users	Millions of users
Geographic Focus	USA	Algeria	UAE & Gulf countries	Morocco, Algeria, Tunisia
Core Services	Buy, Sell, Rent, Mortgage	Buy, Sell, Rent	Buy, Sell, Rent, Investment	Buy, Sell, Rent
Property Types	Residential & Commercial	Residential only	Residential & Commercial	Residential & Commercial
Payment Methods	Credit cards, Bank transfers	Cash, Bank transfer	Credit cards, Bank transfers	Cash, Bank transfer

Fees	Agent fees, Some paid for promotions	Free for standard listing, Paid for promotion	Free with paid plans	Free with paid plans
Quality Control	Automated filters & AI	Manual verification & fraud reporting	Human oversight & algorithms	Manual verification & AI
Dispute Resolution	Customer support, User reviews	Through real estate agencies	Customer support & reviews	Customer support & ratings
Communication	In-app, Phone, Email	Phone, Email	Chat, Phone, Email	Phone, Email
Smartphone Apps	iOS / Android	iOS / Android	iOS / Android	iOS / Android
Price Estimation	Zestimate (highly advanced)	Not available	Not available	Not available
Market Analysis	Highly comprehensive with precise data	Local reports	Gulf market reports	General market insights
Search Filters	Extensive	Limited	Highly efficient	Good
Listing Method	Paid for agents	Free + Paid plans	Free + Paid plans	Free + Paid plans
User Interaction	Reviews & Ratings	Limited	Direct contact with agents	Direct contact with agents
Additional Features	Price estimation (Zestimate), Market trends, Home loans	Government listings, Social housing projects	Market reports, Analytics, Agent directory	Educational articles, Agency directory

Table 1.1: Comparison of popular real estate platforms: Zillow, Lkeria, Bayut, and Mubawab

Comparative Analysis of Real Estate Platforms

Online real estate platforms Zillow, Lkeria, Bayut, and Mubawab function as intermediaries between property owners and developers and their potential buyers and renters. These platforms differ in their operational methods and service offerings although they have some common elements.

In the United States, Zillow operates as a leading real estate platform that provides extensive property information which covers price evaluations and market trends and sales background. Advanced algorithms enable Zillow to generate precise data which supports its property valuation tools and comparative market analysis.

Lkeria operates as an Algerian real estate platform which provides users with both residential and commercial property search services and free and premium property listing options. Buyers and renters who are specifically interested in the Algerian market can use this platform to find suitable properties.

Bayut is a chief platform in the Gulf region, especially the UAE, that provides a veritable database of residential and commercial real estate. The platform has a beautiful, up to date user interface, and many different interesting tools like virtual tours and automatic pricing updates in real time.

Mubawab is a real estate platform that is heavily recognized in North African countries, and it provides property search services in Algeria, Morocco, and Tunisia. It has robust filtering capabilities and supports several languages to accommodate the diversity of users[15][16][17][18].

1.9 Justifications for Choosing Zillow, Lkeria, Bayut, and Mubawab for Comparison

The four platforms Zillow, Lkeria, Bayut, and Mubawab emerged as suitable subjects for evaluation because they are market leaders in real estate services while delivering full market coverage to their users. The following key reasons justify their selection:

- **Comprehensive Services and Market Coverage:** Comprehensive Services and Market Coverage: The platforms deliver an extensive array of real estate services which include property listings, pricing tools, market reports and direct communication between buyers and sellers and real estate agents. Their market coverage enables users to obtain diverse business models and user experiences.

- **Popularity and Large Databases:**Popularity and Large Databases:All these platforms maintain their popularity through extensive property databases which they use to provide services. The platforms represent the digital real estate sector because they maintain strong popularity which enables complete examination of industry developments and market needs along with consumer actions.

- **Contribution to the Development of a Holistic Real Estate Platform:** The development process toward a full-featured real estate platform involves the evaluation of existing systems

with the purpose to identify their strengths and weaknesses. Analyzing different platforms eases the process of accessing valuable information that leads to better and more accessible real estate platforms. The analysis of user interaction strategies enables the discovery of optimal methods that should be integrated into upcoming real estate technology improvements.

Through this comparison, the research seeks to provide a comprehensive understanding of the changing digital real estate market by examining four platforms and their evolution along with potential future improvements for the industry.

1.10 A Comparative Study of User Interfaces and User Experience in Real Estate Digital Platforms

1.10.1 Zillow

Home Page Viewing the top half of Zillow's homepage, it shows the basic and easy to read interface with the search bar made of heavy weight at the top to search what you are looking for with the location of course attached to the search. The user interface emphasizes the *Zestimate* price estimation on the first screen, in line of its efficient delivery of rapid analytical results to users. Zillow also incorporates sophisticated filtering tools and interactive maps that not only further refine searching, but also afford users the ability to visually search the areas they are interested in. The platform's contemporary look and streamline navigation, on both desktop and mobile application, makes it an exemplary user centric interface design project within the real estate industry[17].

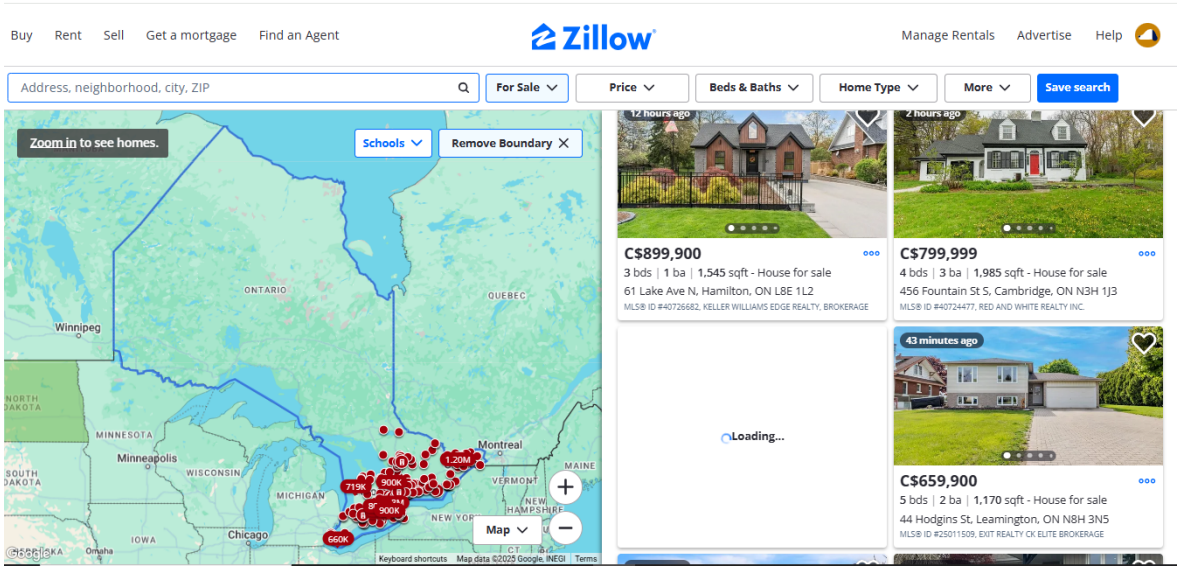


Figure 1.2: Zillow's Homepage[17]

1.10.2 Bayut

The Bayut app ensures you have a smooth browsing experience as you can scroll through 3D virtual tours of projects and apartments, view maps, sort and filter, visit the nearby properties and read about real time market trends with updated news articles. These aspects clearly reflect Bayut's promise to provide a state of the art digital experience specially built for luxury property in the UAE. The platform is beautifully designed with up to the minute pricing updates, and rich media that delivers a comprehensive view of a property[16].

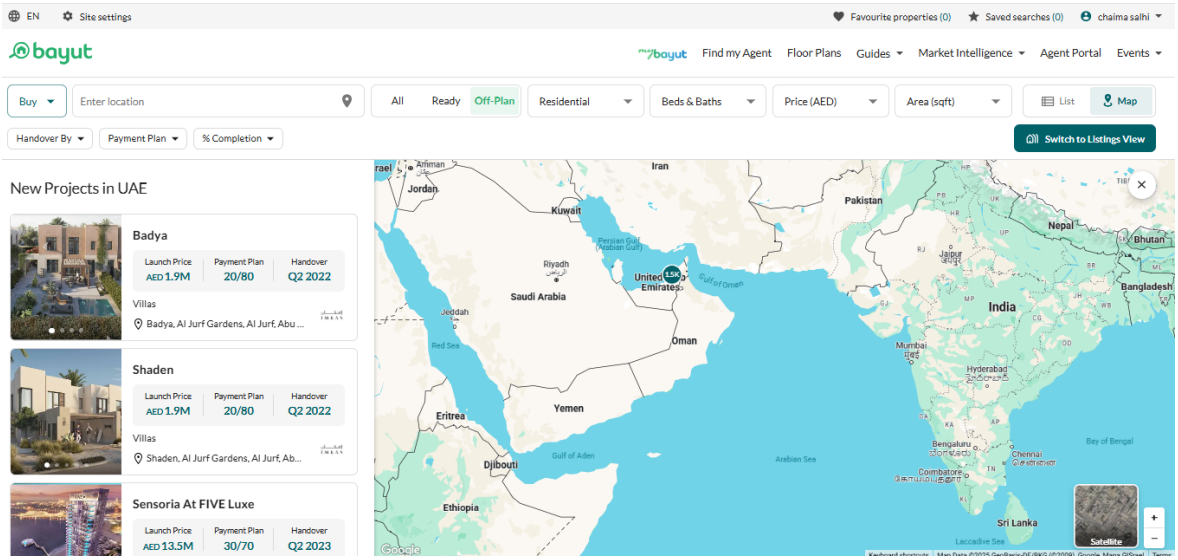


Figure 1.3: the integrated maps feature in the Bayut app[16]

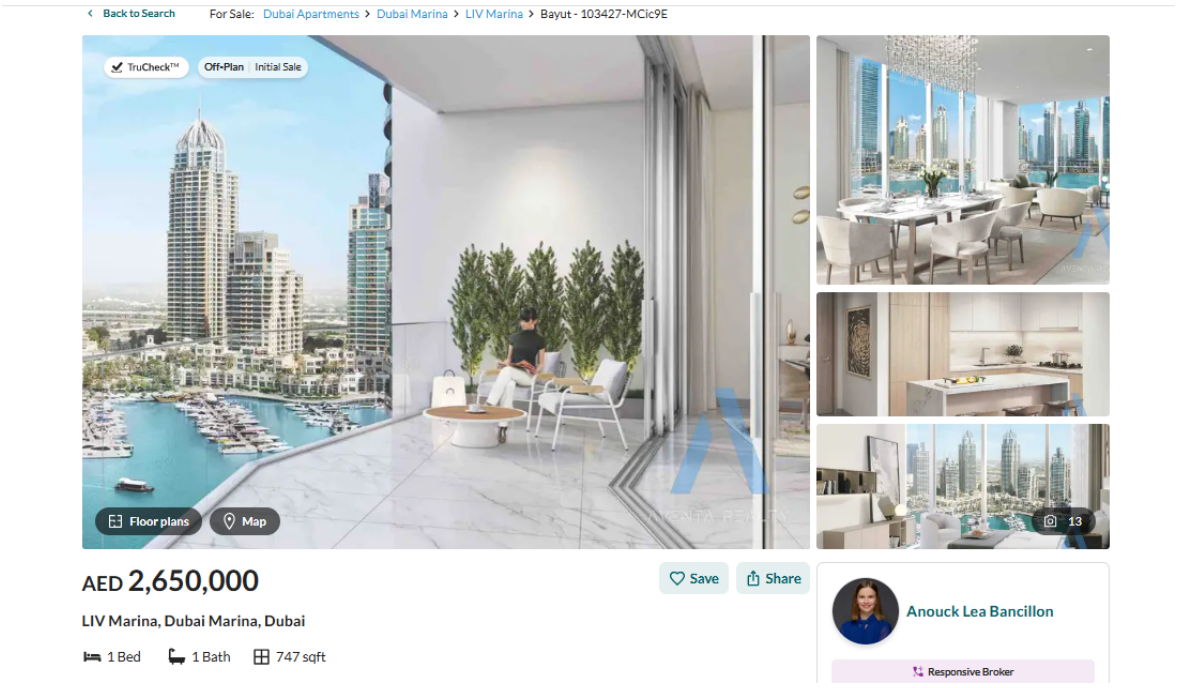


Figure 1.4: Detailed property information[16]

1.11 Advantages and Limitations of Real Estate Platforms

1.11.1 Advantages

- **Wide Market Coverage:** These apps offer broad exposure to those looking to buy, sell and rent, all on a regional or global level, as the case may be.
- **Advanced Search Features:** Intuitive filters give users the ability to search based on location, price, and property type, providing a more tailored search experience.
- **Free and Paid Listings:**Users can submit properties for free or the paid ones for more exposure.
- **Technology Integration:** Experts jam pack your site with the best features such as *Zillow* and *Bayut* namely AI based price estimation, market statistics, and 3D virtual tours to keep your users engaged.
- **Support for Regional Markets:** Generalist platforms such as *Lkeria* and *Mubawab* that focus on Algeria and the Maghreb, *Bayut* for the Gulf, are naturally more adjusted to the specific needs of local users.

1.11.2 Limitations

- **Geographical Coverage Variability:** Some solution, such as *Zillow*, is not available out of the US, and others, like *Bayut*, are only applicable in UEA, losing the global usage potential.
- **Lack of Standardized Pricing:** Price estimates differ between platforms, and sometimes it may not be so accurate especially when there is low data in an area.
- **Limited Market Analytics:** The analytic intelligence of *Lkeria* and *Mubawab* are not significantly deep compared to *Zillow* which makes them less effective for price prediction.
- **Feature Limitations:** There are some features, such as virtual tours and live price updates, that some platforms may offer when others do not which can affect potential buyers.
- **Heavy Reliance on Internet Access:**These services are internet dependent,and some users might find it difficult to have good access to them in a few regions.

1.12 Conclusion

Overview The real estate sector is one of the most important sectors of the Algerian economy, with a growing level of activities as a result of significant housing projects and government's policies to sustain housing. The supply side expansion and the local government initiatives are helping the

supply demand balance to be maintained although there are still challenges such as escalating stocks in some regions, heightened demand in the bigger cities and higher real estate prices.

In the pursuit of transparency and promotion of real estate transactions, the use of new technologies and digital platforms is the need of the hour. These feature are provided to allow users the ability to look for properties, price compare listings, and safely and secure perform transactions. This digitisation of these solutions is likely to increase market dynamics, limit the prevalence of informal practices and create a more sustainable future for the Algerian real estate market.

In such a framework the chapter provided an extensive definition of the real estate market, its economic relevance in terms of impact and depth and which are the driving forces of the same. A comparison with reference platforms such as *Zillow*,*Lkeria*, *Bayut* and*Mubawab* showed that the Algerian digital real estate market is still in its early stages. As a result, the demand for strong, locally focused platforms that value transparency, provide advanced analytics support and a human centric user experience to improve the sector is more urgent than ever.

Chapter 2: Real estate marketing and digital real estate markets

2.1 Introduction

Real estate marketing has undergone substantial progress over the past years to shift from its conventional methods towards different digital marketing approaches. Marketing professionals who work in real estate need to master their skills in marketing techniques because real estate marketing exists to both draw in customers and convert them into property buyers or renters. The industry faces substantial obstacles in the form of strong market competition as well as economic cycles which affect both customer choices and property market behavior.

The digital revolution has extended its reach from standard real estate operations to open real estate markets which transformed the process of buying and selling. Modern investors together with buyers have the ability to view properties and compare prices while finalizing transactions digitally through intermediary free platforms.

The upcoming section will evaluate how blockchain technology together with artificial intelligence and smart contracts have altered the real estate industry. The analysis will focus on digital markets by examining their main characteristics along with the difficulties they encounter and their prospects for worldwide digital evolution.

2.2 Real Estate Marketing

Real estate marketing involves a collection of methods which work to market the sale or rental of different property types that include both residential and commercial spaces as well as investment properties. The discipline encompasses every approach that leads to customer identification and property rental or purchase through real estate market comprehension and marketing goal definition and strategic development[19].

2.3 Objectives of Real Estate Marketing

1. **Increasing Brand Awareness**

    - Initiate measures to establish firm market foothold by creating customer confidence Create first priority status for real estate buyers and tenants among the properties that the company offers[20].

2. **Building a Strong Network of Relationships**

- The company builds trustworthy relationships with customers by sustaining regular communication The organization delivers precise information while providing outstanding customer support services[20].

3. **Attracting Buyers and Tenants**

   - The strategy involves content creation and paid advertising to acquire customer leads. The objective involves targeting customers who actively seek the product instead of those who passively follow[20].

4. **Speeding Up the Selling Process**

   - Ads along with search engine targeting enable businesses to reach dedicated buyers.
   - Reducing time and effort compared to traditional marketing methods[20].

5. **Outperforming Competitors**

   - The company's strengths and property features stand out through specific identification.
   - Reputation development leads to customer base expansion[20].

6. **Achieving the Company's Financial Goals**

   - Company sales and rentals growth must reach desired financial targets.
   - Digital marketing activities enable the expansion of sales channels[20].

7. **Enhancing Customer Experience**

   - A company must deliver transparent information along with appealing promotional deals.
   - The organization needs to provide superior customer relations while allowing various payment choices[20].

8. **Increasing Service Prices**

   - The rise of property demand enables businesses to raise their prices[20].

9. **Selecting the Best Marketing Channels**

   - The market together with target audience analysis determines the best channels for promotion.
   - The analysis of competitor marketing channels helps businesses maximize their customer outreach potential[20].

2.4 Fundamentals of Real Estate Marketing

2.4.1 Market Analysis

- Analyzing competitor performance through their advantages and drawbacks together with their promotional approaches and available pricing details. The process involves reviewing property listings through their geographical position together with cost structure and available features and financing options to determine market advantages[20].

2.4.2 Defining the Target Audience

- A business needs to comprehend its potential customers while separating them into groups according to their interests and available financial resources. Different marketing methods and advertising channels need to be selected based on their suitability for reaching the target audience[20].

2.4.3 Budget Allocation

- The amount of real estate marketing funds requires proper distribution according to the established marketing goals. The effectiveness of marketing campaigns gets evaluated through Return on Investment (ROI) calculations[20].

2.4.4 Creating a Digital Identity (Branding)

- The company needs to establish a unique brand that showcases its main advantages which include top real estate locations and high quality properties. The development of customer trust and loyalty happens through the establishment of a strong brand image[20].

2.5 Real Estate Marketing Methods and Strategies

2.5.1 Social Media Platforms

- The main real estate marketing instrument relies on either paid ads or native social media content[21].
- The combination of paid advertisements delivers quick audience expansion while organic content development requires extended time for audience growth[21].

2.5.2 Company Website

- A digital property display that demonstrates professional real estate listings from the company.

- The website requires optimization for search engines along with user friendly design and SSL certification to protect data security[21].

2.5.3 Real Estate Advertising

- Search engines including Google and YouTube provide immediate access to potential customer bases.
- The use of video ads alongside promotional content results in better audience engagement[21].

2.5.4 Influencer Marketing

- The real estate industry benefits from partnerships between established influencers and industry professionals to broaden their market exposure.
- People make purchase decisions because they trust the recommendations of popular influencers[21].

2.5.5 3D Virtual Tours

- The technology provides users with a digital representation of real world spaces which eliminates the need for physical property inspections.
- Virtual tours through social media platforms and at real estate events generate additional sales leads[21].

2.5.6 Artificial Intelligence (AI) Integration

- The system processes customer information to generate customized deals and develop promotional materials that achieve desired results.
- Chatbots provide immediate assistance to customers[21].

