**CHAPTER 3**

**SYSTEM ANALYSIS**

System analysis is a problem solving technique that decomposes a system into component pieces of purpose of studying how well those component parts work and interact to accomplish their purpose the following chapter provides the detail description of the existing system. It also provides an overview of the proposed system and feasibility of the Vehicle.

**3.1 EXISTING SYSTEM**

The existing system of AR technology has only ability to project 2D objects from a surface plane, which is very basic projection of Augmented Reality. There is no specific app for any automobile industry and it is yet to be implemented in future to enhance the feasibility of the automobile industry. Native apps does not support 3D projection and designs are not processed yet.

**3.1.1 Vehicle showcase AR App**

Vehicle showcase AR app is android-based augmented reality application which is designed for automobile industry. It is designed to augment the car for the customer in the real world and it display the accessories of the vehicle in 360 degree. This allows user to view the car in full-fledged mode without visiting the showroom. The showroom can also avoid the maintenance of the car placed in the showroom. It is completely voice controlled and hands free operation with touch to view the car that has been projected

**3.2 DRAWBACKS**

**3.2.1 Vehicle Showcase AR application**

* It only gives the details similar to frequently asked questions.
* It is given only for a particular car model from the database.

**3.3 PROPOSED SYSTEM**

The proposed system is Vehicle showcase AR application to display the 3D car model in the real world with different way of augmented projection.

The main aim of this project is to develop a application of Augmented Reality for automobile industry were the customers can view the car models of their favorite brand in free real world space with voice controlled AI bot.

For the first time we are combining two forms of technology like Augmented Reality and Artificial Intelligence chat bot.

**3.4 FEASIBILITY STUDY**

An analysis and evaluation of a proposed project to determine if it is technically feasible, is feasible within the estimated cost, and will be profitable. Feasibility studies are usually conducted where large sums are at stake. A feasibility study aims to objectively and rationally uncover the strengths and weaknesses of an existing Augmented Reality applications and threats present in the environment, the resources required to carry through, and ultimately the prospects for success in the Vehicle showcase AR application.

**3.4.1 Tests of Feasibility**

Feasibility study is conducted once the problem clearly understood. Feasibility study is necessary to determine that the proposed system in Vehicle showcase AR app is feasible by considering the technical, operational, and economical factors. By having a detailed feasibility study the management in the will have a clear-cut view of the proposed system of the banking bot. Feasibility study encompasses the following things:

* Technical Feasibility
* Economical Feasibility
* Operational feasibility

**3.4.1.1 Technical Feasibility**

A large part of determining resources has to do with assessing technical feasibility. It considers the technical requirements of the proposed project of vehicle-showcase AR application. The technical requirements are then compared to the technical capability of the Automotive system. The systems project is considered technically feasible if the internal technical capability is sufficient to support the customer requirements. The analyst must find out whether current technical resources can be upgraded or added to the 3D model section with latest database.

The essential questions that help in testing the operational feasibility of a system include the following:

* Is the project feasible within the limits of current technology?
* Does the technology exist at all?
* Is it available within given resource constraints?
* Is it a practical proposition?
* Manpower- programmers, testers & debuggers
* Software and hardware
* Are the current technical resources sufficient for the new system?
* Can they be upgraded to provide to provide the level of technology necessary for the new system?

**3.4.1.2 Operational Feasibility**

Operational feasibility is dependent on human resources available for the project and involves projecting whether the system will be used if it is developed and implemented. Operational feasibility is a measure of how well a proposed system in banking bot solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of Vehicle showcase AR Application.

The essential questions that help in testing the operational feasibility of a system include the following:

* Does current mode of operation provide adequate throughput and response time?
* Does current mode provide end users and managers with timely, pertinent, accurate and useful formatted information?
* Does current mode of operation provide cost-effective information services to the business ?
* Could there be a reduction in cost and or an increase in benefits?

