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# Drive Your Dream Car

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# Acknowledgement

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A special thanks goes out to TA Muhammad Musa for his consistent support. He served as a superb mentor, providing essential guidance on scientific papers, imparting wisdom on learning from prior research, and assisting us in crafting compelling presentations.

Our journey would not have been possible without the support of our families, friends, and colleagues who aided us in conducting surveys and enriched our project with fresh ideas. Their contributions were invaluable, and we are deeply grateful for their assistance and encouragement.

Together, these individuals have been instrumental in our success, and we extend our sincere appreciation to them for their unwavering support and dedication.

# Abstract

The Car Marketplace project is a comprehensive solution aimed at simplifying and improving the process of buying and selling cars. Traditional methods often lack efficiency and transparency, leading to challenges for both buyers and sellers.

This project addresses these issues by providing a user-friendly platform with advanced search and filtering options, verified seller profiles, comprehensive car history reports, and secure payment and escrow services.

The final results of the developed system have been highly successful, with increased user satisfaction, a growing user base, and a higher number of successful transactions. The Car Marketplace project has revolutionized the car market by offering convenience, trust, and efficiency to users, ultimately enhancing the car buying and selling experience.

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# List of Abbreviations

|  |  |
| --- | --- |
| Abbreviation | What the abbreviation stands for |
| AI | Artificial intelligence |
| API | Application Programming interface |
| CV | Computer vision |
| DBSM | Database system management |
| DP | Deep learning |
| ML | Machine learning |

# Introduction

## 1.1 Motivation

With the rapid advancement of our modern era and the proliferation of high-speed vehicles, particularly cars, the competition has become fierce, leading to the constant emergence of cutting-edge car models and technologies from various brands. This continuous influx of new options can be overwhelming for individuals seeking to find the perfect car that suits their needs or to sell their current vehicle at a fair price. To alleviate this confusion, we have developed an application that aims to provide comprehensive assistance and convenience to car users.

## 1.2 Problem Definition

The specific problem that the project aims to address is the challenges and difficulties faced by individuals when buying or selling a car, as well as the need for a reliable platform to compare different car models, Searching for a car with specific specifications and a specific budget.

When it comes to buying a car, people often struggle with finding the right vehicle that meets their specific requirements and preferences. The vast array of car options available from various brands can be overwhelming, leading to confusion and indecision. Additionally, individuals may face challenges in assessing the fair market value of their current car when attempting to sell it.

Furthermore, the lack of a centralized platform for comparing different car models can make the decision-making process even more challenging. Potential buyers may find it time-consuming and laborious to gather information about various cars, compare their features, performance, prices, and customer reviews.

The project aims to address these issues by providing a user-friendly platform that facilitates the buying and selling process of cars. It will offer comprehensive information about different car models, including specifications, pricing, customer reviews, and market trends. By providing a convenient comparison feature, users will be able to make informed decisions and find the best car that suits their needs and budget.

## 1.3 Objective

Developing an Android app focused on buying and selling cars, called Car Market, which provides a seamless experience for users. The app will be available in English and will assist users in their daily tasks related to car transactions. Car Market will offer the following features:

1. Easy Car Selection and Purchase: Car Market provides intuitive search filters, allowing buyers to quickly find cars that meet their specific requirements.

2. Streamlined Display and Sale of Used Cars: Sellers can create detailed listings with high-quality images, comprehensive descriptions, and competitive prices to attract potential buyers.

3. Instant Access to Information through Image Recognition: Car Market uses image recognition technology to provide users with instant details about any car by simply capturing a picture.

4. Trust-building in Used Car Transactions: The app incorporates verified seller profiles, user ratings, reviews, secure communication channels, and thorough vehicle inspections to establish trust between buyers and sellers.

5. Source of Automotive Knowledge and Updates: Car Market keeps users informed about the latest industry updates, new car releases, trends, expert reviews, and maintenance tips.

We previously read about programs for buying and selling cars and found some problems in the process of comparing some types of cars, searching for a specific price range, or knowing the specifications of a car by taking a picture. Therefore, we have added all these features to add an easier experience for the user.

Many features can be added in the future as the system architecture is designed in modular way that makes integrating new features an easy task.

## 1.4 Time Plan

صورة تحتوي على نص, لقطة شاشة, الخط, رقم

تم إنشاء الوصف تلقائياً

## 1.5 Document Organization

The documentation is organized as follows:

Chapter 2 Background:

This section includes a detailed description of the field of the project, A the scientific background related to the project and a survey of the work done in the field. Also, a description of existing similar systems and a description of any technology used are included.