2.5.7 Email Marketing

- Electronic mail functions as a communication channel for reaching out to prospective clients through which businesses send fresh deals and industry developments.
- The system aids in customer re-engagement while simultaneously providing feedback on customer actions[21].

2.5.8 Company & Property Profile

- The organization presents an authentic description of its operations and its success story to establish customer faith.

- The property description consists of full property specifications together with maps and photographs and virtual walkthroughs[21].

2.5.9 Effective Marketing Strategies

- The practice of identifying desired customer groups to address their requirements.
- Use of contemporary technologies such as virtual reality and artificial intelligence
- The implementation of search engine optimization practices to boost property visibility in search rankings.
- The company uses social media interaction to develop its distinctive brand personality.
- Advertising expenditure enables companies to reach their target clients more quickly[21].

2.6 Types of Real Estate Marketing (Different Marketing Methods)

- **Traditional Marketing:** Print marketing, print advertising, banners, and real estate expos[20].
- **Digital Marketing:** Real estate websites, paid advertising, and SEO management[22].
- **Content Marketing:** Articles, videos, and real estate reports educating clients and driving interests[20].
- **Email Marketing:** Sending offers and information to potential clients[20].
- **Influencer Marketing:** Marketing real estate with influencers[20].

Figure 2.1: Real Estate Marketing Strategies

2.7 Concept of Traditional Real Estate Markets

Traditional real estate markets use time tested means to buy, sell, and rent property, historically considered ”traditional” because they have adhered to the same or similar processes all these years. Properties are sold, bought, and rented in traditional real estate markets through real estate offices and all other forms of real estate sale, lease, or rental non-digital processes.

Examples of Traditional Real Estate Markets:

- Local real estate offices.
- Annual real estate shows.
- Print advertisements and magazines.

2.8 Concept of Digital Real Estate Markets

When we talk about digital real estate markets we are referring to any online platform that sells, lists, and rents properties on the internet. Digital (i.e., new) technology is utilized in these real estate markets with tools like artificial intelligence, virtual reality, and data analytics to provide an effective and efficient user experience[22].

Examples of digital real estate markets:

- Global real estate markets:**Zillow** (USA).

- Arab real estate markets: **Bayut** (UAE) and **Lkeria** (Algeria).
- Metaverse Technologies: Buying and selling virtual properties with digital currency.

2.8.1 Difference Between Digital and Traditional Real Estate Markets

Table 2.1: Difference Between Digital and Traditional Real Estate Markets

Aspect	**Digital Real Estate Markets**	**Traditional Real Estate Markets**
Search Method	Online (websites & apps)	Through real estate offices & brokers
Interaction	AI powered chatbots and automation	Direct interaction with real estate agents
Time & Effort	Fast and easily accessible from anywhere	Requires more time and in-person visits
Marketing	Relies on social media & digital ads	Relies on newspapers, billboards, and TV
Transaction Completion	Can be done remotely using e-signatures	Requires signing physical contracts

2.8.2 Impact of Digital Real Estate Services on the Real Estate Market

- **More Transparency:** Digital real estate services provide users with reliable data on current property prices, and therefore reduce the chances of price manipulation and bad deals in the market, which adds a level of transparency to the market.
- **Wider Search Capabilities:** While in the past, property searches were limited to your local area, the introduction of digital real estate services means you can search for real estate anywhere in the world.
- **Easier Buying Process:** Digital services reduce the time and effort needed for property transactions, and create a much simpler and streamlined. process.
- **New Business Models:** Digital real estate services have helped to pioneer new business models, such as crowdfunding real estate investment platforms and property management platforms[23].

2.8.3 An Overview of Daily Active App Users in Real Estate Markets

Figure 2.2: Daily Active App Users Among Real Estate Marketplaces[17]

2.8.4 Future Trends in the Digital Real Estate Market

Emerging Trends in Digital Real Estate

1. **Blockchain Technology for Security and Transparency**
    - **Smart Contracts:** Users can securely purchase or lease commercial contracts over multiple contracts, saving money and time.
    - **Digital Property Registration:** Real estate and patent data can be stored on secure blockchain databases, preventing fraud and forgery.
    - **Tamper Proof Review and Rating System:** Users are guaranteed transparency in their opinions, enhancing trust in the market[24].
2. **Metaverse and Virtual Real Estate**
    - Virtual real estate includes the buying, selling and ownership of virtual properties conducted in a virtual world, with major real estate companies now investing more heavily in virtual real estate in the Metaverse[25].
3. **Artificial Intelligence in Real Estate Market Analysis**
    - Artificial intelligence algorithms can analyze large data and market data to find probable predictions on properties and also provide individual investment recommendations based on the user's interests and financial expectations[26].

4. **Virtual Reality (VR) and Augmented Reality (AR) for Property Tours**
    - **360 Degree Virtual Tours:** Allows users to explore properties through VR technology like they are present.
    - **Augmented Reality (AR) for Interior Design Visualization:** Allows users to customize properties by placing furniture, changing colors, and visualizing renovations using the cameras on smartphones or tablets[27].
5. **Cryptocurrency Payments**
    - Brokers and sellers are increasingly using digital currencies with their clients, and currencies such as Bitcoin and Ethereum are being used in transactions to purchase real estate.
    - This is advantageous for overseas deals and there are additional savings in currency exchange rates[28].

2.8.5 Positive and Negative Impacts of the Digital Real Estate Market

Positive Impacts

- Property can be purchased anywhere through digital platforms.
- The buying and selling are faster through AI and blockchain technology.
- Fewer intermediaries lowers buyer and sellers costs.
- The increasing demand for smart homes and Internet of Things based buildings.
- New jobs created in technology and digitized real estate marketing.
- Smart contracts create more security in the transaction care of the technology.
- Companies can employ people and let them work remotely because there is less reliance on physical offices.

Negative Impacts

- Increasing competitive environments can push up property prices in certain locales.
- Technical problems can provide a bad experience for users.
- Some traditional jobs in real estate may be lost.
- Higher cost of construction and maintenance of smart properties.
- Decrease demand for traditional real estate brokers and jobs
- Potential for digital fraud if systems are not adequately secure.
- Reduced demand for office spaces may negatively impact the commercial real estate market.

2.9 Conclusion

this chapter has examined real estate marketing and its significance in encouraging property to sell and attracting clients. In examining real estate marketing, we compared traditional real estate marketing-a form of marketing that relied on traditional means to finding prospective buyers through print advertisements, and real estate fairs-to digital real estate marketing, which uses modern technological means to find possible customers through social media channels, search engines, and digital advertisements.

In comparing traditional real estate marketing to digital marketing, we illustrated how and why digital real estate marketing is more an effective and efficient approach to reach potential customers in less time and at a much lower cost. In this, we highlighted improvements in consumer' experiences using digital real estate marketing channels because it provided enhanced customer experiences using advanced modern technologies such as 3D Virtual Tours, artificial intelligence technologies, and Search Engine Optimization (SEO) strategies to ensure customer satisfaction. Understanding the latest technological advancements in communication and real estate marketing and finding a way to develop a digital real estate platform that can develop and integrate many of the advancements for buyers and sellers may be vital to also providing a total experience for the buyer and seller; and can also serve to improve integrity, simplify prices and transactions, and improve overall efficiency in the real estate market.

Chapter 3: Conception and Implementation of the Proposed System

3.1 Introduction:

In this chapter, we review the actual stages of developing our project, from defining the main idea and formulating the general concept of the ”darvoo” app to implementation. We also review the steps in developing the app, explaining how to implement some of the previous ideas.

3.2 Problem Analysis and the Need for the System

Despite the increased reliance on digital solutions, traditional ways of doing business still dominate real estate transactions are still performed via fragmentation. All of these issues contribute to an inefficient and unclear real estate marketplace. The main problem areas are as follows:

- **Lack of Transparency:** Users have no or limited reliable information when it comes to price, condition or exact location of the property.
- **Fragmentation of Services and Multiple Channels:** Users must navigate between different websites or intermediates of action and this eats up time and effort in the navigation and transaction phase of the property.
- **Weak Direct Interaction:** Some current applications do not have the functioning communication items between advertisers and prospective clients that could benefit the engagement process and facilitate decision making.
- **Lack of Smart Filtering and Personalization:** many sites do not offer filter modules of entrance, which may allow a user to better identify the best property quickly based on individual needs.
- **Limited Access to Accurate Data:** Some systems do not support image uploading which instead creates challenges in uploading clear images or official documents that impact users' ability to assess the property remotely before a visit.

3.3 System Objectives

- Provide a versatile and integrated platform for the advertisement and viewership of all types of properties (residential, commercial, land, etc.).

- Provide an improved user experience for searching, communicating, and interacting in a collective and user friendly digital space.
- Provide transparency and credibility to the information being displayed by utilizing verification methods, user ratings, and supporting documentation
- Allow the user to submit a request to rent or purchase a property by indicating their desired attributes (number of rooms, location, etc) to allow the administrator to search for matching request(s) and make initial contact.
- Allow users to easily post their properties for sale/rent with the ability to upload photos and other supporting documents.
- Provide enhanced search and filtering capabilities based on location, price, property type, and attributes.
- Allow advertisers and users to communicate with each other quickly and securely.
- Support an administrator control panel that is able to suspend or delete posts or content (the administrator should also be able to look at user report if they exist but this will be a simple procedure as if it is not under the post).
- Provide reports or analytics on postings as well as user interactions as a way to facilitate better decision making.

3.4 Proposed System and Its Architecture

With the ongoing urban sprawl and fast growth of the real estate industry, there is an ever-increasing demand for innovative solutions leveraging technology to enhance and facilitate the purchasing, selling, and leasing of real estate, while further expediting interaction, efficiency, and transparency across all parties of the real estate market.

In this context, the proposed system intends to create an integrated and flexible digital platform that will offer support to any variety of users whether individuals or companies with a streamlined and secure user experience.

The platform is equipped with current user interface tools, which enables users to display properties, search per their standards through filtering and sorting, determine a property's geographical parameter on the map, and upload images and documents related to the listing. The platform also facilitates direct communication for parties interested in a particular listing, thus improving the speed of the transaction process while improving cost savings, and lowering the overall effort involved in the transaction.

In technical terms, the system is architected based on integrated services, made up of a main server, Application Programming Interfaces (APIs), and an easily changeable database that holds, manages and stores information about users, properties, and all transactions related to them. The system is operated through an administrative control panel made specifically for Administrators. This panel allows

them to manage listings, review user generated content, manage users' permissions and management complaints to help with quality assurance and the stability of the system.

The platform has external integrations that include cloud storage for image and document hosting, and authentication services for account and user data security. The design of this system, was made scalable to prepare for expected user growth and increased requests.

This system is one step toward a digital transformation in the real estate sector combining usability and reliability in one platform that can connect everyone involved in the real estate process while enhancing the efficiency of the real estate market.

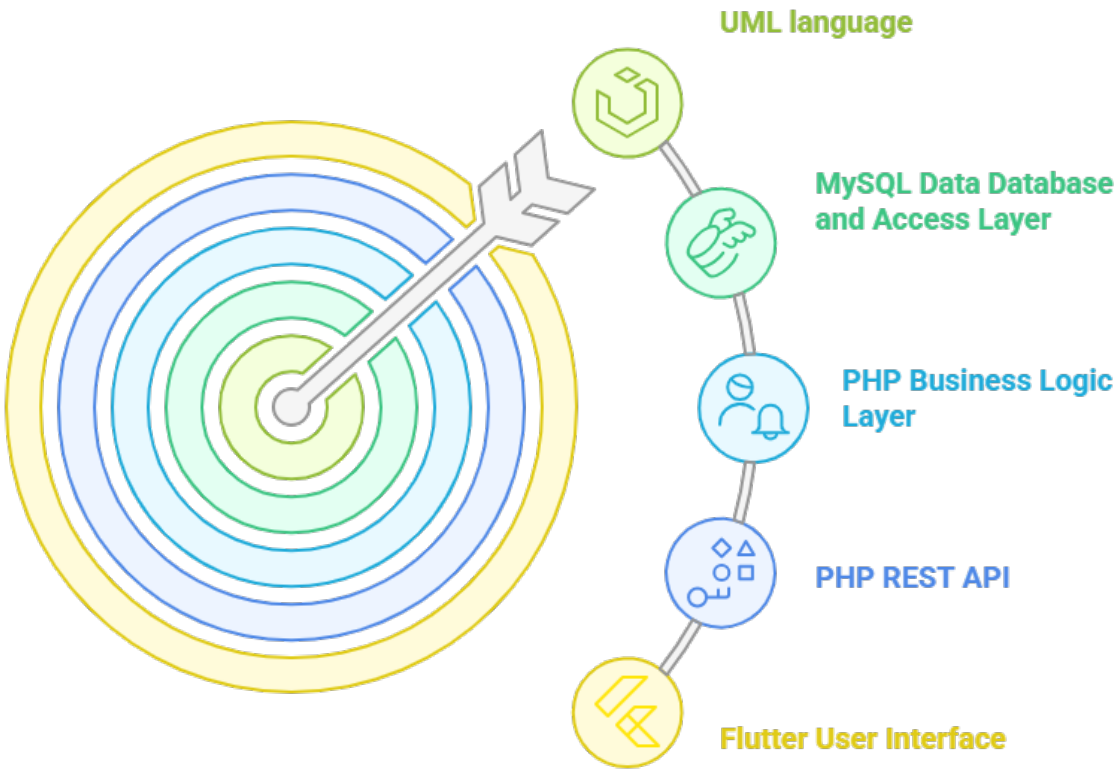


Figure 3.1: Global architecture of the system

3.5 Hardware

We used a 6th gen **i7 Dell Latitude E7470** with **16GB of DDR4 RAM** and a**256GB SSD**, which is good and fast enough for an application developer to work effectively and efficiently on web applications, both at the frontend and the backend of things.

3.6 Software

3.6.1 Backend Infrastructure

The server side layer is the backbone of the system that takes care of all secondary tasks like operations on data, transactions, and client server communications. It can also involve simulation tools for an improved system development which is of particular interest in energy demanding areas such as cooling systems. It is in this scenario that engineers and energy consultants can appreciate the value of simulation tools to maximize the total system performance.

- **Server:** The server must support the execution of the backend platform, handling requests from both users and administrators in a secure and up-to-date manner.
- **Application Framework:** Application framework gives us an organized, easy & efficient way to work with application codes.
- **Database:** We use a powerful database like **MySQL** to ensure economical and stable storage and retrieval of user profiles, property listings, queries, and other essential data at the same time.
- **Authentication and Authorization:** Authentication occurs when the system checks user identity before providing access and Authorization determines the authorized user's available actions and system areas.
- **APIs (Application Programming Interfaces):** The implementation of APIs helps the frontend connect with the backend to deliver fundamental system capabilities including login functions and search functionality and user interaction features. interaction.
- **Image Storage:** The system allows users to upload images and media which then get stored automatically through cloud storage solutions to protect both accessibility and security
- **Notifications:** The system uses notification mechanisms which provide booking confirmations, email alerts, identity verifications and periodic reminders.
- **Scalability and Performance:** The backend system demonstrates scalability and high performance through its design while it maintains the ability to handle growth related traffic. To achieve this goal the system implements load balancers and caching strategies alongside horizontal scaling techniques.
- **Security:** Data security represents the chief concern within the system. The backend needs to comply with modern security standards which require strong auto generated passwords and firewall defenses and software trust avoidance and regular security audits for user privacy and system integrity protection.

- **Live Chat:** The platform includes a live chat feature to allow users to contact support or communicate with each other in real time based on system requirements. This feature enhances user experience by providing instant responses, real time assistance, and increased engagement. A robust and secure solution was selected to ensure scalability, data protection, and easy customization.

3.6.2 Frontend Development and UI/UX Design

The **Darvoo** platform receives frontend development and user experience (UX) design to provide photographers and users with a seamless and visually engaging digital experience. The platform aims to establish a responsive interface which users can interact seamlessly with platform features. The essential elements of this process include:

- **User Centered Design:** The design process starts with identifying the exact requirements professionals or clients have so the platform can provide an experience that is both customized and useful.
- **Responsive Design:** The design allows for universal operation across all phone devices. Users can enjoy a standalone fit regardless of screen contrast.
- **Clear and Simple Navigation:** The platform implements a navigation system which combines simplicity with clarity to help users discover content fast through recognizable layout elements and natural organization methods.
- **Interactive Elements:** The interface contains interactive elements that include buttons, forms and maps which enhance user participation and usability.
- **Polished Visual Design:** The platform features a modern visual design that follows clean aesthetics and uses Darvoo branding elements to target their core audience.
- **Effective Feedback Mechanisms:** Users receive real time notifications along with confirmations and step by step instructions which eliminate doubt and improve overall comprehension of procedural status.

3.7 Map Implementation

To achieve better distribution among customers, we developed the system with the best available map providers who provide core functionality for the Distribution module.

3.7.1 Map Providers

OpenStreetMap

OpenStreetMap is a free map provider launched in the UK in 2004, created due to the lack of high quality, freely usable map data. The map is maintained by a global community of nearly 5 million

registered users and over 1 million contributors using open source tools and software. Its data is used by local communities, volunteer groups, companies, governments, software developers, and more[29].

Pros:

- Data is generated and used by local people, reflecting high accuracy and real world relevance.
- Includes comprehensive details such as roads, buildings, addresses, shops and businesses, points of interest, railways, trails, transit systems, land use, and natural features.

Cons:

- While it supports desktop `.NET` applications, its integration and advanced service offerings are more limited compared to commercial map providers.

Bing Maps

Bing Maps is a mapping service developed since 2005, originating from Microsoft MapPoint and TerraServer projects. It is partially powered by the HERE platform (formerly Navteq), and utilizes street data, postal information, imagery, and third-party content[30].

Pros:

- Provides bird's eye view, satellite imagery, and directions.
- Supports all `.NET` applications.

Cons:

- Map files are not updated very frequently.

Google Maps

Google Maps is a web based service launched in 2005 by Google. It provides detailed geographic data, including aerial and satellite views, and street level imagery in supported cities[31].

Pros:

- Users can add details about their business on the map.
- Offers street views using photographs taken from vehicles.
- Displays traffic conditions and road speed.
- Provides both aerial and satellite views.

Cons:

- Does not support desktop `.NET` applications.

3.7.2 How Google Maps Was Integrated in Darvoo Project

We took a look at several providers and Google Maps was the best fit for us for this extension using `flutter_map`.

1. **flutter_map Library:** The`flutter_map` library is an open-source Flutter library for displaying maps using a variety of data sources OpenStreetMap. `flutter_map` is a lightweight solution and a straightforward alternative to Google Maps.

2. **Basic Steps to Use `flutter_map`**

```yaml
dependencies:
  flutter:
    sdk: flutter
  flutter_map: ^6.0.1
  latlong2: ^0.9.0
```

Figure 3.2: Add the library to pubspec.yaml

Make sure to run `flutter pub get` after adding the dependencies.

```dart
FlutterMap(
  options: MapOptions(
    initialCenter: controller.myLocation,
    initialZoom: 15.0,
  ), // MapOptions
  children: [
    TileLayer(
      urlTemplate: "https://{s}.tile.openstreetmap.org/{z}/{x}/{y}.png",
      subdomains: ['a', 'b', 'c'],
    ), // TileLayer
    MarkerLayer(
      markers: [
        Marker(
          point: controller.myLocation,
          width: 80,
          height: 80,
          child: const Column(
            children: [
              Icon(Icons.location_on, color: Colors.red, size: 40),
              Text("العقار",
                style: TextStyle(fontSize: 12, fontWeight: FontWeight.bold)), // Text
            ],
          ), // Column
        ), // Marker
      ],
    ), // MarkerLayer
  ],
), // FlutterMap
```

Figure 3.3: Use it in Flutter code

3. **Library Features**

- Displays maps from OpenStreetMap or other tile servers.
- Markers and polygons are supported.
- Lightweight and highly customizable.
- No API key needed.