**3.4.1.3 Economical Feasibility**

Economic analysis could also be referred to as cost/benefit analysis. It is the most frequently used method for evaluating the effectiveness of a new system of the Vehicle showcase AR-app. In economic analysis, the procedure is to determine the benefits and savings that are expected from a candidate system and compare them with costs.

If benefits outweigh costs, then the decision is made to design and implement the Vehicle showcase AR app.

Possible questions raised in economic analysis are:

* Is the system cost effective?
* Do benefits outweigh costs and system study?

**CHAPTER 4**

**SYSTEM SPECIFICATION**

**4.1 FUNCTIONAL REQUIREMENTS**

**4.1.1 Voice-Controlled Chat Bot**

* The system should allow users to chat.
* The system shall inform the user if an answer is not available.
* The system shall inform if its not properly heard the voice
* The system shall inform the user about the details of car

**4.1.2 Selecting**

* The system should allow users to select the car models.
* The system should allow users to search for information about the particular car model and details about the accessories.
* The system should allow users to alter and edit in a free hand

**4.1.3 Logs**

* The system should maintain a log of the current question and answer if the user is not satisfied.

**4.1.4 Feedback**

* The user should be able to leave feedback, which is comprised of a text message and a rating.

**4.1.5 Administrative system**

* Information management: The administrator should be able to to add, update the car models.
* Log management: The administrator should be able to view and delete logs.
* Feedback management: The administrator should be able to view and delete feedbacks.

**4.2 NON-FUNCTIONAL REQUIREMENTS**

**4.2.1 User Interface**

* The system shall maintain an easy to use interface across all functionality and for all users
* The client’s user interface should be compatible with all commonly used android mobiles from the version higher than 5.0

**4.2.2 Scalability**

* The system shall be able to scale based on the number of users accounts using the system.

**4.2.3 Security**

* The administrative system should be protected from unauthorized access.
* The database should protected from attacks and unauthorized access.
* The interface should be protected from attacks.
* All passwords should be stored as a secure hash of the administrator password.

**4.2.4 Third party interactions:**

* The system should be able to interact with wit.ai to collect the sentence intent.
* The system should be able to interact with the user in any form of slang that’s given as a input.

**4.2.5 Portability**

* The system should run on a variety of android operating systems.
* The system should be able to run in good camera quality phones.

**4.2.6 Maintainability**

* The system should be easy to maintain.
* There should be a clear separation between the interface and the business oriented logic.

**4.2.7 Exception handling**

* Exceptions should be reported effectively to the user if they occur.

**4.2.8 Ethics**

* The system shall not store or process any information about its users.

**4.3 HARDWARE REQUIREMENTS**

Processor : Qualcomm Processor (Basic)

RAM : 1 GB

Hard Disk : 10 GB

Monitor : 16’’ Colour Monitor

Keyboard : Standard 110 keys

Pointing Device : Touch

Smart Phone : Any type

**4.4 SOFTWARE REQUIREMENTS**

Programming Language : C#

Operating System : Android (5.0 - 9.0)

Front End : Android (Java, XML)

Back End : Unity Engine, Vuforia AR

Web Browser : Mozilla Firefox, Google Chrome

**CHAPTER 5**

**SOFTWARE DESCRIPTION**

A software requirements specification (SRS) is a description of a [software system](https://en.wikipedia.org/wiki/Software_system) to be developed. It lays out [functional](https://en.wikipedia.org/wiki/Functional_requirement) and [non-functional requirements](https://en.wikipedia.org/wiki/Non-functional_requirements), and may include a set of [use cases](https://en.wikipedia.org/wiki/Use_case) that describe user interactions that the software must provide. Software requirements specification establishes the basis for an agreement between users and AR app on what the software product is to do as well as what it is not expected to do. Software requirements specification permits a rigorous assessment of requirements before design can begin and reduces later redesign. It should also provide a realistic basis for estimating product costs, risks, and schedules.

