



# **AUGMENTED REALITY ON REAL STATE**



**Submitted  
by:**

**Nischal Bade**

**Submitted  
to:**

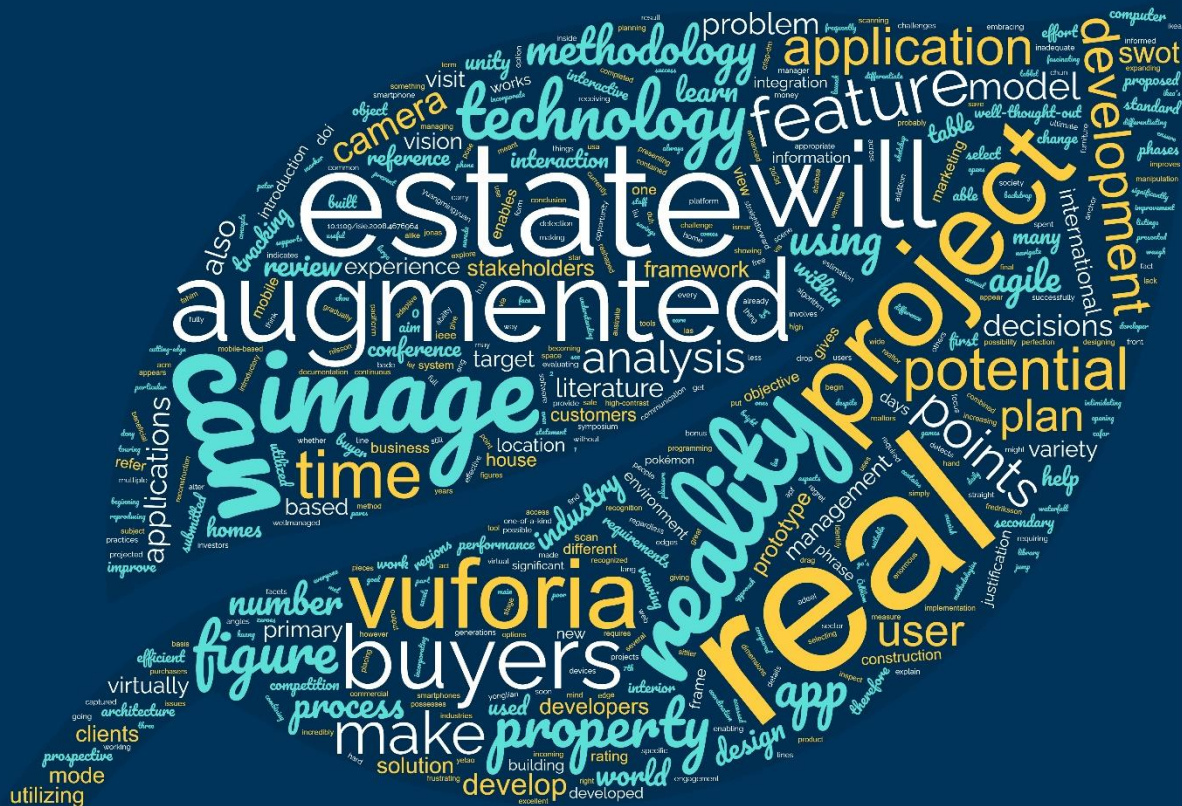
**Manish Shrestha**

## Table of Content

Table of Figures .....	2
Introduction .....	4
Aim.....	5
Objective.....	5
Justification of project.....	6
Problem Statement .....	6
Problem Solution .....	6
<b>METHODOLOGY</b> .....	6
Development Methodology .....	6
Tools and Technology.....	7
integration.....	9
Literature review .....	10
Secondary Literature.....	10
Primary literature .....	10
Project plan .....	11
Conclusion.....	12
SWOT ANALYSIS.....	12
Reference.....	12