3.8 System Modeling

For the architectural design of the platform, we considered UML (Unified Modeling Language) diagrams, a popular graphical modeling approach for modeling software systems, that help us visualize, specify, construct and document complex software systems with a rich modeling vocabulary. UML diagramming helps to specify the structure, behaviour, and interaction of components in a software system while documenting the same information.

For our purposes, we considered the following three types of UML diagrams:

- **Use Case Diagrams:** Represent the system's services from the user's point of view.
- **Sequence Diagrams:** Describe the temporal interaction between system components
- **Class Diagrams:** Shape the static structure of the system, and the relationships between objects/entities of that system.

Using **StarUML**, an advanced, UML modeling tool; we were able to leverage various UML diagram types.

3.8.1 Use Case Diagram

The use case diagram displays two specific actors: ”Administrator” and ”Regular User”. The Administrator has access to everything related to administration in the system including adding, deleting, modifying, and viewing properties. They can also manage requests, users, property categories, real estate documents, etc. Additionally, they can see reports users submit, and can respond appropriately.

As opposed to the Administrator, the ”Regular User” has a certain amount of permissions to be able to interact with the system. They can create an account, maintain or delete it, and they can add, modify, delete and view the properties that were theirs. Regular users can also be able to rate properties they like, give them a like, and report violations if they see any violations related to properties, etc. Each actor (Administrator and Regular User) represents its own independent entity with its own use cases, with no direct inheritance relationship between them.