**5.1 FRONT END**

The front end is designed using Android Studio which includes a collaborative platform for deploying application. Here all the app tools are integrated and it allows automatic detection of entities. It uses NLP, Machine Learning. API Connectivity is been done wit.ai and Vuforia

**5.1.1 C# for Unity**

C# is a general-purpose, multi-paradigm programming language encompassing strong typing, imperative, declarative, functional, generic, object-oriented, and component-oriented programming disciplines. It was developed around 2000 by Microsoft within its .NET initiative and later approved as a standard by Ecma and ISO

**5.1.1.1 Features**

* Simple: It is very simple and easy to use, compare to other scripting language it is very simple and easy, this is widely used all over the world for game engine and designing.
* Interpreted: It is an interpreted language, i.e. there is no need for compilation.
* Faster: It is faster than other scripting language for declaring objects.
* Source: Open source means you no need to pay for use PHP, you can free download and use.
* Platform Independent: C# code will be run on every platform, Linux, Unix, Mac OS X, Windows.
* Case Sensitive: C# is case sensitive scripting language at time of variable declaration. In C#, all keywords (e.g. if, else, while, echo, etc.), classes, functions, and user-defined functions are NOT case-sensitive.

**5.1.1.2 Advantages**

* C# is pure object-oriented, but C++ is a mixture of object-oriented and generic programming features.
* Therefore, programmers find it easy to learn and manipulate. Procedure-oriented.
* C# language has its roots in C and C++. PHP syntax is most similar to C and C++ language syntax.
* C# can run on both UNIX and Windows servers.
* C# also has powerful output buffering that further increases over the output flow. C# internally rearranges the buffer so that headers come before contents.
* C# can be used with a large number of relational database management systems, runs on all of the most popular web servers and is available for many different operating systems.
* So, in general C# is cheap, secure, fast, reliable and type safe for developing Unity engine projects.

**5.1.2 Machine Learning**

Machine learning is a core sub-area of artificial intelligence; it enables computers to get into a mode of self-learning without being explicitly programmed. When exposed to new data, these computer programs are enabled to learn, grow, change, and develop by themselves.

**5.1.2.1 Features**

* Machine learning can easily consume unlimited amounts of data with timely analysis and assessment.
* Machine learning algorithms tend to operate at expedited levels.
* Applying machine learning to practical applications and scenarios is simply vital.

**5.1.2.2 Advantages**

* Sophisticated pattern recognition of voice
* Intelligent decisions
* Self-modifying
* Multiple iterations
* Automation of tasks

**5.1.3 NLP**

Natural-language processing (NLP) is an area of computer science and artificial intelligence concerned with the interactions between computers and human (natural) languages, in particular how to program computers to fruitfully process large amounts of natural language data.

**5.1.3.1 Advantages**

* No training.
* Relives burden of learning syntax.

**5.2 BACK END**

The back end is designed using Unity Engine whose primary function is to store data securely and retrieve it later, as requested by other software applications.

**5.2.1 Unity Engine and Vuforia**

Unity is a cross-platform game engine developed by Unity Technologies, first announced and released in June 2005 at Apple Inc.'s Worldwide Developers Conference as an OS X-exclusive game engine. As of 2018, the engine has been extended to support 27 platforms **Vuforia** is a Augmented Reality (SDK) for mobile devices that enables the creation of augmented reality applications. It uses computer vision technology to recognize and track planar images (Image Targets) and simple 3D objects, such as boxes, in real time. This image registration capability enables developers to position, such as 3D objects and other media, in relation to real world images when they are viewed through the camera of a mobile device. The virtual object then tracks the position and orientation of the image in real-time so that the viewer perspective on the object corresponds with the perspective on the Image Target. It thus appears that the virtual object is a part of the real-world scene.

**5.2.2 Features of Unity**

* Creating and Destroying Game Objects
* Access the Components
* Events for Game Object
* Dealing with Vector Variables and Timing Variables
* Physics Oriented Events
* Co-routine and Return Type.

**5.2.3 Advantages of Vuforia**

* Data integration is easy
* Rating of the images are given
* High Performance
* API key is free
* Comprehensive Driver Support
* Complete Control to connect with unity
* The Flexibility of Open Source