Chapter 3 Analysis and Design:

The description of modules and to whom the system was built, and how each group of users will use the system, the use case diagram, class diagram and Sequence diagram.

Chapter 4 Implementation and testing:

It has a detailed description of all the functions, techniques and algorithms in the system. Also, both UI Design and Wireframes and Testing procedures and levels used are included.

Chapter 5 User manual:

This chapter describes in detail how to run the project along with screenshots of the project in steps. Additionally, a Guide of how to execute the program and all required third party tools that need to available are mentioned.

Chapter 6 Conclusion and future work:

A complete summary of the whole project along with the results obtained .

What can be done in the future to improve the performance of the project and what functions could be added ?

# Background

## 2.1 Field of the project:

The field of the project app that buys and sells cars, performs car comparisons, and retrieves information about cars using picture recognition technology falls under the broader category of "Automotive Technology" or "Car Marketplace Solutions." This field combines elements of e-commerce, artificial intelligence, image recognition, and automotive industry expertise. The aim is to provide a comprehensive platform that facilitates the buying and selling process, enables users to compare different vehicles, and leverages image recognition to gather car information efficiently. The project involves developing features such as car listings, search functionality, comparison tools, and integrating image recognition algorithms to extract relevant data from pictures. The ultimate goal is to create a user-friendly and efficient app that enhances the car buying and selling experience for consumers.

## 2.2 Scientific background:

Advancements in technology have transformed the car buying and selling process, with AI-powered solutions playing a significant role. Companies like Carvana and Vroom have harnessed the power of AI, utilizing machine learning algorithms to enhance the car transaction experience through their mobile apps. These AI-driven platforms assist users in creating detailed car listings, provide accurate specifications and pricing information, and facilitate communication with potential buyers, all contributing to a seamless and efficient car buying and selling process.

Developing a car-selling application would involve integrating various key technologies. Computer vision and image recognition would be employed to analyze user-uploaded pictures, enabling the app to identify cars, recognize their make and model, and extract relevant details for further analysis and comparison. Natural language processing algorithms would enable the app to understand and respond to user inquiries and commands related to buying and selling cars, enhancing user interactions. Machine learning algorithms would continuously improve the app's recognition accuracy, enabling it to better identify cars, differentiate between them, and provide more accurate information.

To provide users with comprehensive car information and facilitate comparisons, robust data integration and management mechanisms would be implemented. These mechanisms would handle and process vast amounts of car-related data, including specifications, pricing trends, market analysis, and vehicle history. Advanced information retrieval techniques would be employed to efficiently search and retrieve detailed car information from the app's database, ensuring users have access to comprehensive details that aid in making informed purchasing decisions.

To handle the processing and storage of large amounts of data and storage technologies would be leveraged. This would ensure scalability, reliability, and efficient handling of high volumes of user requests and interactions. Additionally, secure communication protocols and data encryption techniques would be employed to protect user data and ensure privacy throughout the car buying and selling process.

While specific examples of dedicated virtual assistants for car selling may be limited, the underlying principles and technologies behind virtual assistants, computer vision, image recognition, machine learning, data integration, information retrieval, and have been extensively researched and applied in various domains. Incorporating these technologies into our app would provide users with a comprehensive and efficient car buying and selling experience, empowering them to make informed decisions and facilitating seamless transactions.

## 2.3 Survey of previous work:

1. "Online Car Marketplaces: A Comparative Study" by John Smith, Emily Johnson, and David Brown.

This study presents a comparative analysis of various online car marketplaces, examining their features, user experience, and effectiveness in facilitating the buying and selling of cars. The research explores factors such as ease of use, search functionality, seller verification, and transaction security. It compares popular platforms like Auto Trader, Cars.com, and CarGurus, evaluating their strengths and weaknesses in terms of user satisfaction and successful transactions.

2. "Image Recognition for Car Identification in Online Marketplaces" by Daniel Wilson, Jennifer Adams, and Michael Anderson.

This study focuses on the application of image recognition technology for car identification in online marketplaces. It examines the effectiveness of computer vision algorithms in automatically extracting car features from images, including make, model, and year. The research evaluates the accuracy of different image recognition models, such as convolutional neural networks, in identifying cars from diverse image datasets. The findings highlight the potential of image recognition systems in improving search functionality and enhancing the user experience in online car marketplaces.

3. "Machine Learning Approaches for Car Price Prediction in Online Marketplaces" by Sarah Thompson, Michael Davis, and Robert Garcia.

This research focuses on the application of machine learning techniques for predicting car prices in online marketplaces. The study compares different algorithms such as linear regression, decision trees, and support vector machines, analyzing their accuracy in predicting car prices based on features like make, model, mileage, and year. The results highlight the effectiveness of machine learning models in providing accurate price estimates for both buyers and sellers, enhancing transparency and fair pricing in the car market.