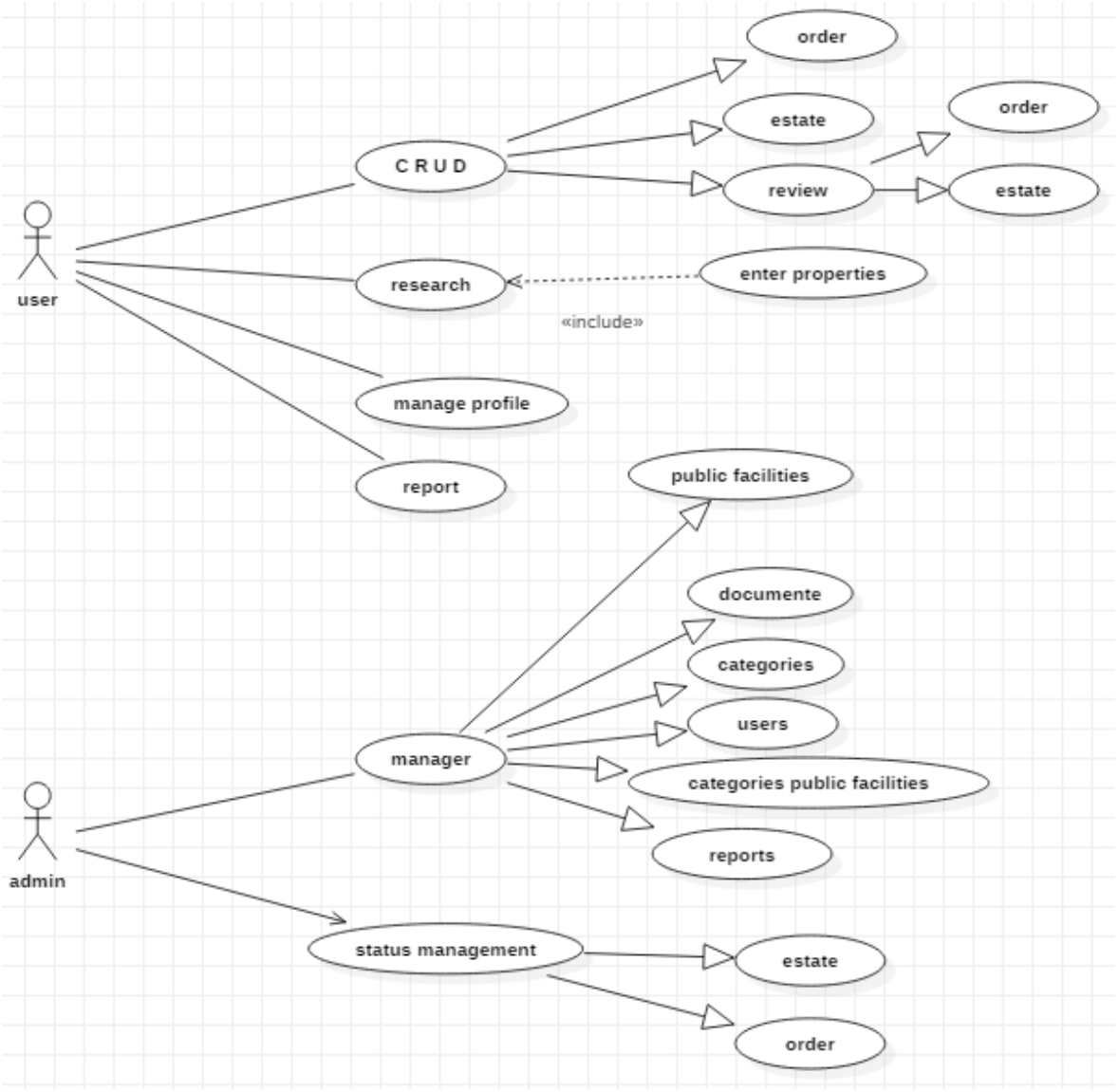


Figure 3.4: Use Case Diagram

3.8.2 Sequence Diagrams

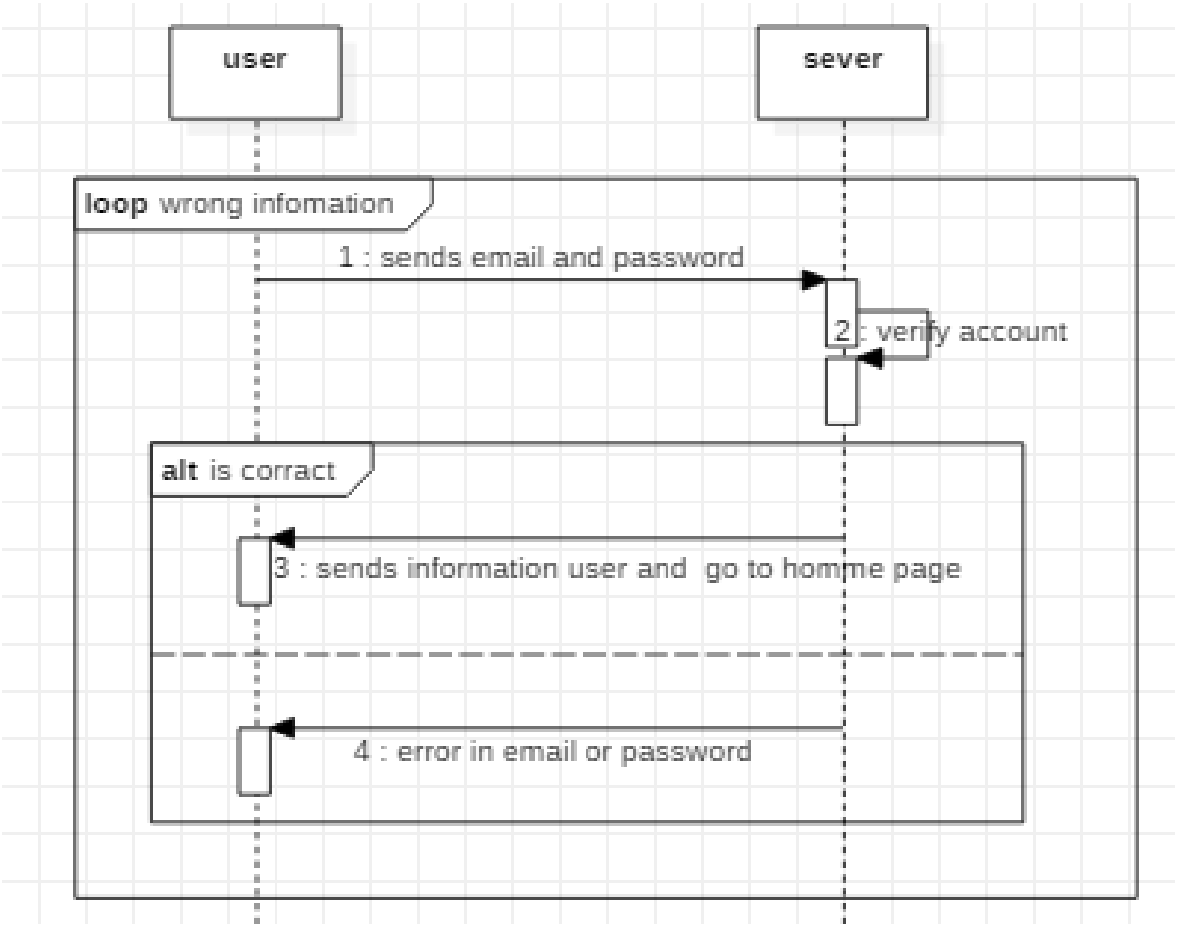


Figure 3.5: Sequence Diagram of login

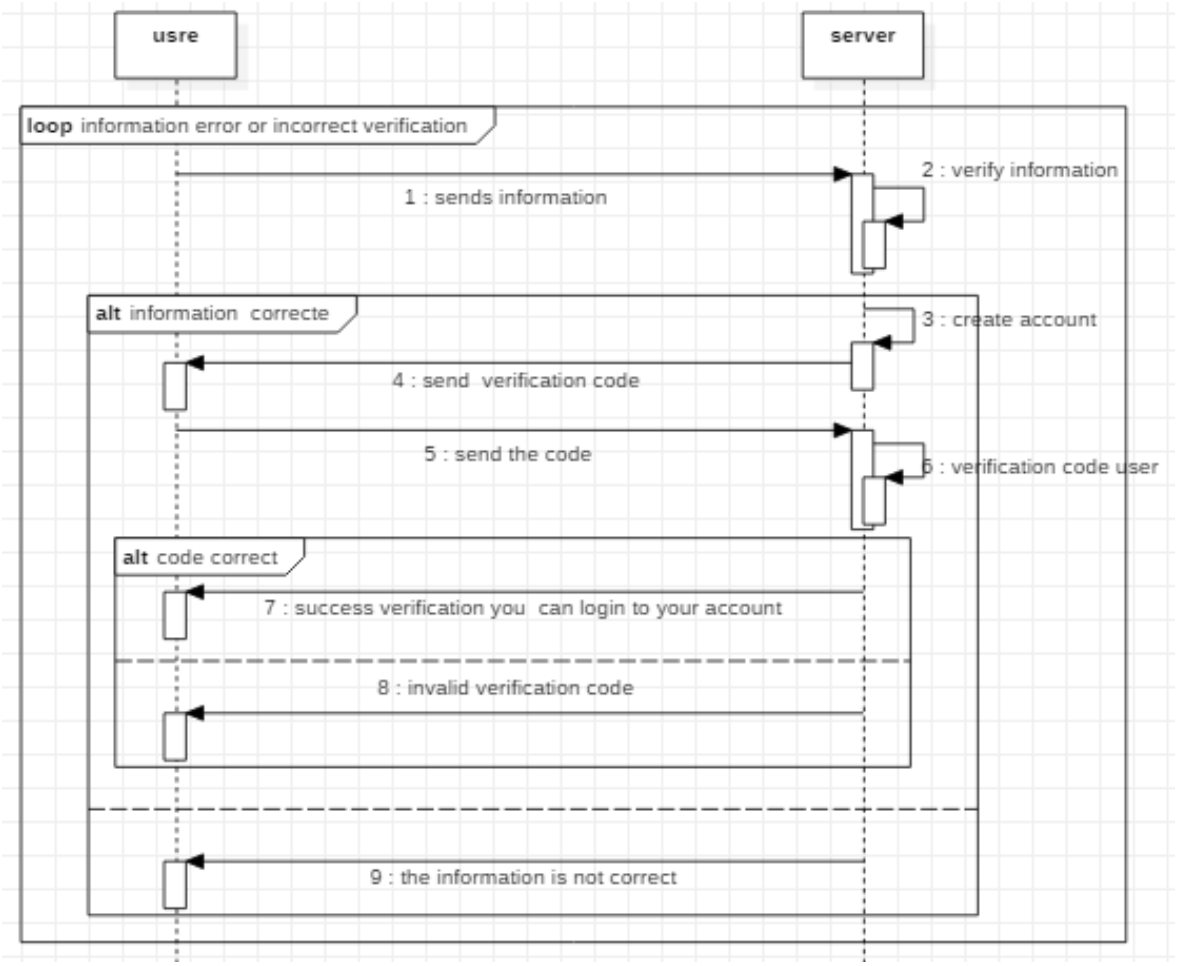


Figure 3.6: Sequence Diagram of signup

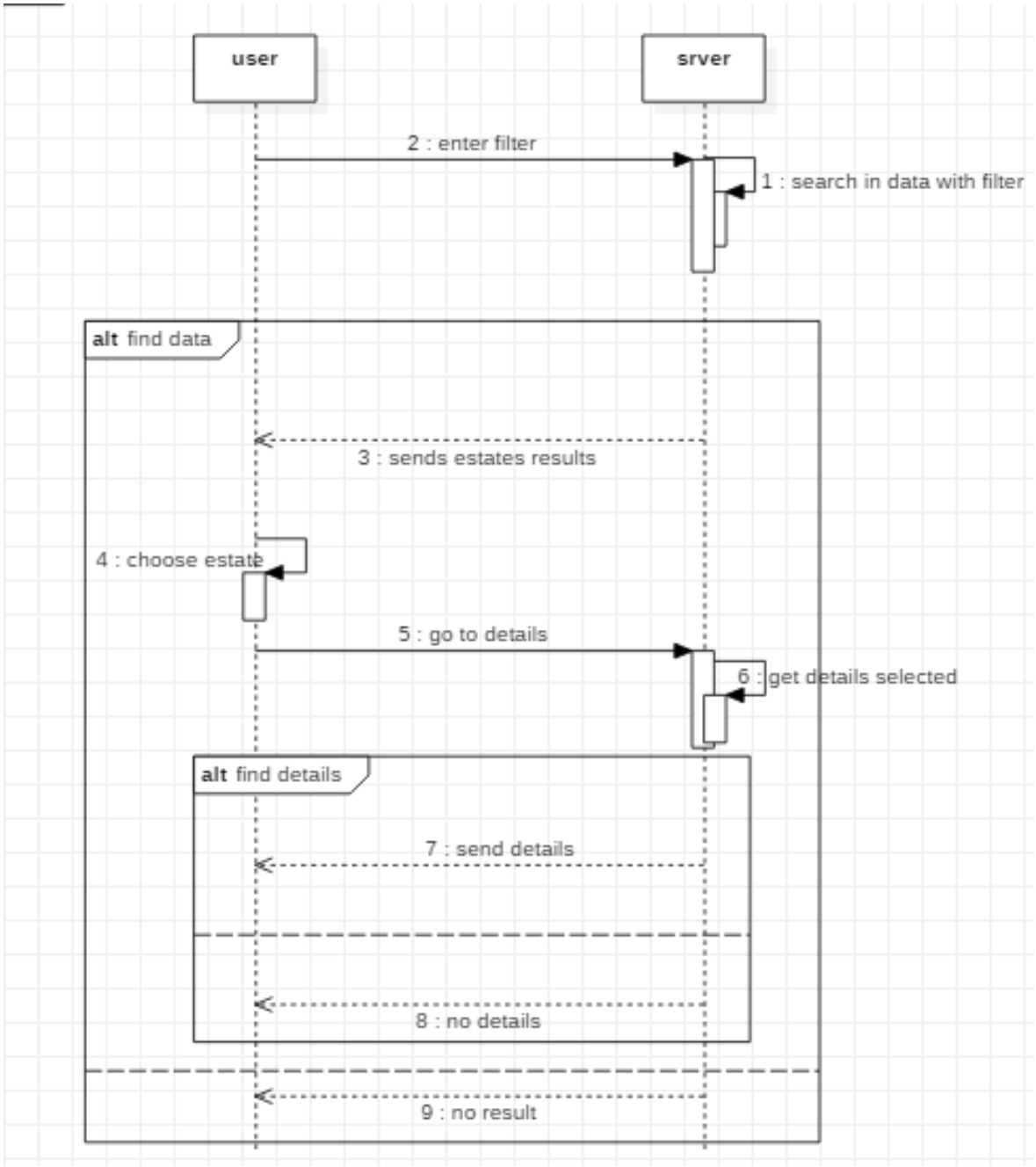


Figure 3.7: Sequence Diagram of search

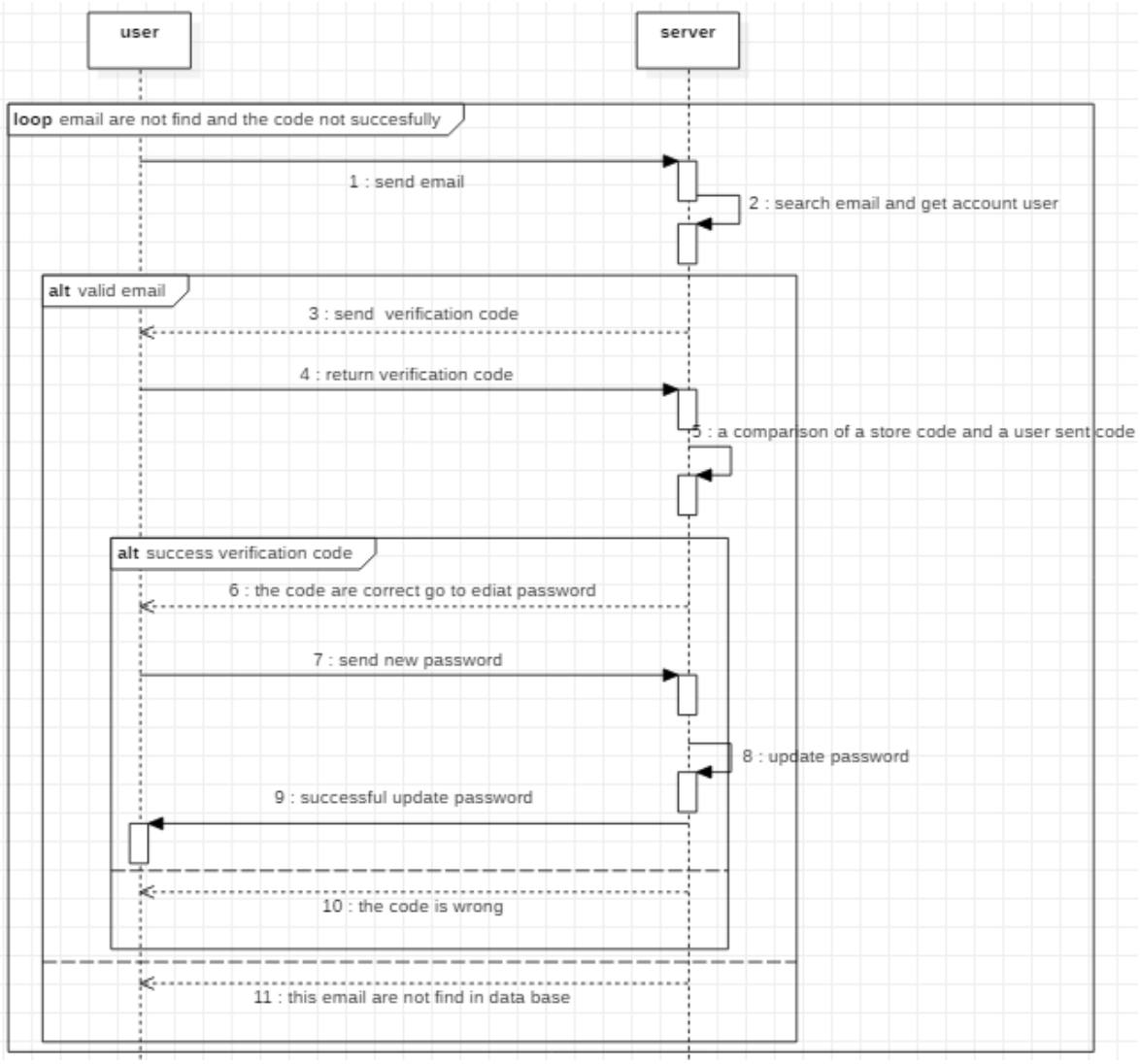


Figure 3.8: Sequence Diagram of forget password

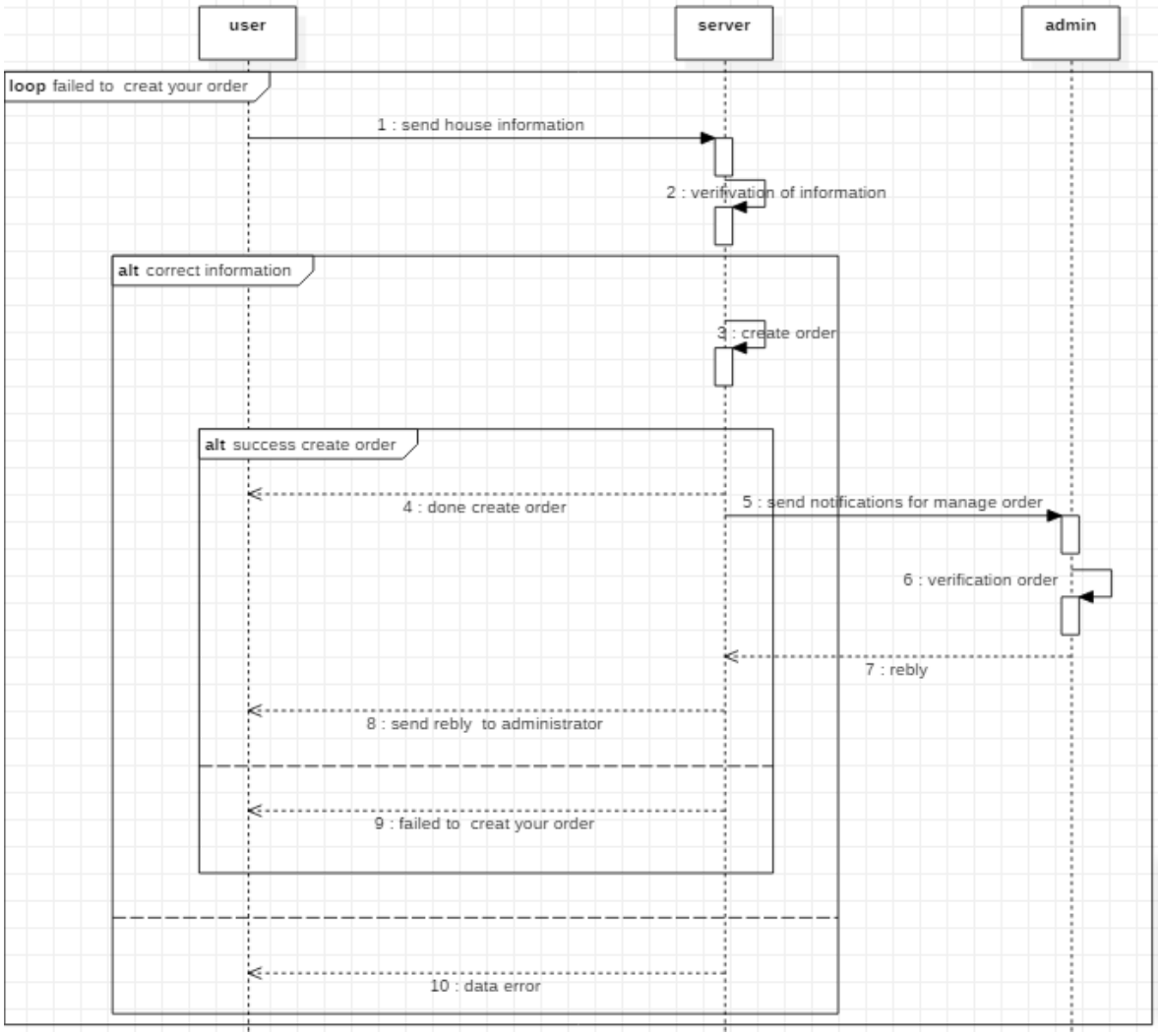


Figure 3.9: Sequence Diagram of add order

3.8.3 Class Diagrams

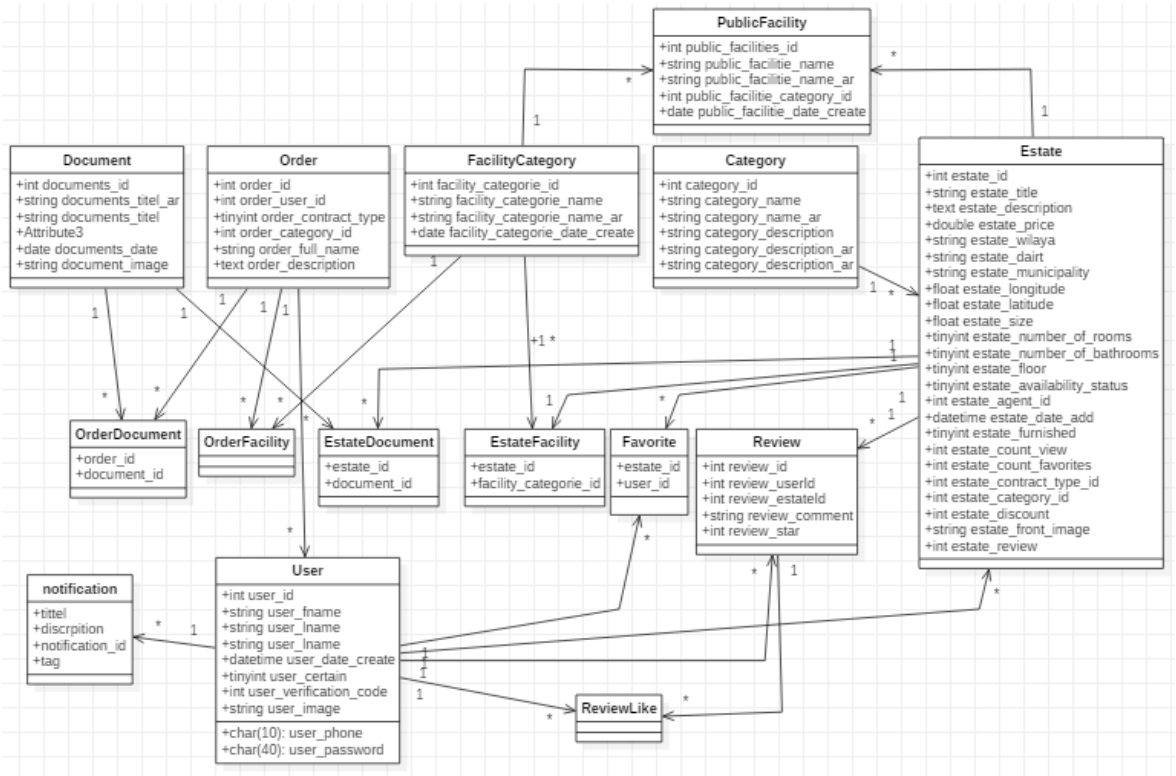


Figure 3.10: Class Diagrams

3.9 Conclusion

Conclusion The requirements and design of the **Darvoo** application has provided a nice picture of the system and its significant elements which of as largely focused on UML to express the platform's user interactions (admin and regular user).

The use case diagrams represent the functions that are available to each type of user, "admin" and "regular user". They show the set of features available to each user type. This does include admin features and property management but also includes features available to regular users, i.e. managing and properties, reports, categories and documents, and adding and editing the properties; rating, reporting, and browsing.

The sequence diagrams represent the way to conduct the important operation, i.e. how to submit a request and how to conduct a search on the platform. It also demonstrates how different objects of the system facilitate these operations.

The class diagram represents the internal structure of the system it describes the crucial elements :*User*, *Property*, *Request*, *Rating*, *Report* along with the connections and relationships between them. This diagram adds to the ability to visualize the database and the logical architecture of the application.

These models help serve the feasibility of developing the system to meet specified user requirements. In addition ensure it will be successful in digitally managing properties.

Chapter 4: Application Interfaces

4.1 Introduction

This review of the **Darvoo** platform is a comprehensive description of its final form, an assessment of its system, and the limitations it faced. The final form of the platform featured a modern and user-friendly interface that balanced screen appeal with performance, and included full integration of core functionality. The platform was developed to provide a platform for property search, buying, renting, and management. The app identifies property searches with full information, high resolution photos, detailed listings, and other advanced search options that work with maps and a wide range of categories for various audiences, including buyers, renters, and property management.

4.2 Home Page

The primary interface of the real estate mobile application has a clean look and modern design with the white and purple color scheme, a welcome message, and a search bar on top for searching properties. After the search bar, there are category filters in Arabic marked ”For Rent”,” For Sale,” and ” For Exchange.” Under these filters are thumbnail images of various properties. There is a featured property with a larger image, a description in Arabic, and a price. Lastly, at the application bottom, a navigation bar provides icons for ”Requests,” ”Add,” ”Notifications,” and ”Settings.”

4.3 Profile page

This represents the user profile interface in our real estate application, showing the user’s information , who has no reviews yet (*average rating not yet available*), and one property listing, along with no calls or messages recorded on his account.

4.4 Property categories page

This page is meant to show properties by transactions (rentals,sales,exchanges) and type of property (shops,warehouses, etc.); it will show a short description for each property (image, location, price, etc.).

Figure 4.1: Home page

Figure 4.2: Profile page

Figure 4.3: Property categories page

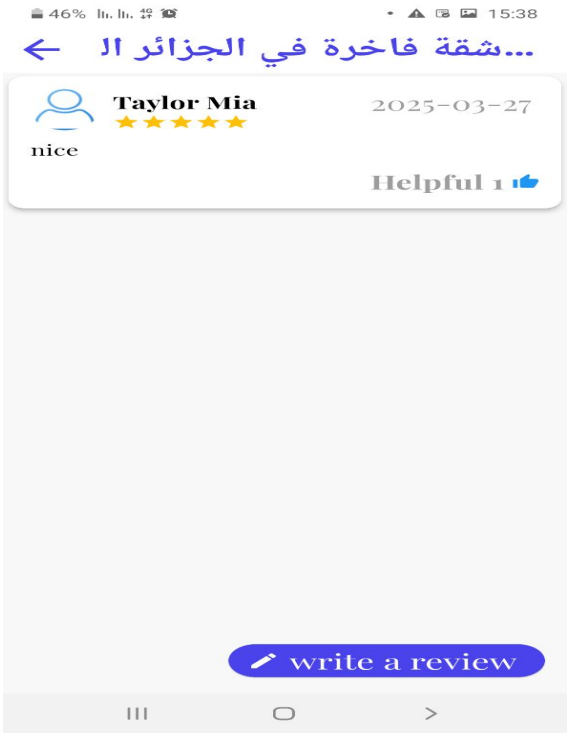
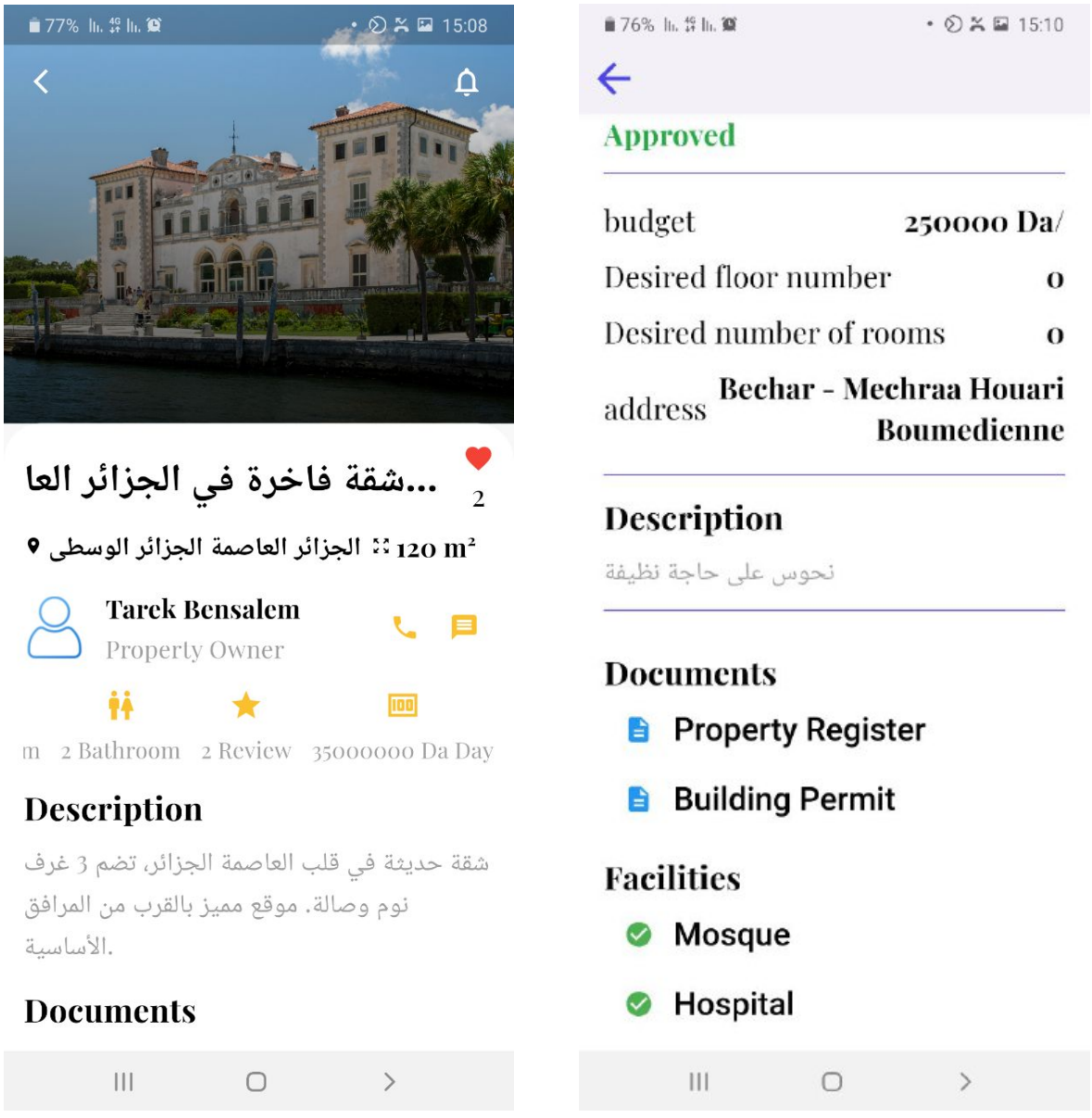


Figure 4.4: Property reviews page

4.5 property details page

The details of a luxury apartment in **central Algiers/algeria**, with a surface area of **120 m²**. The apartment is priced at **35,000,000 Algerian Dinars/day**.

the owner is **Tarek Bensalem** and has had **2 reviews**. the apartment has **3 bedrooms**, living room and **2 bathrooms**. The apartment is located in a *preferred location where the essential needs are found*, right in the **center of the capital city**.



(a) (b)

Figure 4.5: Property details page

4.6 Property Search Page

This page communicates search results relevant to properties in a formatted manner, displaying a large image, the property name, price (with time period: per night or per week), geographic location, and number of bedrooms/bathrooms and size. All of this information allows the user to compare and choose the appropriate property quickly and clearly.

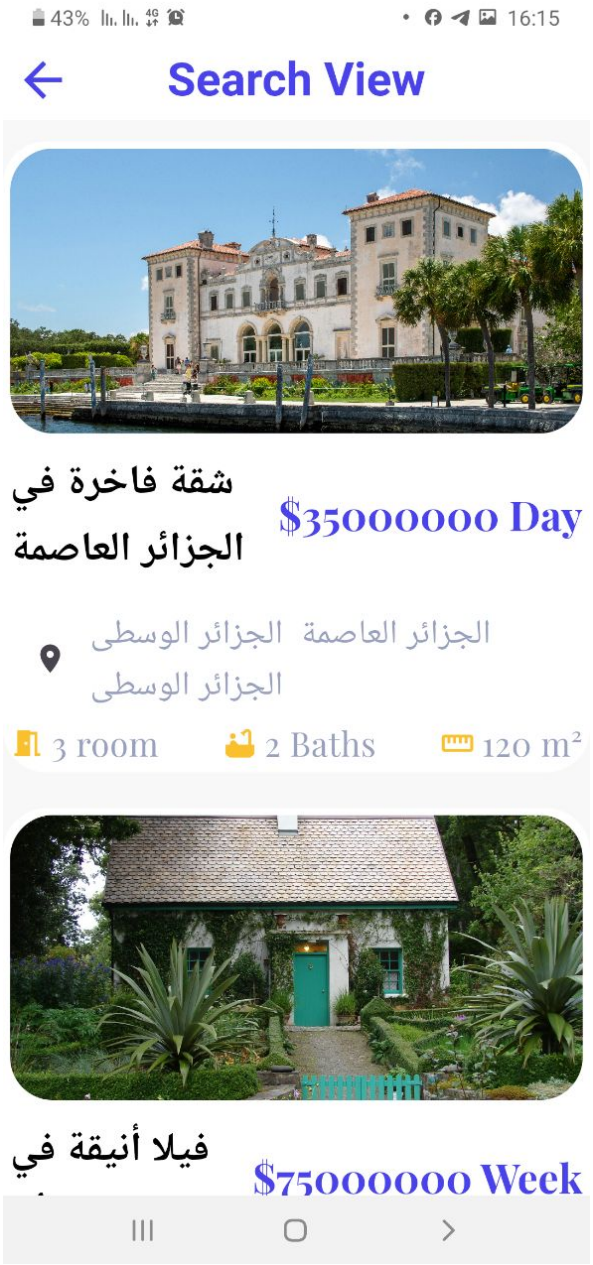


Figure 4.6: Property search page

4.7 Filter Page

This is the ”Filter” page where you can define the criteria to search for properties.

These are the options available on this screen:

- **Contract type**: Choose whether you want to find a property ”For rent,” ”For sale,” or ”To exchange.” In the above image, ”For rent” is selected.
- **Wilaya**: Pick which province (wilaya) you want to look. In the above image, ”28 - Msila” is selected.
- **Commune**: After you select a wilaya, select which commune of that province you want to look. In the above image, the commune that was selected was ”Belaiba.”
- **Property type**: Define the type of property you want to search. The types that will be visible are ”Residential Apartment,” and ”Villa.” In the above image, the option chosen was ”Residential Apartment.”
- **Budget**: You can define the price you can afford:
  - **Max (DA)**: This is the maximum you are willing to pay (20,000 Algerian dinars in the above image).
  - **Min (DA)**: This is the minimum you are willing to pay (10,000 Algerian dinars in the above image).

At the bottom of the screen, there is an ”Apply filter” button. You need to select it when you want to apply these criteria so it will find the results that match.