## Table of Figures

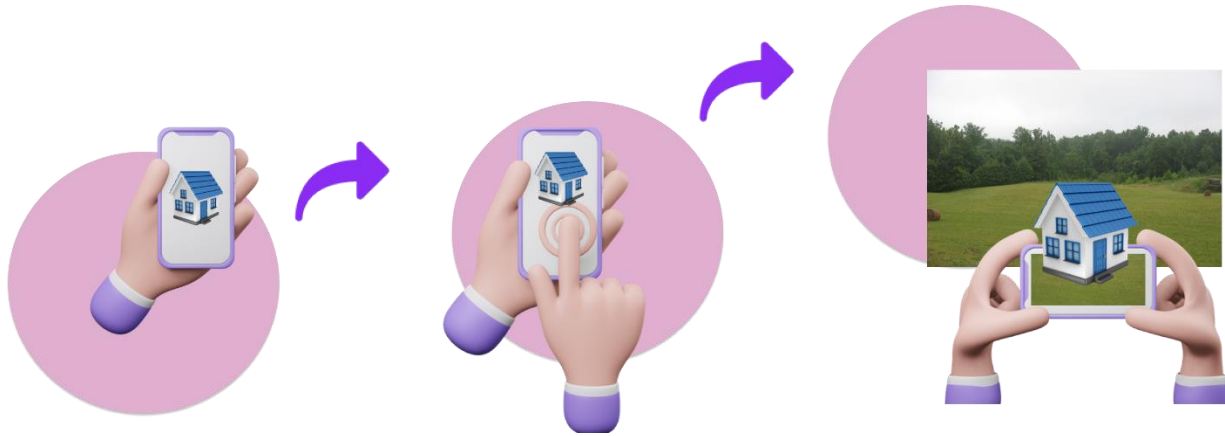
Figure 1 How our app works .....	5
Figure 2 system architecture.....	9
Figure 3: project plan .....	11
Figure 4: SWOT Analysis of Augmented Reality on Real Estate .....	12



## Introduction

Augmented reality is beginning to be recognized as beneficial across a growing number of industries (AR). When you think of all the possible applications of augmented reality, the real estate market probably isn't the first thing that comes to mind. However, nobody can deny the enormous potential it has to revolutionize the real estate industry, both for sellers and buyers. This is something that cannot be denied. These days, virtually everyone possesses a smartphone or tablet computer with built-in internet access, and the hardware contained within these devices continues to improve on a daily basis. This indicates that utilizing augmented reality applications on the cutting-edge smartphones that we all carry around is gradually becoming less intimidating and more natural. The recent development paves the way for the implementation of augmented reality applications in the real estate sector. When augmented reality was not utilized in the real estate industry, there was an absence of perfection in all facets of the business. When customers and staff alike are required to visit each location on their own, it can be extremely frustrating. It's possible that people will make poor decisions because of time constraints.

The process of showing homes to potential buyers can be made more effective and efficient by using augmented reality in real estate, as demonstrated by the application. The amount of time spent touring each location with customers, combined with the fact that real estate developers frequently lack the appropriate resources to impress customers, is a common challenge they face. Real estate developers are confronted with a number of significant challenges in today's world, one of the most significant of which is the challenge of figuring out how to make things more convenient for potential buyers. The interaction that commercial real estate investors, stakeholders, and customers have with a particular location may, however, be subject to change as a result of the development of augmented reality technology. Augmented reality can assist real estate developers in expanding their marketing strategies and provide customers with a more memorable experience in their homes. Because of this technology, buyers are able to virtually inspect every part of the house or space and determine whether or not it meets their requirements. This enables buyers to make decisions more quickly while also having access to more accurate information.



*Figure 1 How our app works*

## Aim

By enabling prospective buyers of real estate to virtually explore a property in all three dimensions, you can help them learn more about a property without requiring them to physically visit the location. Both the buyer and the realtor will benefit from time savings.

## Objective

- Develop marker-based AR Application
- Develop well maintained documentation for project.
- To complete the project within time framework.
- Develop user friendly environment.
- Explore the use of modern technology for Augmented Reality.
- To learn about project management.
- Learn about research processes and practices.
- To learn about development methodology and programming languages.
- Develop mobile-based Augmented reality platform.

## Justification of project

### Problem Statement

Regardless of how much effort was put into the construction of the building or design of the building, it is impossible to eliminate the possibility of receiving complaints from purchasers in the real estate industry. When viewing a home online via an image, many prospective buyers have trouble mentally placing themselves inside the property. Reproducing designs requires both time and money, and that's before you even begin making alterations to the prototype that the developer is currently working on. Despite the completion of the prototype the buyers do not have the full understanding or capability to fully understand vision that the prototype are meant to show in the real world environment

### Problem Solution

The requirements of the Buyers are not met by the current system. Therefore, a well-managed application incorporating AR that can be used to view any property for sale, whether it is already built or still in the design process, may be the suitable solution to the issues outlined above. AR is a useful tool for presenting and evaluating proposed renovations. Real estate agents can save time by not having to explain the same aspects of a property to several clients, and potential buyers can make more informed decisions by restricting their options after viewing a 3D model of the house that appears when an image of the property is scanned into the app. As an added bonus, it will let buyers alter the interior design and see the property in its final form before it is built. Overall, the process improves the client's pleasure.