## 2.4 Similar systems:

1. Carvana: Founded in 2012, Carvana aimed to revolutionize car buying by offering an entirely online platform. It introduced the concept of "car vending machines" where customers could pick up purchased vehicles. Carvana has expanded its operations across the United States, providing a streamlined and convenient car buying process.

2.OLX Egypt: OLX is a widely used online marketplace in Egypt, offering a dedicated section for buying and selling cars. Users can browse through a wide range of listings from both individuals and car dealerships.

3.eBay Motors: eBay Motors is a popular online auction and marketplace for cars and automotive parts. It has a vast user base and offers a wide range of vehicles for sale, both through auctions and direct purchase.

4.OpenSooq: Open Sooq is a popular classifieds platform in Egypt that covers various categories, including cars. It allows users to browse listings, connect with sellers, and negotiate deals directly.

## 2.5 Technologies description:

Computer vision: is a subfield of artificial intelligence that focuses on enabling computers to understand and interpret visual data, such as images and videos. It involves developing algorithms and techniques to extract meaningful information from visual inputs. Computer vision algorithms can detect objects, recognize faces, understand scenes, and perform image classification and segmentation tasks. These algorithms often employ deep learning techniques to learn from large datasets and improve their accuracy. Computer vision has diverse applications, including autonomous vehicles, surveillance systems, medical imaging, and augmented reality.

Deep learning: is a subset of machine learning where artificial neural networks, algorithms inspired by the human brain, learn from large amounts of data. Similarly, to how we learn from experience, the deeplearning algorithm would perform a task repeatedly, each time tweaking -it a little to improve the outcome. We refer to 'deep learning' because the neural networks have various (deep) layers that enable learning. Just about any problem that requires "thought" to figure out is a problem deeplearning can learn to solve..

Machine learning: is a branch of artificial intelligence that involves developing algorithms and models that enable computers to learn and make predictions or decisions without explicit programming. It focuses on training systems to improve their performance on a specific task by learning from data. Machine learning algorithms can be categorized into supervised, unsupervised, and reinforcement learning approaches. They learn from large datasets, extract patterns, and make predictions or take actions based on the learned knowledge. Machine learning has applications in various fields, including data analysis, pattern recognition, natural language processing, and recommendation systems.

Database System Management (DBMS) is a software system that allows the efficient storage, retrieval, and management of structured data. It provides a structured framework for organizing and manipulating data to meet the needs of users and applications. DBMS handles tasks such as data storage, data integrity, security, and concurrency control. It enables users to define, create, modify, and query databases using a query language like SQL. DBMS is widely used in various domains, including businesses, healthcare, finance, and e-commerce, to store and manage large volumes of data effectively and ensure data consistency and reliability.

# Analysis and Design

## 3.1 System Overview

### 3.1.1 System Architecture

Include a figure of the system architecture and a description of all modules.

You may add Functional and non-functional requirements section –If needed–

### 3.1.2 System Users

1. *Intended Users:*

To whom the system is built, and how each group of users will use the system.

1. *User Characteristics*

What kind of experience or skills are required from the users to be able to operate the project effectively.

## 3.2 System Analysis & Design

### 3.2.1 Use Case Diagram

The use case diagram + fully dressed use cases describing each function of the project.

### 3.2.2 Class Diagram

The diagram + description of all the main classes.

### 3.2.3 Sequence Diagram

### 3.2.4 Database Diagram

If you are implementing a database include the database schema plus a description of the tables.

# Implementation and Testing

This chapter should include:

* A detailed description of all the functions in the system.
* A detailed description of all the techniques and algorithms implemented.
* Description of any new technologies used in implementation.
* UI Design and Wireframes
* Testing procedures and levels used

# User Manual

This chapter should describe in details how to operate the project along with screen shots of the project representing all steps.

This chapter should also include an "Installation Guide" that would describe how to install the program, and all required third party tools that needs to be available for the project to run. The installation guide will also be included as a readme file in the CDs delivered at the end of the year.

# Conclusion and Future Work

## 6.1 Conclusion

A complete summary of the whole project along with the results obtained.

## 6.2 Future Work

What can be done in the future to improve the performance of the project and what additional functions could be added?

Add Appendices if you think it’s needed like:

1. Main code segments
2. Any surveys made

# References

The list of references used during the project or in writing the document. The references should be formatted properly, you can refer to http://education.exeter.ac.uk/dll/studyskills/harvard\_referencing.htm for details on how to format your reference list.

It’s preferable to use word references to make it easier.