Figure 4.7: Filter page

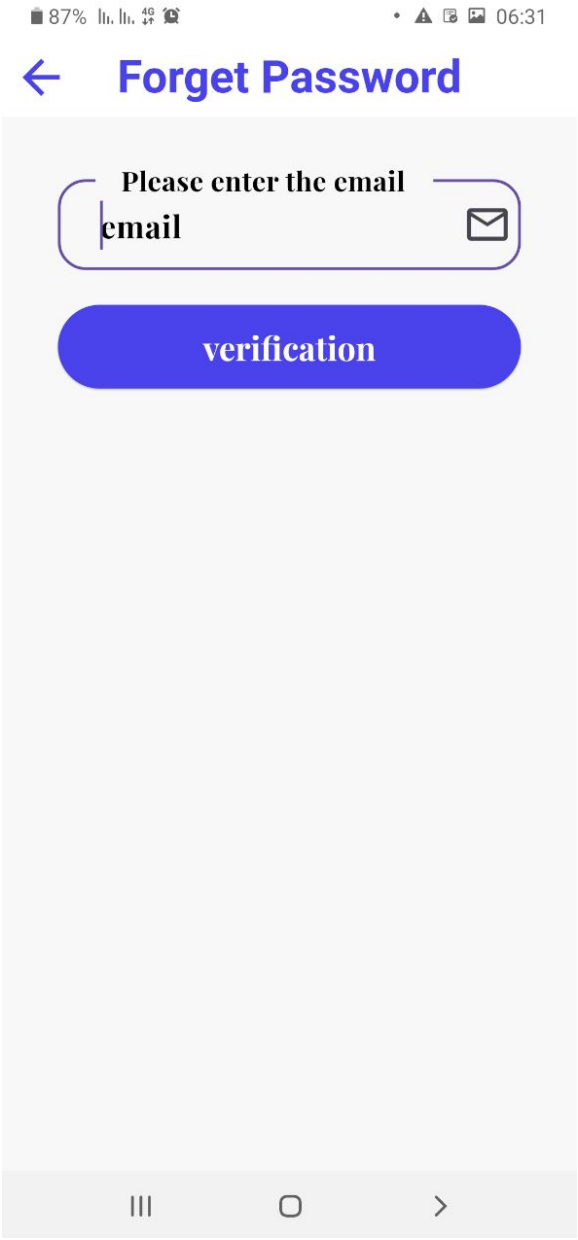


Figure 4.8: Forgot password page

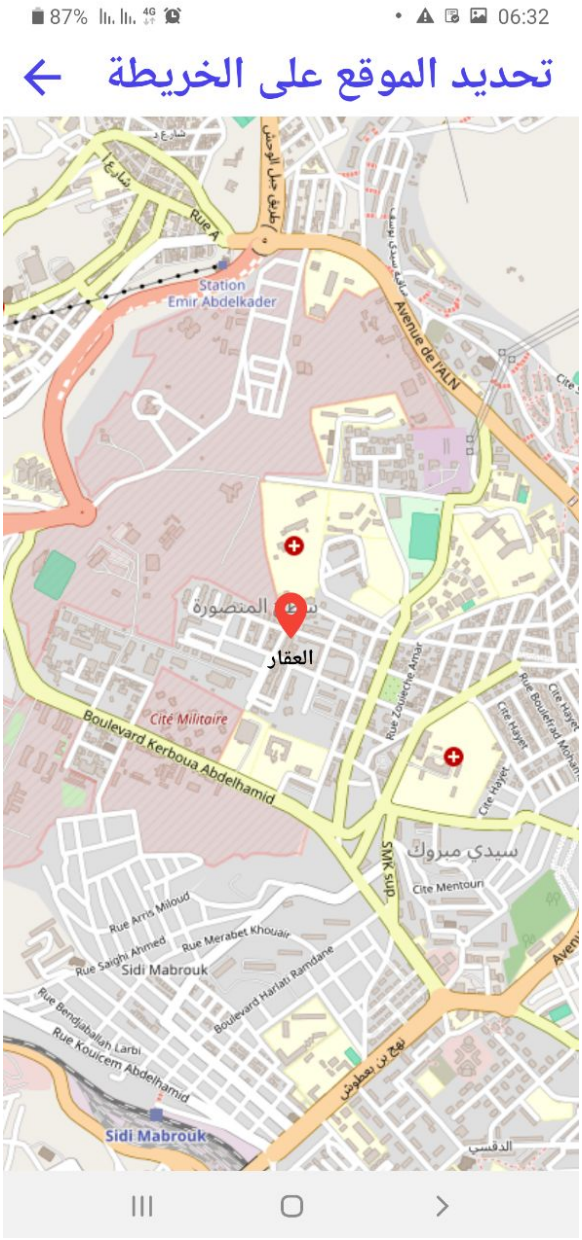


Figure 4.9: Property Locator Map Page

4.8 property requests submitted

This screen shows a list of property requests that the user has submitted showing the status of each (pending or approved) with details of each request, property type, budget, location, and rental period (if applicable). The user can create additional requests or remove requests through this screen.

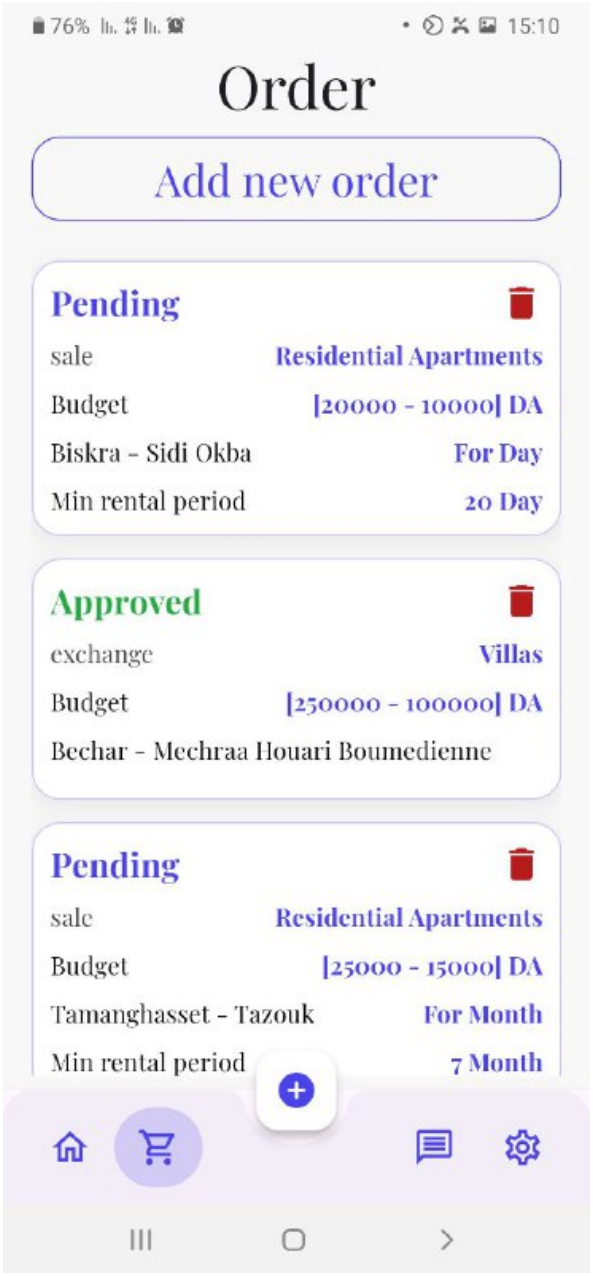


Figure 4.10: Property requests submitted

4.9 Request Submission Steps

(Add Order): This image shows a part of the ”Add Order” process, specifically a step in regards to the property specifications, where property type (residential apartments), rental term (monthly), minimum required term (24 months), state, municipality, and budget range, were specified.

(Step 1/4 – Researcher Information): This page asks for personal information about the researcher and type of request (rental or sale) in general.

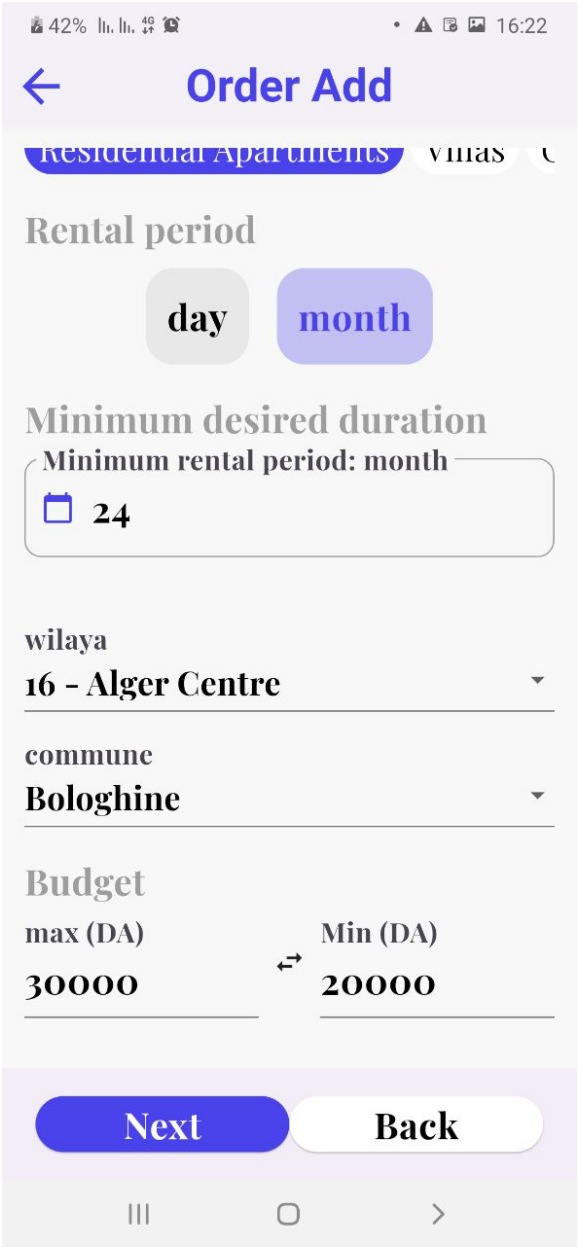


Figure 4.11: Request Submission Steps (1)

Figure 4.12: Request Submission Steps (2)

(Step 2/4 – Properties): This page will enable you to specify criteria for the property you want, for example, type, rental period, wilaya, commune, and budget.

(Step 3/4 – Terms and Conditions): This page will enable you to specify the characteristics of the property, such as the number of rooms and the floor, in addition to writing a description of your request.

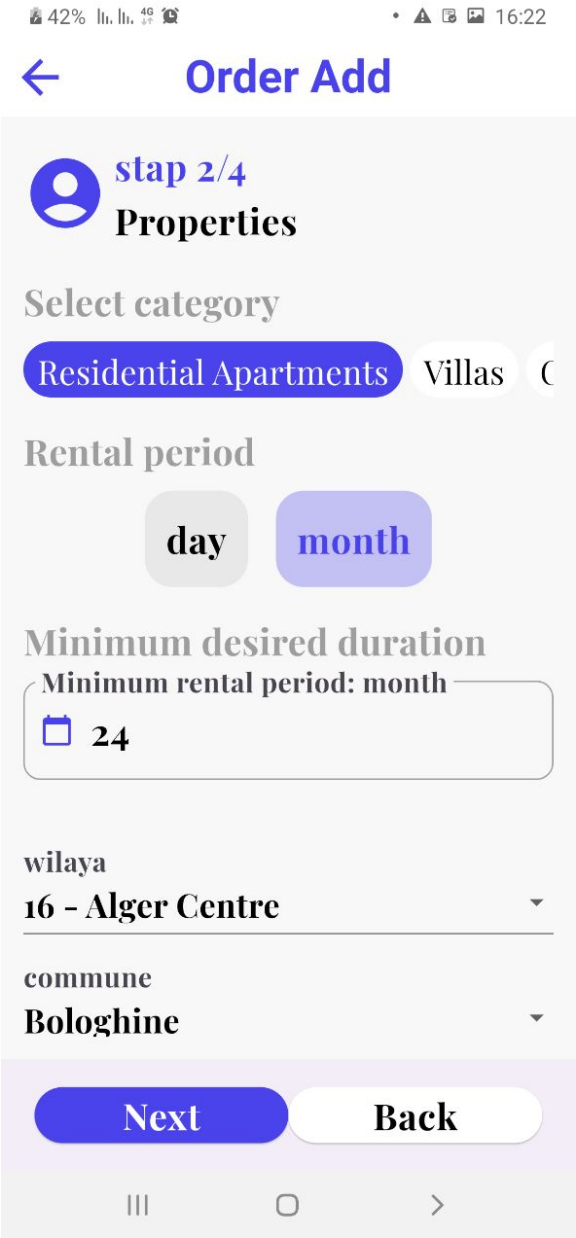


Figure 4.13: Request Submission Steps(3)

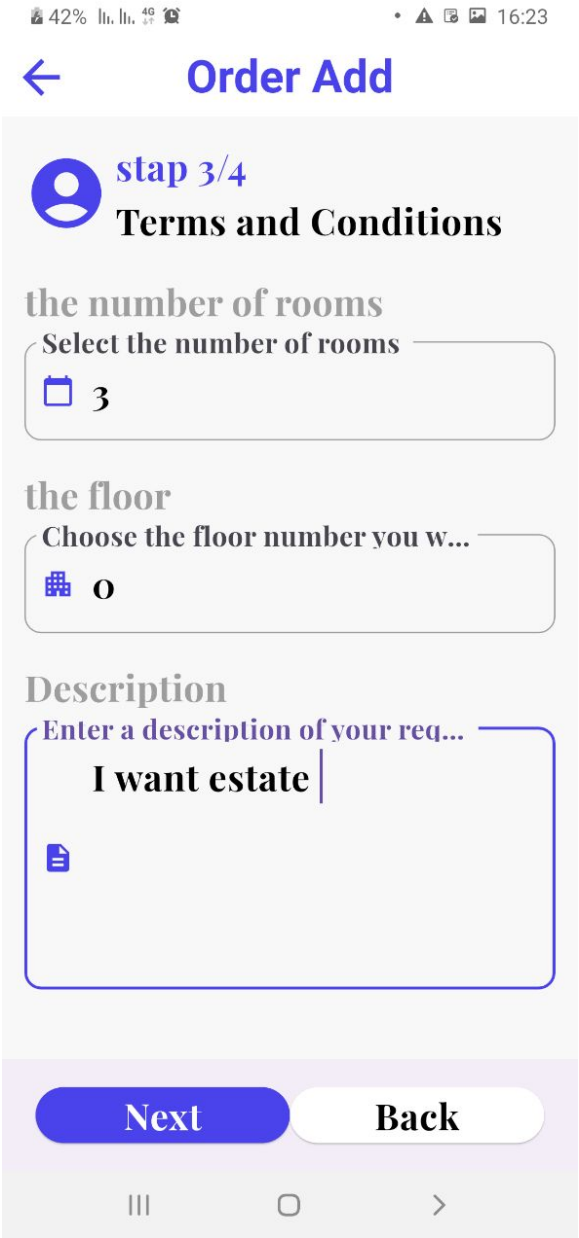
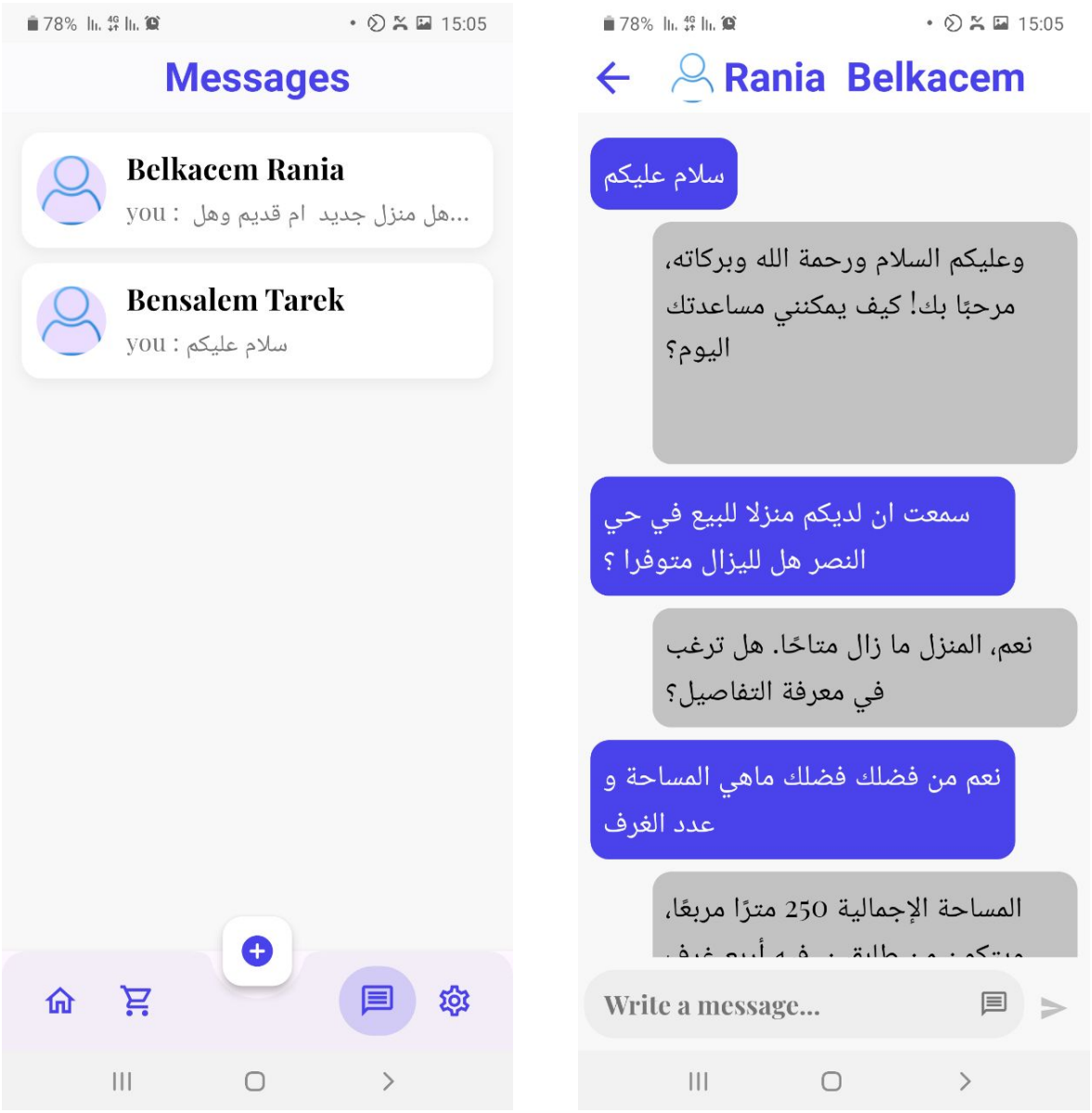


Figure 4.14: Request Submission Steps (4)

4.10 Messages page

There is a list of conversations with other users on the ”Messages” page, while the individual chat page is an exchange of messages about the details around a particular house for sale between the user and ”Rania Belkacem”.



(a) (b)

Figure 4.15: Messages page

4.11 Add Estate

This image shows step 1 of adding a property. The user can now identify the type of document (rent, sale, or exchange), the property type (villas), when they select the desired nearby assistances, and the address and listing description.