## METHODOLOGY

### Development Methodology

There are many different approaches to software development, including CRISP-DM, Agile, DSDM, Waterfall, and a great many others. For the purpose of developing the web application, I will be utilizing the agile method, which is one of these development methodologies. The Agile methodology is a way of managing projects that involves dividing them up into a number of different phases. It requires ongoing communication and coordination with the various stakeholders, in addition to continuous improvement at each stage. As soon as they get started, teams immediately jump into a process that involves planning, carrying out, and evaluating their work. Continuous collaboration is essential, not only with the members of the team but also with the project stakeholders. The term "agile project management" does not refer to a specific framework but rather functions as a catch-

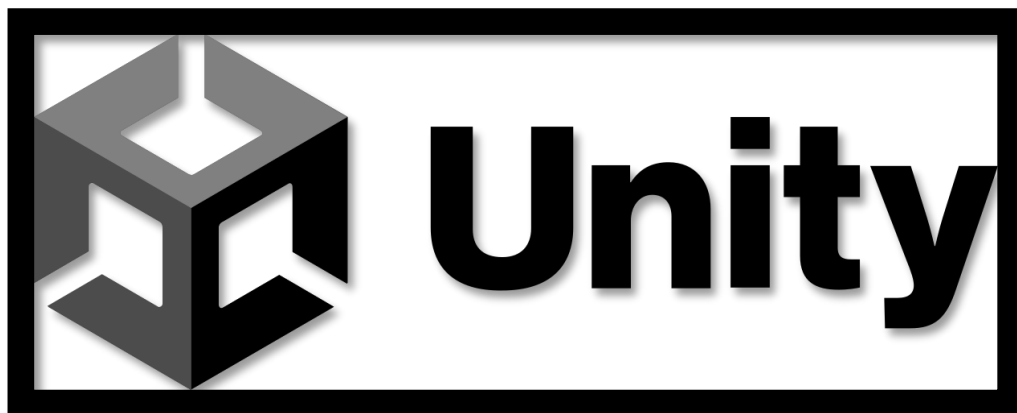


all phrase that can incorporate a variety of distinct frameworks. The phrase "agile project management" can refer to a number of different concepts, such as "Scrum," "Kanban," "Extreme Programming," and "Adaptive Project Framework" (APF).



### Tools and Technology

**Unity** - Games and other interactive experiences in 2D, 3D, VR, and AR can all be made with the UNITY engine.



**Vuforia** - The Vuforia app is an augmented reality platform for mobile devices. Vuforia locates "feature points" within the target image and then uses those points to make a likeness comparison between the target image and the incoming camera frame. An image captured by a camera is compared in Vuforia to a standard image. High-contrast patches, curves, or edges that don't significantly change when viewed from different angles are what Vuforia excels at scanning. Inadequate feature points in an image can prevent it from being correctly identified. Therefore, having a large number of feature points that can act as an anchor for object recognition technology is the primary goal. If the vast majority of reference feature points on a camera frame are located using the same feature extraction algorithm, the image is recognized as the marker. There is an Object Scanner tool in Vuforia that is used to scan



everything.