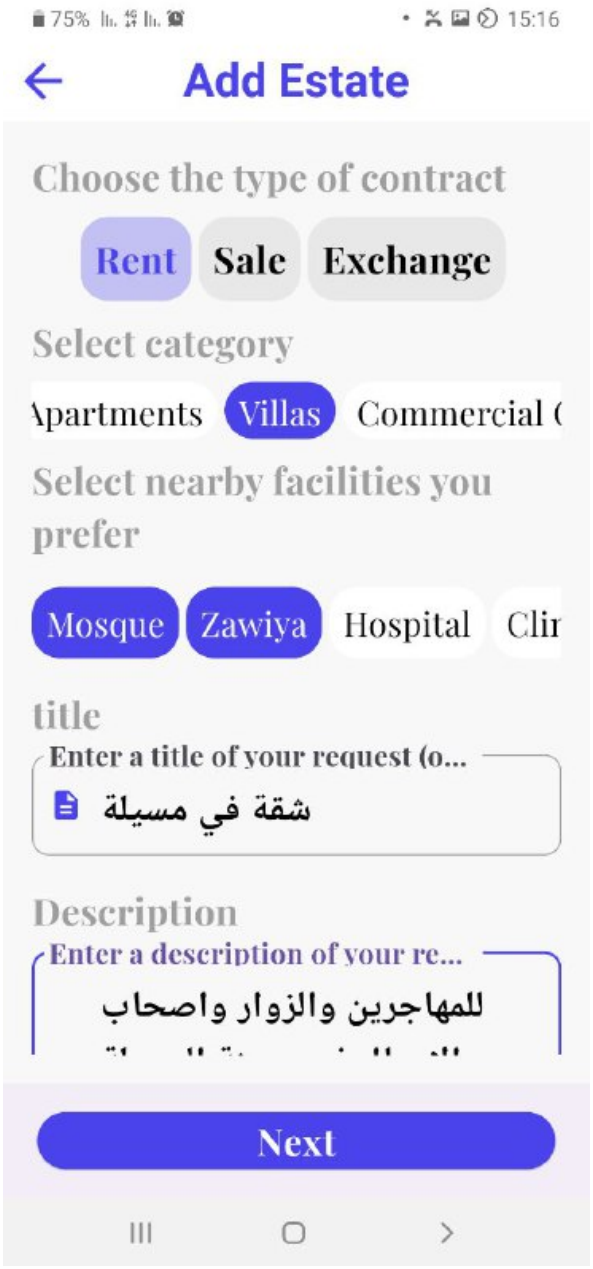


Figure 4.16: Add Estate - Step 1

In this image, the next steps in the process are completed, this image is for specifying the rental term, the state, the municipality, and to select a location, before proceeding onto the next step.

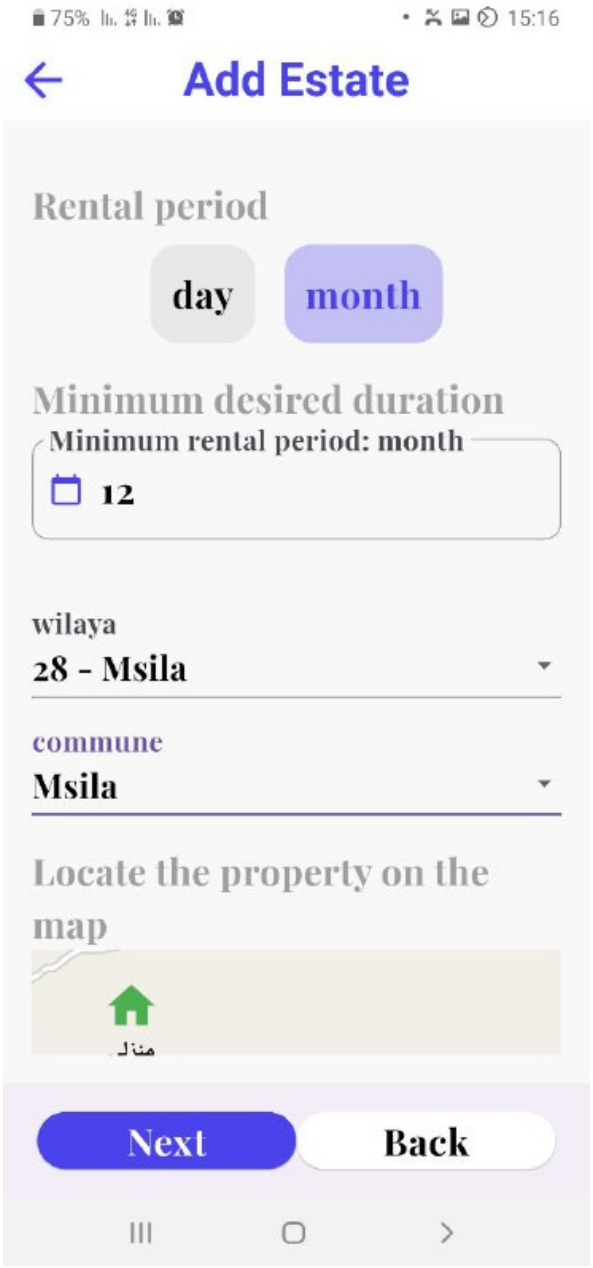


Figure 4.17: Add Estate - Step 2

This image is just showing the picking of the location on the map in the state of M'Sila, with the option to confirm where the place is.

Figure 4.18: Add Estate - Step 3

This image enables the user to enter more property details, it's fields for entering the number of rooms (3), number of bathrooms (1) and floor (1).

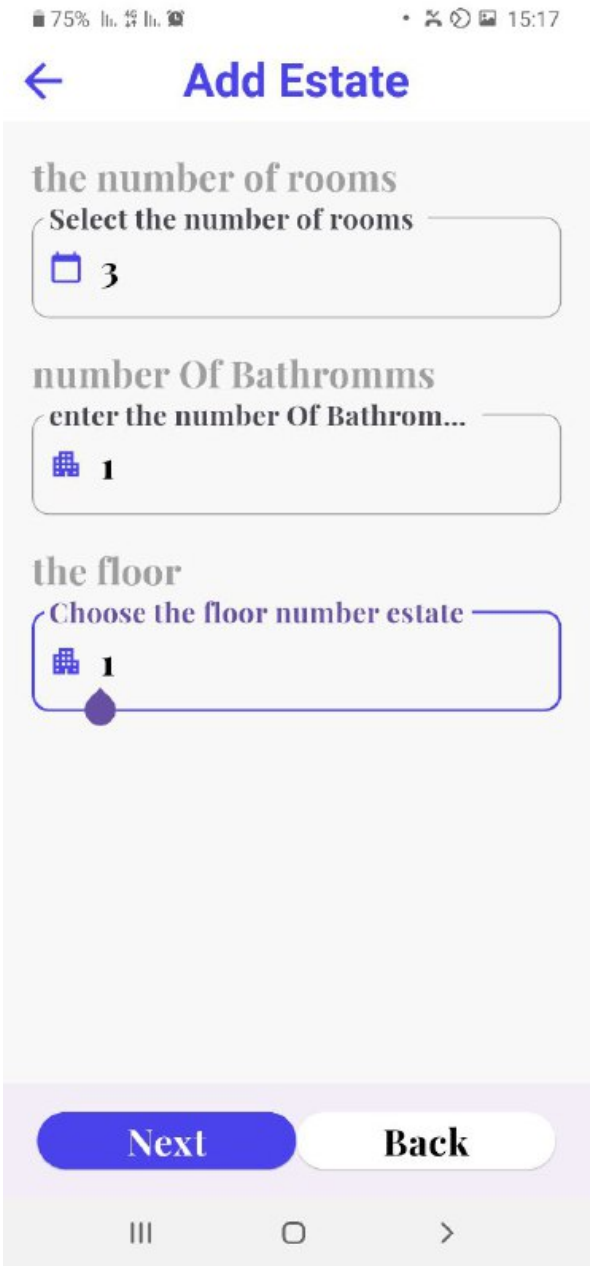


Figure 4.19: Add Estate - Step 4

This image allows the user to enter the area and price for the property.

Figure 4.20: Add Estate - Step 5

This image allows the user to choose a main image for the property, as well as upload other images, before submitting the data.

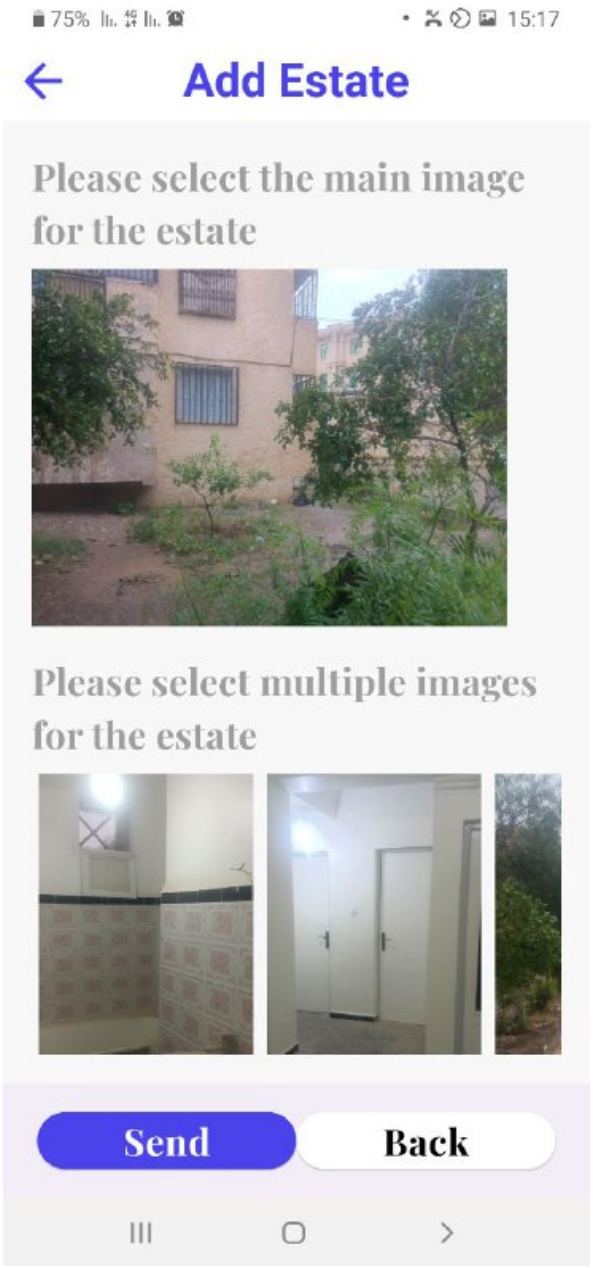


Figure 4.21: Add Estate - Step 6

4.12 conclusion

This chapter provides a practical explanation of each of the *Darvoo* app's interfaces. We analyzed the main user interfaces, confirming that the app features a modern and user friendly design that facilitates easy property searching, addition, and management. The models indicated the app's usability to meet user needs, as it offers advanced filtering functionality and interactive features (such as valuations and reports), in addition to the ability to request a customized property. The results obtained represent the extent to which pre-defined goals and objectives were achieved, providing a solid foundation for further development of the app to meet the needs of the digital real estate market.

General conclusion and future work

System assessment is an important factor that determines the success or failure of a software system in terms of its performance, functionality and usability. In this section, the *Darvoo* application regarding real estate sales, rentals, and sales exchanges was examined to understand how successful it has been in reaching its goals, and how convenient and suitable are the users' requests. The system was evaluated by using a number of different methodologies, i.e., testing, usability, andperformance analysis. The analysis concerned their functionalities, usability comfort of use, dependability, safety and scalability showing strengths and weaknesses we can exploit to develop a plan for future improvements.

5.1 Implementation Summary

Developing the **Darvoo** application encountered substantial complexity because of the intricate and fast paced Algerian real estate market. The development faced a series of challenges including the short time frame and problems related to incorporating essential functionalities. The main obstacle emerged from the lack of payment services since the Algerian Dinar could not be integrated into the application because Algeria Post did not offer remote payment APIs. The implementation of this service depends on obtaining an ecommerce based commercial registration which the development team failed to secure. The existing problems led to incomplete feature implementations.

5.2 Recommendations for Future Enhancements

The **Darvoo** application stands as a groundbreaking and original real estate market platform in Algeria which demonstrates substantial capabilities for market growth and operational advancements. The primary goal for future development includes establishing a specialized platform for luxury properties while implementing 3D technology for users to explore their desired homes.

The company aims to introduce automatic property valuation solutions which will determine prices by comparing with the regional real estate market. The system should focus on expanding to both local and international markets to provide assistance to both Algerian expatriates who want to invest in Algerian properties. The goal of these developments is to create a complete digital platform that serves every participant inside the real estate industry.

5.3 Challenges Faced and Lessons Learned

Throughout its development process, the *Darvoo* application faced several obstacles that taught essential lessons for expansion and improvement. The most notable challenges include:

5.3.1 Technical Development Challenges

The development of the user friendly yet high performance *Darvoo* application demanded solutions for technical problems that involved complex programming, feature unification and universal device support. The essential learning from this experience is to perform thorough planning alongside consistent testing while demonstrating flexibility when facing unanticipated technical issues.

5.3.2 Trust and Transparency

Users faced significant challenges when building trust in a marketplace that demanded cautious behavior. The combination of accurate property details and seller verification processes served as a solution to overcome this user trust gap. The success of this particular application model depends on complete transparency and clear communication.

5.3.3 Compliance with Laws and Regulations

Any business involved in real estate must follow all local legal requirements which include rules about contracts and taxes as well as user privacy regulations. The application required legal consultations for developing properly defined user policies which were included within its terms of service.

5.4 Expected Future Developments for the Darvoo Application

A series of ambitious developments will be implemented by the *Darvoo* application to enhance its market position during its next stages through the following objectives:

- The Algerian Ministry of Startups will provide the ”Startup” Label to the application which will enable them to access monetary resources together with technical backing and boost user confidence.
- Algerian investors residing abroad will benefit from new banking opportunities through the company’s first international branch outside Algeria.
- The application will enable electronic payment transactions in Algerian Dinars immediately after receiving the official payment API from the relevant authorities. The platform will see a substantial acceleration in real estate deals because of this development.
- The application plans to introduce 3D property viewing functions that will make the exploration process better for users.

The company aims to construct a digital real estate system that meets current technological standards while improving transparent and efficient market access for real estate in Algeria.

5.5 General Conclusion

In conclusion, this thesis studied the *Darvoo* application project which wanted to bring about a transformative change in Algerian real estate. Based on a literature review and inspections of the local market, several problems were identified for the real estate market, including poor access to information; lack of transparency; and weak presence of digital means.

We were able to identify the functional and non-functional requirements of the app, design a database capable of hosting real estate data, and develop the app using modern tools and programming languages. Despite time constraints and regulatory constraints, our app featured a user-friendly environment and a practical user interface.

The *Darvoo* experience demonstrated the necessity to digitalize real estate, and an obligation to provide primordial technology that can help ease the processes of buying, selling, renting, and exchanging property. We hope that *Darvoo* remains a continuing project that will mature along with its enhancements and continues to thrive on user feedback, as it has the aspiration to be the leading platform both locally and internationally.

It is hoped that this effort provides a strong platform to build a successful real estate application and a digital real estate ecosystem for individuals and investors. The Ontology of a successful application is to listen to its users, continue to innovate, and to follow best technical and legal practices.

Appendix A: Frameworks and languages and tools

In this section, we will describe the environment in which we built our application, our language, libraries and packages, and the tools we used while developing the application.

A.1 Programming Language

- **Dart:**Dart is web, Android and iOS application development language developed by Google. It is used for cross platform application development, meaning that one application runs on different devices without complete rewrites.

  The Dart language can run in two modes of execution: as native code compiled for high performance applications on mobile and desktop devices; or transpiled into JavaScript which runs in web browsers. This is essential for portability; allowing developers to develop in a web environment or on a mobile device. Dart has a syntax that is simple and easy to understand, especially versus other programming languages such as, Java, JavaScript or C#.

  Dart has a number of powerful tools available to develop applications quickly including the *Hot Reload* feature in Flutter. Dart supports core programming, such as variables, conditional statements, sequences, functions, classes, and inheritance, which provides structure for crafting professional and flexible applications across multiple platforms[32].

Figure A.1: Dart

- **Php:**PHP is a free server side, open source programming language most commonly used in web application development. PHP was founded in 1994 by Rasmus Lerdorf and has grown to become one of the most frequently utilized programming languages for developing dynamic

websites. The code is executed on the server and the output goes to the browser (client). Therefore, PHP is well suited for interactive or other web applications.

PHP is very easy to learn and has simple syntax. PHP works with almost all operating systems and web servers, and integrates with many databases (like MySQL). PHP also supports wonderful frameworks and libraries (like Laravel and Symfony) and is behind the most popular content management system, Wordpress. All these wonderful features make PHP a solid choice in the world of web development[33].

Figure A.2: PHP

- **SQL:** Structured Query Language, which is a computer language for storing, manipulating and retrieving data stored in a relational database. SQL is the standard language for Relational Database Systems. All the Relational Database Management Systems (RDBMS) like MySQL, MS Access, Oracle, Sybase, Informix, Postgres, and SQL Server use SQL as their standard database language[34].

Figure A.3: SQL

- **UML:** Unified Modeling Language (UML) helps you specify, visualize, and document models of software systems, including their structure and design, in a way that meets all of these requirements. You can use UML for other non software systems too. It represents the results using UML 2.0's thirteen standard diagram types[35].

Figure A.4: UML

A.2 Development environment

- **Visual Studio:** It is an IDE developed by Microsoft. The first release for developers was in 1997. In 2002, it first received a flavor of .NET, and then it underwent a revolution with many new features in every major build. Visual Studio 2015 introduced support for .NET Core, which is a cross platform, free, and open-source managed software framework such as .NET[36].

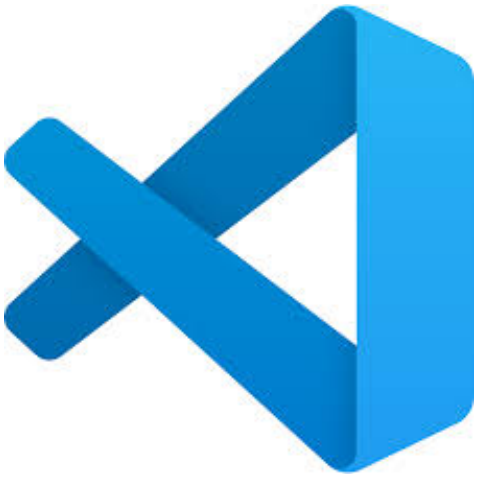


Figure A.5: Visual Studio Code

- **XAMPP:** XAMPP is a free software package that contains the components necessary to create a local server on your computer. This software package contains components necessary for web application development like: Apache (the web server), MySQL/MariaDB (the database management system), and PHP and Perl (the programming languages). This allows a developer to run web applications locally (where it is not necessary to have an actual server). XAMPP is usually installed quickly and it is easy to use. There are different installable packages of XAMPP for different operating systems such as Windows, Linux, and macOS. One major feature of XAMPP is that there is a simple interface that could be used to manage the services running on XAMPP. XAMPP is a great tool for beginners and developers to utilize before deploying applications online on a server[37].

Figure A.6: XAMPP

- **Android Studio:** Android Studio is the official Integrated Development Environment (IDE) for Android App development. It is a powerful tool that allows developers to build high quality applications for the Android platform. It has complete tools for the process of Android App development. From writing code to testing and deployment, ANdroid studio has all the functionalities for developers to develop an Android App[38].

Figure A.7: Android Studio

A.3 Framework and librarys

- **Flutter:** Flutter is an open source framework created and maintained by Google. It's used by front end and full stack developers to create user interfaces (UIs) for cross platform applications with a single codebase. When Flutter was first released in 2018, it offered functionality for mobile app development only.

Flutter has an exceptional collection of fully customizable widgets enough to create interesting and professional user interfaces. Flutter gives developers the ability to shorten their development experience through a feature called Hot Reload, where the developer can see developments in the application immediately without having to restart the whole application. Since Flutter has an outstanding bundle of features and functionalities, it is considered an excellent choice to develop cross platform applications with a single development experience[39].

Figure A.8: Flutter

A.4 Tools

- **GitHub:** GitHub is a web based version-control and collaboration platform for software developers. It was started in 2008 and was founded on Git, an open source code management system created by Linus Torvalds to make software builds faster. In June 2018, Microsoft, the biggest single contributor, initiated an acquisition of GitHub for $7.5 billion.

  Git is used to store the source code for a project and track the complete history of all changes to that code. It allows developers to collaborate on a project more effectively by providing tools for managing possibly conflicting changes from multiple developers[40].

Figure A.9: GitHub

- **StarUML:** StarUML is one of the top leading software modeling tools that supports UML (Unified Modeling Language), aiming to maximize the productivity and quality of software development. It is based on UML version 1.4 and provides eleven different types of diagrams, while also accepting UML 2.0 notation.

  It actively supports the MDA (Model Driven Architecture) approach through the UML profile concept. StarUML excels in customizability to the user's environment and has high extensibility in its functionality[41].

Figure A.10: StarUML

- **LaTeX:** That´s "lay tech", not "lay tecks"or "late-x"! LaTeX is a document preparation system. It is frequently used by scientists, engineers, software developers, mathematicians and othersto typeset long, technical documents. LaTeX is a plaintext marking up language, and converts it into PDF documents following good typeseting rules. This yields (professional-looking) documents in a differentleague from those produced with a word processor.

  LaTeX has so many features that it can be used for a large variety of document types with veryfine customisation possible of the layout and fonts. LaTeX is the perfect tool for building templates that don't require the user to have an understanding of LaTeX, this results in non LaTeX users being able to produce beautifully formatted documents and learn how to use LaTeX as they use it[42].

Figure A.11: LaTeX

Appendix B: List of Acronyms

AADL : Agence Nationale de l'Amélioration et du Développement du Logement.

AI : Artificial Intelligence.

API : Application Programming Interface.

AR : Augmented Reality.

GDP : Gross Domestic Product.

IoT : Internet of Things.

LPA : Assisted Promotional Housing.

LPP : Public Promotional Housing.

LSL : Social Rental Housing.

OPGI : Public Real Estate Promotion and Management Office.

SEO : Search Engine Optimization.

UML : Unified Modeling Language.

VR : Virtual Reality .

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الجمهورية الجزائرية الديمقراطية الشعبية

وزارة التعليم العالي و البحث العلمي

جامعة محمد بوضياف - المسيلة

عنوان المشروع:

تطوير تطبيق ويب مخصص لبيع وتأجير العقارات

مشروع لنيل شهادة مؤسسة ناشئة في إطار القرار الوزاري 1275

الاسم التجاري

Darvoo

صورة العلامة التجارية

Darvoo

بطاقة معلومات:

حول فريق الاشراف وفريق العمل

1- فريق الاشراف:

فريق الاشراف	
(01): المشرف الرئيسي البروفيسور: سمير أخروف	التخصص: اعلام الي
المشرف المساعد:	التخصص: .....

2- فريق العمل:

فريق المشروع	التخصص	الكلية
الطالبة: صالحي شيماء.	الإعلام الآلي التقريري والأمثلة.	الرياضيات والاعلام الالي
الطالب: عبد العالي بكور.	ذكاء اصطناعي.	الرياضيات والاعلام الالي

1. فكرة المشروع (الحل المقترح)

- ✓ **مجال النشاط** يعمل تطبيق **Darvoo**على تسهيل عمليات البحث والتواصل بين الباحثين عن العقارات والوسطاء أو المالكين، من خلال توفير منصة ذكية وآمنة لعرض وتصفّح العقارات بمختلف أنواعها، مما يساهم في تطوير السوق العقاري وتعزيز الشفافية وسرعة الوصول إلى المعلومات.
- ✓ **كيف بدأت الفكرة وكيف تطورت ؟** بعدما لاحظنا فجوة واضحة في سوق العقارات بسبب ضعف التنظيم وغياب الأدوات الرقمية الفعالة التي تُمكّن المستخدمين من العثور على العقارات المناسبة بسهولة وسرعة. توجد منصات عقارية متعددة، لكن العديد منها يعاني من ضعف في التصميم، بالإضافة إلى تأخير في التحديثات ومشاكل في الموثوقية.
- ✓ **ما الذي سوف تقوم به؟** سوف نقوم بتطوير التطبيق ومراجعته وتحسين اداءه ثم اطلاقه على المتاجر الالكترونية ثم الترويج له على منصات متعددة.
- ✓ **كيف سيكون ذلك؟** سيكون التطبيق بسيطا عمليا وسهل الاستخدام مع امكانية البحث المتقدم والعديد من الخيارات المتعددة للمستخدمين.
- ✓ **من الذي سينجز ذلك؟** سأقوم أنا وزميلي بتطوير التطبيق فنحن قادرين على القيام بجميع اعمال البرمجة والتصميم وتحليل البيانات والتسويق الرقمي مبدئيا. سيكون بامكاننا تقديم الدعم والاجابة عن استفسارات المستخدمين في اي وقت.
- ✓ **أين سيتم إنجازه ؟** سيتم تطوير تطبيق **Darvoo** في الجزائر، مع إطلاقه على متاجر **Google Play** و**App Store** ليكون متاحًا لمختلف المستخدمين داخل الجزائر وخارجها، حيث يدعم التطبيق اللغتين العربية و الانجليزية.

2. القيم المقترحة

3. يقدم تطبيق **Darvoo**قيما ومميزات للمستخدمين والعملاء تتمثل في:

- **الحداثة:** يُصنف هذا التطبيق ضمن الجيل الجديد من المنصات الرقمية المتخصصة في القطاع العقاري، حيث يعتمد على البحث الحديث بالاضافة الى تصنيفات البحث الرقمي والبلاغات الرقمية الذكية وتكنولوجيا التعلم الإلكتروني، مما يجعله مكانًا متقدمًا عن منصات العقار القديمة المنتشرة في السوق.
- **الأداء:** يحقق التطبيق مؤشرات أداء تتجاوز المعايير المتوقعة إلي كونه سهل الإستخدام وفعال.
- **التكييف:** سيكون التطبيق مرنا ومتكيفا مع التغيرات والتطورات التي تحدث في مجال التكنولوجيا واحتياجات المستخدمين مما يضمن استدامته في بيئة تنافسية متغيرة.
- **إنجاز المهمة:** يهدف المشروع إلى ترسيخ مكانة التطبيق كمنصة مرجعية أساسية في القطاع العقاري، تُمكن المستخدمين من تحقيق أهدافهم الاستثمارية والسكنية بكفاءة عالية وموثوقية مضمونة، مع تبسيط العمليات المعقدة وتحسين تجربة المستخدم الإجمالية.

- **التصميم**: يتبنى التطبيق منهجية التصميم المتمحور حول المستخدم ، مع تطبيق المعايير الدولية لتجربة المستخدم وفقاً لمبادئ الهندسة البصرية والنفسية. يعتمد النظام على نظرية الألوان المريحة بصرياً ومبادئ الواجهات البديهية، مما يحقق تفاعلاً سهلاً ومتدفقاً. كما يتضمن آليات التحسين المستمر القائمة على ردود الفعل والتحليل السلوكي للمستخدمين.
- **خفض التكاليف:** يُحقق تطبيق **Darvoo** وفورات اقتصادية ملموسة من خلال تطبيق نظرية تحسين العمليات، حيث يختزل الزمن والجهد المطلوبين في عمليات البحث العقاري التقليدية. يوفر النظام أدوات التواصل المباشر المتطورة، مما يقلل من التكاليف المباشرة وغير المباشرة المرتبطة بالوساطة التقليدية، ويخفف العبء النفسي والمالي على المستخدمين.
- **الحد من المخاطر:** يحتوي تطبيقنا على آليات الإبلاغ ، وأنظمة التقييم والتصنيف، والملفات التعريفية المؤكدة للوسطاء. يهدف إلى تعزيز الشفافية والموثوقية في التعاملات، وتقليل التعرض للممارسات غير القانونية أو غير الأخلاقية في السوق العقاري.
- **سهولة الوصول:** سنعمل على توفير التطبيق في مختلف المتاجر الالكترونية والتسويق له على منصات التواصل الاجتماعي ما يسهل من وصول المستخدمين له كما عملنا على اتاحة الوصول للتطبيق لجميع مستخدمي الهاتف الذكي بإتاحته لكل من انظمة ال **IOS** وال **Android** والاجهزة اللوحية.

4. فريق العمل :

- ✓ **يتكون الفريق من:** المصممين على مختلف المستويات الذين يتقنون واجهة المستخدم وتجربة المستخدم(**ux \ui**) تكون زاوية تصميم محترفة وسلسة للاستخدام ، ومسوقون رقميون للترويج للعمل الجديد على أبرز منصات الترويج ، والدعم الفني لمساعدة المستخدمين على التحدث بثقة عالية وديناميكية.
- ✓ **طرق التفاعل والتواصل مع المستقلين:** سنتواصل بمختلف الوسائل الالكترونية والحضورية لضمان حسن سير العملية.

5. أهداف المشروع

- **توفير منصة رقمية متكاملة.**
- **ربط البائعين والمشترين أو المؤجرين والمستأجرين بطريقة مباشرة وفعالة، مع إمكانية التفاعل بين الطرفين.**
- **توظيف تقنيات حديثة مثل البحث الذكي والتصفية المتقدمة لتسهيل الوصول للعقار المناسب.**
- **توفير تطبيق بواجهة بسيطة وسهلة الاستخدام.**
- **توفير تطبيق بنسخة مجانية متاحة للجميع.**

- **توفير تطبيق امن وموثوق.**
- **توفير تطبيق مبتكر ومتطور باستمرار.**
- **خلق تجربة رقمية موثوقة في سوق العقارات، وتعزيز الثقة بين المستخدمين عبر نظام تقييم ومراجعات فعّال.**

6. جدول زمني لتحقيق المشروع :

الأشهر

		2-1	4-3	5	6	7	8	9	10
الأعمال	التطوير في التطبيق	✓	✓						
	الشروع في الاختبارات المبدئية وتصحيح العيوب		✓	✓					
	تجريب النموذج الأولي			✓	✓	✓			
	جمع الاراء والتعليقات والتعديل على النموذج			✓	✓	✓			
	الحصول على وسم المشروع المبتكر						✓		
	تسجيل براءة الاختراع من اجل الحصول على رقم الإيداع والحماية الصناعية							✓	
	متابعة عملية الحصول على براءة الاختراع وتصحيح ملاحظات الممتحنين.								✓

7. عرض القطاع السوقي :

- ✓ **السوق المحتمل:** تستهدف المنصة الأجهزة الذكية المحمولة لجميع الأفراد(الأسر الجديدة),المستثمرون العقاريون,المهاجرون أو العائدون,أصحاب الأعمال,التحول من الايجار الى التمليك, ووكلاء العقارات والمؤسسات الذين يبحثون عن حلول.
- ✓ **السوق المستهدف (الشريحة):** الأفراد المهتمون في شراء أو بيع عقار أو تأجيره. الوكلاء العقاريين والمطورين العقاريين، المستثمرون العقاريون، وأصحاب الشركات والوكالات العقارية. المغتربون والعائدون من الخارج,كما يشمل الهدف الشركات العاملة في مجال العقارات وغيرها من الهيئات

الحكومية والخاصة التي تبحث عن مقرات العمل أو مساحة للاستخدام. وقد تم إختيار السوق المستهدف لتكون عملية التسويق التجاري الخاصة بالعقارات.

✓ **تم اختيار السوق المستهدف للأسباب التالية:**

- يمثل سوق العقارات مجال ضخم يستمر في التوسع في كل من الأسواق المحلية والعالمية.
- أدى التقدم التكنولوجي إلى جانب استخدام الهواتف الذكية إلى زيادة دورها في أنشطة البحث عن العقارات.
- لا تزال جودة الخدمة الرقمية ضعيفة في سوق العقارات الجزائري في حين لا توجد منصة موحدة لتقديم تجربة شاملة.
- توجد حاجة أساسية لمنصة آمنة جديرة بالثقة تربط المشترين بالبائعين بطريقة مباشرة وفعالة.
- عندما تدخل دارفو السوق، سيكون لديها فرصة للحصول على حصة سوقية كبيرة بسبب المنافسة المحلية المحدودة.
- يؤدي الطلب الكبير في السوق على الخدمات التي تبسط المعاملات العقارية مع تقليل التكاليف والمخاطر إلى تزايد شعبيتها.

8. **إمكانية ابرام مع الزبائن المهمين:** سيتاح للزبائن المهمين الحصول على فرصة إعادة تصميم التطبيق ليعكس توجهاتهم الشخصية، فضلا عن وجود فرص لتقديم حلول على مستوى الوكالات العقارية الكبرى أو الهيئات الحكومية.

قياس شدة المنافسة :

✓ **درجة المنافسة في السوق المحلي:**

يُظهر السوق المحلي منافسة رقمية محدودة، حيث لا تزال التطبيقات المتخصصة مثل **Darvoo** غير متوفرة لتقديم حلول متكاملة كاملة، مما يتيح فرص اختراق واسعة للسوق.

✓ **درجة المنافسة في السوق الإقليمي/الدولي:**

يحتوي السوق الدولي على تطبيقات معروفة مثل **Zillow** و **Bayut**، لكنها لا تخدم السوق الجزائري، كما أنها تفشل في تكييف خيارات التسعير واللغة والمنتجات المتاحة.

9. **التكاليف والأعباء :**

✓ **التكاليف الثابتة:**

- **نشر التطبيق:** يتضمن توزيع التطبيق تكاليف نشر **"Darvoo"**على مختلف المتاجر الإلكترونية، مثل متجر بلاي ومتجر التطبيقات.

- **دعم العملاء:** توفر المنصة دعمًا فنيًا فعالًا لجميع مستخدميها، بما في ذلك مالكي العقارات والمشترين والمستأجرين والعملاء المؤسسيين، من خلال فريق دعم العملاء المخصص.
- **تكاليف الاجهزة والمعدات**: يتعين على المؤسسة دفع تكاليف معدات الخادم وأنظمة الأمان وأدوات اختبار الأداء كجزء من استراتيجيتها للحفاظ على استمرارية الخدمة وكفاءة الأداء.

✓ **التكاليف المتغيرة:**

- **رسوم بوابات الدفع:** تفرض المنصة على المستخدمين رسومًا مقابل معالجة الدفع الإلكتروني (مثل شراء عضوية مميزة أو دفع عمولات)، والتي تختلف باختلاف طريقة الدفع (البطاقات المصرفية، المحافظ الرقمية...).
- **تطوير التطبيق:** يشمل تطوير التطبيق تكاليف الصيانة والتحديثات وتطوير ميزات جديدة لتلبية متطلبات سوق العقارات المحلي والدولي.
- **التسويق للتطبيق:** سيخضع التطبيق للتسويق من خلال حملات إعلانية على وسائل التواصل الاجتماعي، والتسويق عبر محركات البحث، والتعاون مع المؤثرين العقاريين، بالإضافة إلى المشاركة في الفعاليات والمعارض العقارية.

10. رقم الاعمال:

✓ **سيتم انشاء معدل رقم اعمال التطبيق**: سيحقق التطبيق معدل نمو تجاري من خلال الاشتراكات المدفوعة والشراكات التجارية مع المؤسسات والشركات الخاصة، بما في ذلك وكالات العقارات ومستثمري العقارات وأصحاب المشاريع.

✓ **الاشتراك الشهري** : يحصل مستخدمو الاشتراك الشهري على إمكانيات إعلانية متقدمة وأولوية في نتائج البحث، بالإضافة إلى تحليلات متعمقة.

✓ **الاشتراك السنوي** :(يقدم الاشتراك السنوي خصمًا يصل إلى 32 بالمائة من السعر الشهري).

✓ **التخصيصات الخاصة**: تتيح المنصة تقديم خدمات مخصصة لكبرى شركات العقارات.

11. النموذج الاولي التجريبي

سنعرض صورا للشكل العام للتطبيق وبعض الواجهات الخاصة به ثم نعرض مثال تجريبي عن التطبيق في حالة العمل:

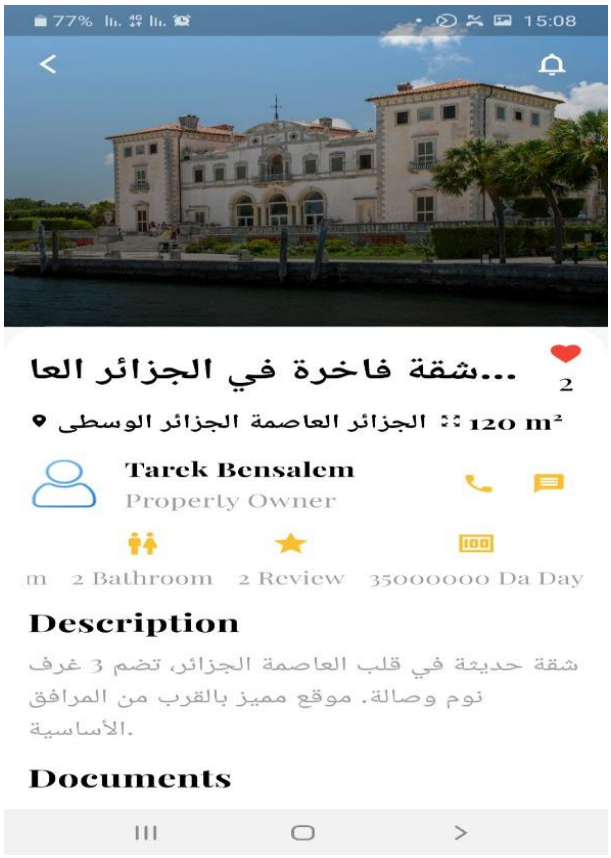
1- الشكل العام للتطبيق:

الشكل1: الصفحة الرئيسية

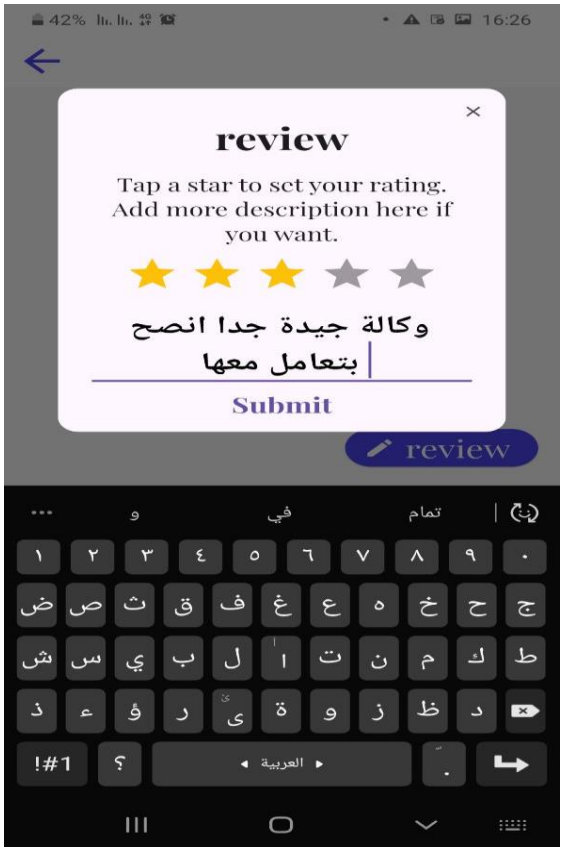
الشكل2: صفحة الملف الشخصي

الشكل3: صفحة التصنيفات

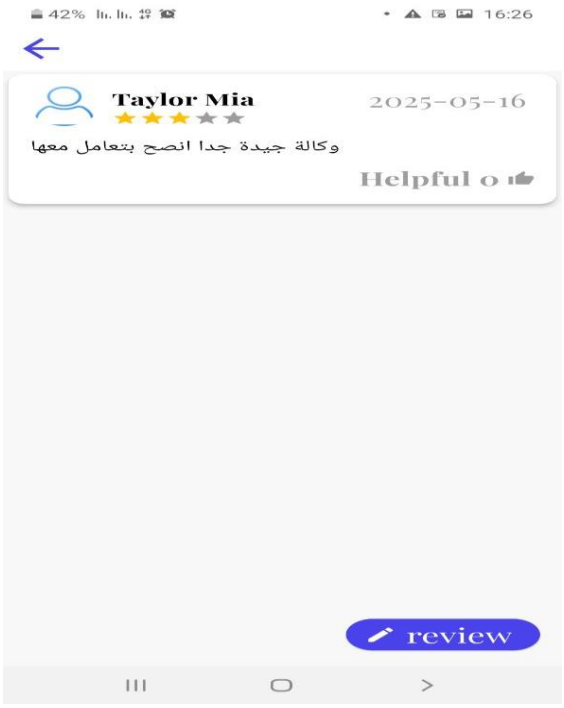
الشكل4: صفحة مراجعات العقارات



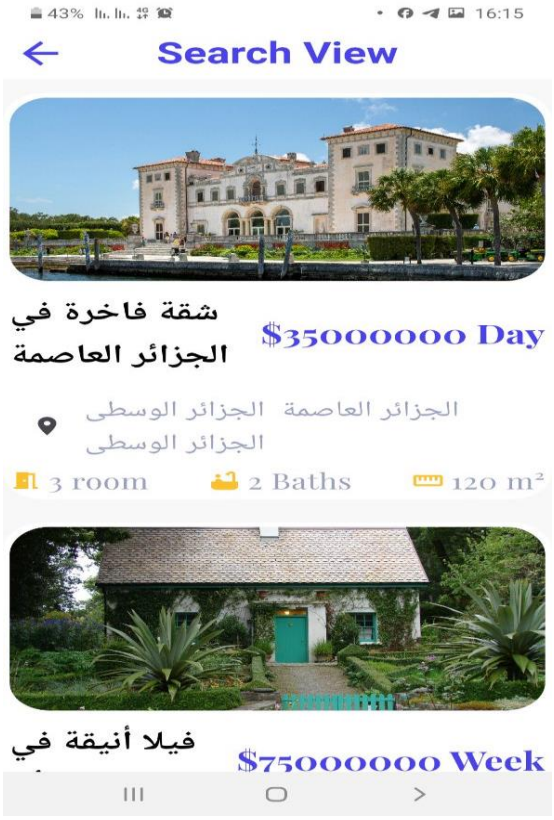
الشكل 5: صفحة تفاصيل الملكية



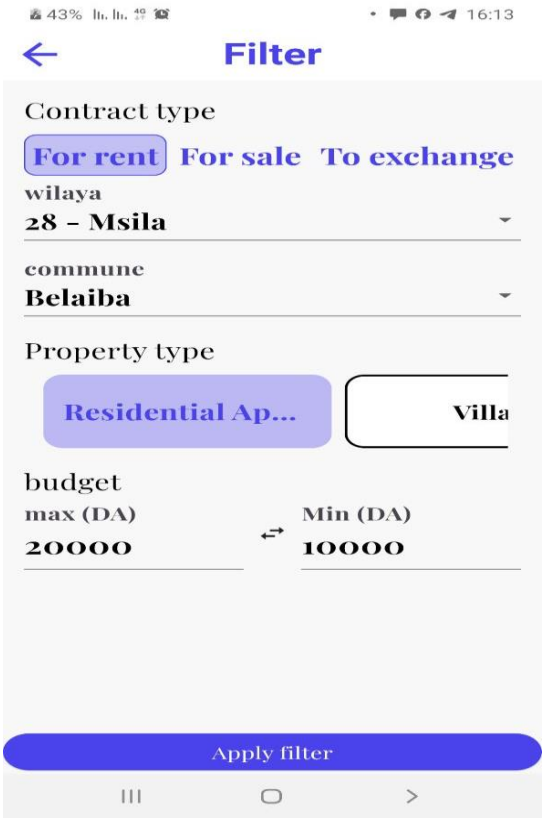
الشكل6: صفحة إضافة مراجعة



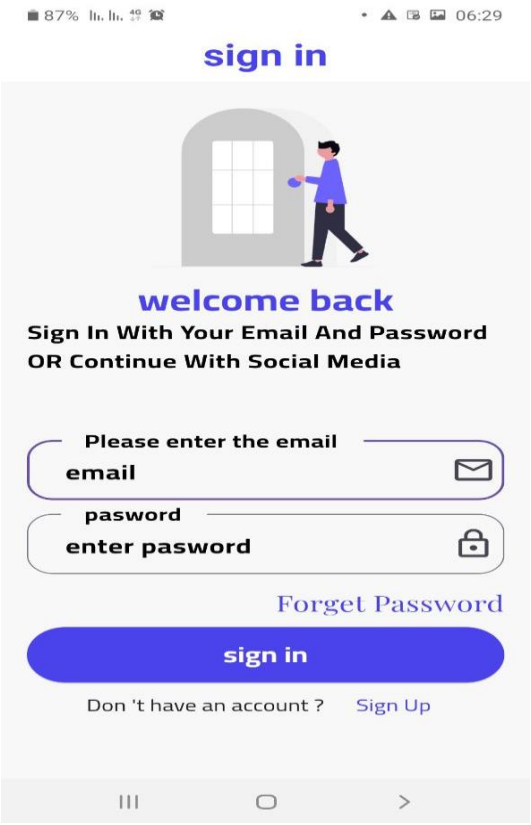
الشكل7: صفحة تقييم الوكالة



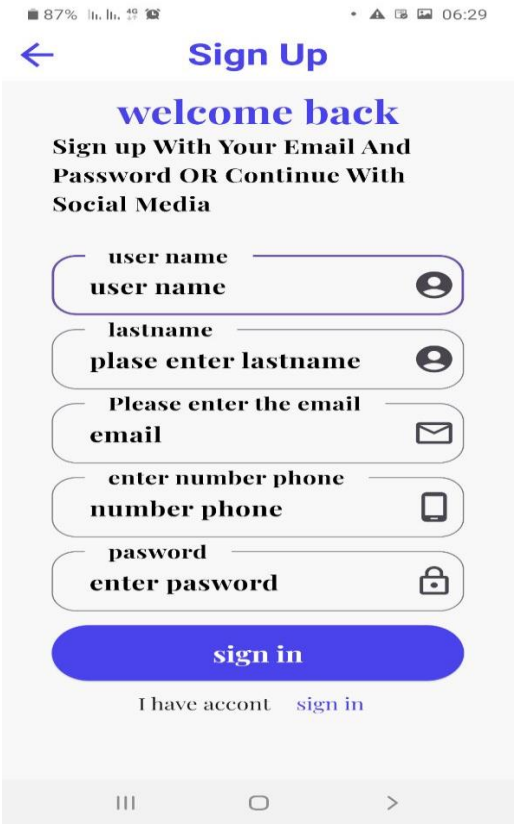
الشكل8: صفحة البحث



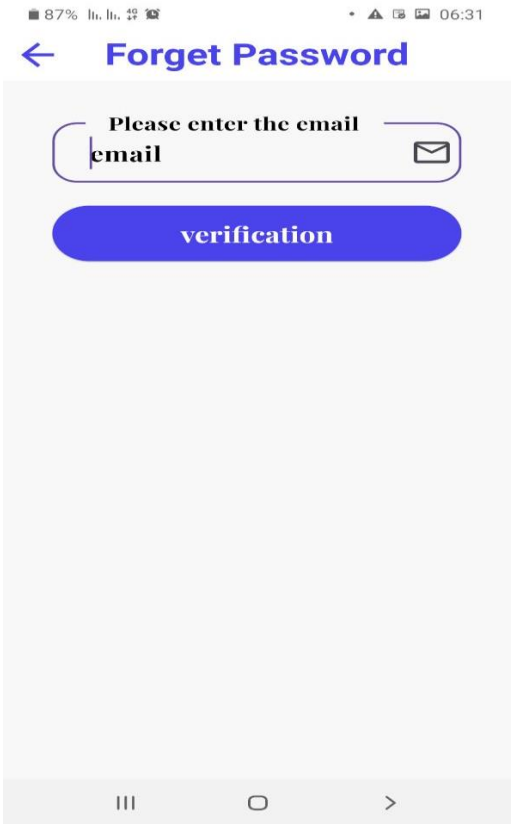
الشكل9: صفحة التصفية



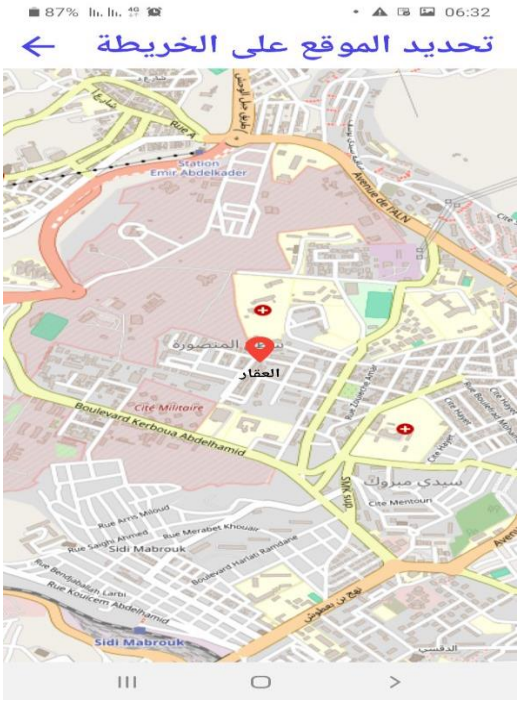
الشكل10: صفحة تسجيل الدخول



الشكل11: صفحة الاشتراك



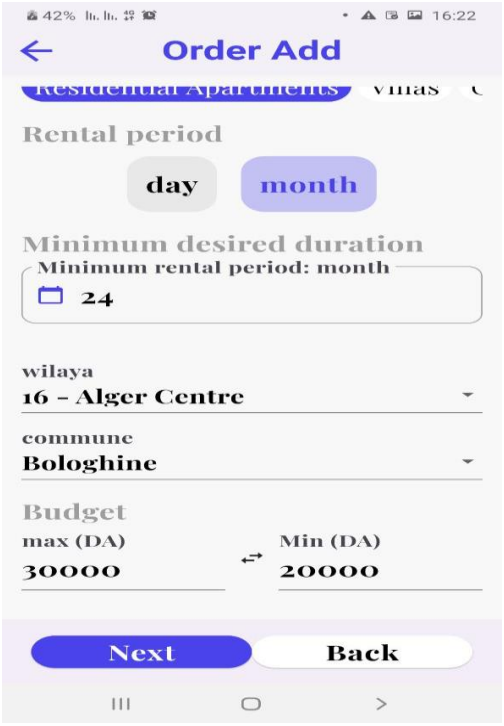
الشكل12: صفحة انشاء كلمة سر جديدة



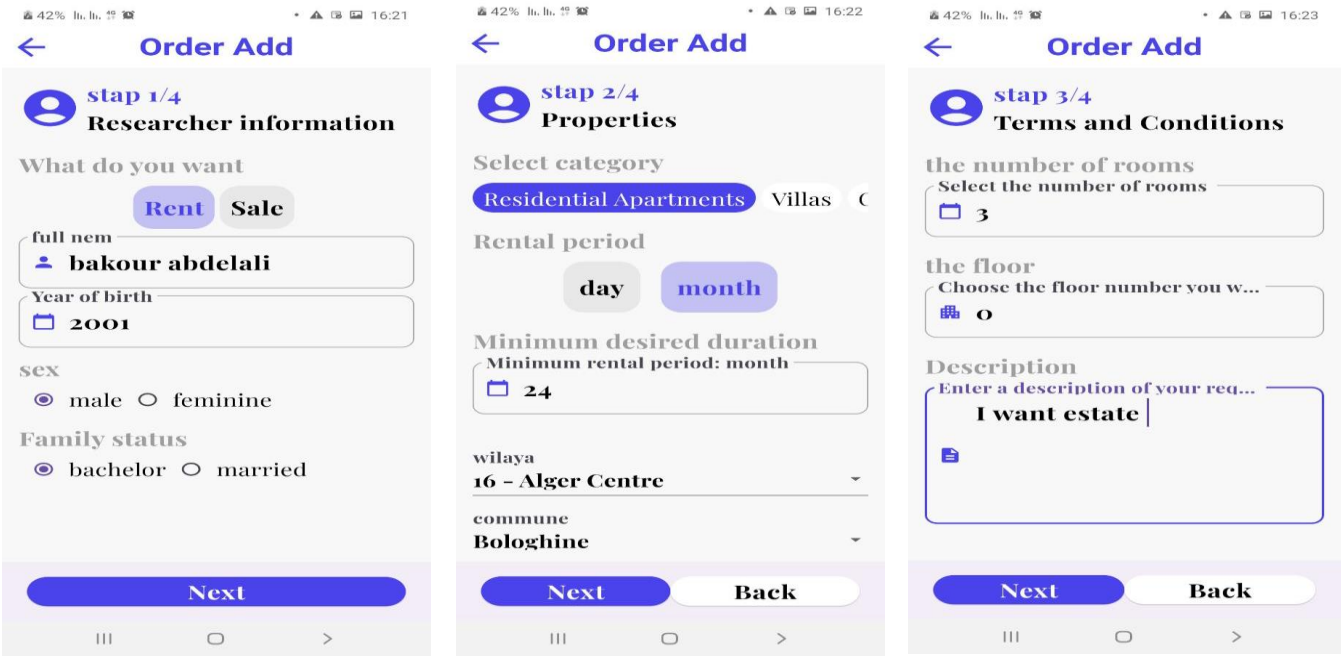
الشكل 13: تحديد موقع العقار على الخريطة

2- تجربة عملية للتطبيق:

حيث نقوم باستعراض كيفية عمل التطبيق والاجراءات المتبعه في تسجيل المعلومات التي ستعين في عملية استرجاع الهاتف المفقود.



الشكل 14: صفحة اضافة طلب عقاروفق مواضفات معينة



الشكل 15: صفحة اضافة طلب عقاروفق مواصفات معينة

شهادة توطين/ تحضين مشروع مبتكر ضمن القرار1275

الجمهورية الجزائرية الديمقراطية الشعبية
People's Democratic Republic of Algeria

وزارة التعليم العالي
و البحث العلمي
جامعة محمد بوضياف المسيلة
حاضنة الأعمال

Ministry of Higher Education
and Scientific Research
Mohamed Boudiaf University
Business Incubator

INCUBATEUR
UNIVERSITE DE M'SILA

جامعة محمد بوضياف - المسيلة
Université Mohamed Boudiaf - M'sila

الرقم: 0003/ح أ/2025

شهادة توطين/تحضين "مشروع مبتكر ضمن القرار1275"

أنا الممضي أسفله السيد (ة): بن التومي سارة

مدير حاضنة الأعمال لـ: جامعة محمد بوضياف بالمسيلة

المقر الاجتماعي/العنوان: جامعة المسيلة القطب الجامعي شمال

رقم علامة الحاضنة: 0804213017

تاريخ تسليم العلامة: 2021/04/12

أشهد أن الطالب / الطلبة التالية أسماؤهم:

اللقب	الاسم	الطور الدراسي	التخصص	الكلية
صالحي	شيماء	M2	الإعلام الآلي	كلية الرياضيات والإعلام الآلي
بكور	عبد العالي	M2	الإعلام الآلي	كلية الرياضيات والإعلام الآلي

تحت إشراف الأستاذ/الأساتذة التالية

اللقب	الاسم	الرتبة	التخصص	الكلية
أخروف	سمير	أستاذ التعليم العا	إعلام آلي	كلية الرياضيات والإعلام الآلي

تم احتضانه على مستوى حاضنة الأعمال لـ: جامعة محمد بوضياف بالمسيلة

بمشروع تحت اسم:

dévloppement d'une application web dédiée à la vente et à la location de biens immobiliers

خلال السنة الجامعية: 2025/2024

سلمت هذه الشهادة بطلب من المعني (ة) للإدلاء بها في حدود ما يسمح به القانون.

حرر في: المسيلة بتاريخ: 2025/05/13

مدير الحاضنة:

حاضنة الأعمال
نائبة مديرة حاضنة الأعمال
بجامعة المسيلة
د. قصيلي سمية

مخطط نموذج العمل التجاري Darvoo :تطبيق ذكي لبيع وتأجير وتبادل العقارات.

شرائح	العلاقات مع العملاء	القيمة المضافة	الأنشطة الرئيسية	الشركات
• مستثمرو العقارات. • الأفراد الباحثون عن سكن للبيع/الكراء/التبادل. • الوكالات العقارية. • الطلاب والموظفين. • أصحاب العقارات (العارضين المباشرين).	• دعم فني مباشر داخل التطبيق. • الدعم الشخصي. • حسابات مخصصة لكل مستخدم لتتبع نشاطه. **القنوات** • نشر التطبيق على في متاجر تطبيقات الهاتف الالكترونية. • الإعلانات عبر شبكات التواصل الاجتماعي. • التحسين من ظهور التطبيق في محركات البحث.	• منصة ذكية تجمع بين البيع، الشراء، الكراء والتبادل. • سهولة الوصول لعروض متنوعة. • نظام تقييم ومراجعات موثوق. • حماية بيانات المستخدمين. • توفير الوقت والجهد. • الشفافية والمصداقية. • تمكين أصحاب العقارات والوكالات. • دعم اتخاذ القرار. • إتاحة خدمة مستمرة. • تعزيز الشمول الرقمي.	• تطوير وصيانة المنصة. • التسويق الرقمي. • إدارة قاعدة البيانات والعروض. • تحديث الواجهة وتجربة المستخدم. **الموارد الرئيسية** • **موارد مالية:** قرض بنكي. • **موارد بشرية:** مطورين ومسوقين وموظفي خدمة العملاء. • **الموارد مادية:** الأجهزة والمعدات. • **الموارد الفكرية:** براءة اختراع/الملكية الفكرية.	• وكالات عقارية محلية. • مطورو برمجيات خارجيون. • شركات دفع إلكتروني. • الشركاء في منصات التمويل العقاري. • شركات التمويل والبنوك. • شركات التأمين العقاري. • مطورون عقاريون. • الهيئات الحكومية والبلديات(التراخيص).

مصادر الايرادات	هيكل التكاليف
• **الاشتراكات المميزة:** عمولات على كل عملية بيع/كراء/تبادل. • **العروض الخاصة:** اشتراكات مميزة لأصحاب الإعلانات (يتم تحديد التسعيرة حسب متطلبات الشركة). • **تخصيص نسخة من التطبيق للشركات الكبرى:** (يتم تحديد التسعيرة حسب متطلبات الشركة). • **الإعلانات:** رسوم نشر إعلانات مميزة. • بيع بيانات تحليلية (بشكل قانوني ومجهول).	1. **التكاليف الثابتة:** • **تكلفة النشر** :تكلفة نشر التطبيق على منصتي **google play**و**apple store**. • **تكلفة خدمة الدعم للعملاء:** تكلفة تقديم خدمة الدعم للعملاء. 2. **التكاليف المتغيرة:** • **تكلفة صيانة التطبيق:** تكلفة صيانة التطبيق سنويًا. • **تكلفة التطوير والتحسين**: تكلفة التطوير والتحسين. • **تكلفة التسويق** :تكلفة تسويق التطبيق على المتاجر ومواقع التواصل الاجتماعي.