**SKETCHUP** - 3D House model.



integration

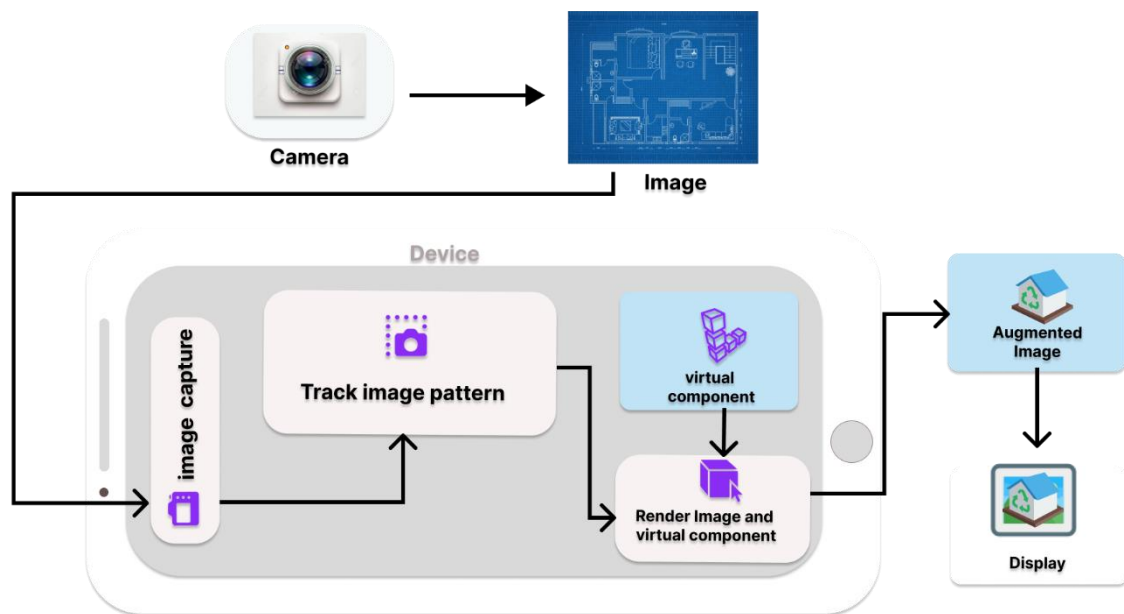


Figure 2 system architecture

An augmented reality (AR) real estate app is developed, and a life-size house model is projected into the real world. Vuforia supports a wide variety of image recognition techniques. The Vuforia library was used in this proposed model to identify a target image. Vuforia does this by comparing the camera's output to a standard image. Vuforia detects and zeroes in on regions with a high concentration of feature points, such as bright regions, curved edges, and straight ones. Vuforia's target manager provides a star rating based on heuristic analysis of the target, but this rating does not always reflect the target's actual detection and tracking performance in real time. Edge detection is utilized by Vuforia. Vuforia gives more credit to a high-contrast image if it contains more vertices or line and Unity will render the augmented image in real world environment. Simply When a user launches AR application for the first time, they will be presented with the introductory scene. The opening sequence will feature multiple residences. Users can select one of these options based on personal preference. From there, the app will launch the camera, at which point the user can focus on the image target; Vuforia will scan the image, and the results will be displayed

## Literature review

### Secondary Literature

Ikea IKEA's augmented reality (AR) app is one of the most well-known interior design augmented reality (AR) solutions. It enables users to try out pieces of furniture and decorations in the space they are in without having to measure it or make decisions they might later come to regret. They are able to navigate the product catalog and select items to drag and drop into the location of their choosing. AR+ mode is an enhanced version of Pokémon GO's augmented reality feature in which Pokémon appear anchored to your real-world environment right in front of you. This mode can be accessed by selecting the AR+ mode option from the main menu. You are free to approach a Pokémon at any distance, giving you the opportunity to earn an Excellent Throw bonus or provide the backdrop for the perfect photo.

### Primary literature

The application will have an augmented reality feature that, when activated, will give the user the ability to view a three-dimensional virtual model of the apartment or house that is being shown to them when they scan an image of it using their phone. This will help to make the process of showing homes more successful and efficient. It is going to be tested designing the straightforward user interface of the iPhone application where the user will be looking at real estate listings.

## Project plan

A well-thought-out strategy that details the project's phases and milestones should be developed before work begins on any endeavor. A well-thought-out plan for the project is crucial to its ultimate success. The following project plan has been created to ensure that this project is completed on time and successfully:

Task Id	Task Name	status	Duration	start	finish
0	Augmented reality on Ecommerce	in progress	80 days	10/12/2022	01/01/2023
1	Project initiation	in progress	10 days	10/12/2022	11/1/2023
1.1	start	completed	0 days	10/12/2022	10/12/2022
1.2	Finalize Research Topic	completed	0 days	10/12/2022	10/12/2022
1.3	Topic Review	pending	0 days	10/12/2022	10/12/2022
1.4	Proposal Draft	pending	7 days	10/12/2022	10/19/2022
1.5	Proposal Documentation Review	pending	2 days	10/19/2022	10/22/2022
1.6	Final Proposal Submission	pending	1 days	10/23/2022	10/23/2022
2	Research and Planning	pending	9 days	10/24/2022	11/2/2022
2.1	Observation	pending	2 days	10/24/2022	10/25/2022
2.2	Book Reading	pending	5 days	10/26/2022	10/30/2022
2.3	Case Reading	pending	2 days	10/31/2022	11/2/2022
3	Literature Review	pending	10 days	11/3/2022	11/12/2022
3.1	Search Existing Topics	pending	5 days	11/3/2022	11/7/2022
3.2	Prepare Draft Literature Review	pending	5 days	11/8/2022	11/12/2022
4	Data Collection	pending	10 days	11/13/2022	11/22/2022
4.1	Data Collection	pending	5 days	11/13/2022	11/17/2022
4.2	Data Analysis and Interpretation	pending	5 days	11/18/2022	11/22/2022
5	Execution	pending	15 days	11/23/2022	12/7/2022
5.1	Get 3D Model	pending	1 days	11/23/2022	11/23/2022
5.2	Coding	pending	13 days	11/24/2022	12/6/2022
6	Testing	pending	1 days	12/7/2022	12/7/2022
7	Closure and Handover	pending	25 days	12/8/2022	1/2/2022
7.1	Analyze results	pending	1 days	12/8/2022	12/8/2022
7.2	Implement and install the solution	pending	1 days	12/9/2022	12/9/2022
7.3	Documentation Draft	pending	20 days	12/10/2022	12/29/2022
7.4	Documentation Review	pending	1 days	12/30/2022	12/30/2022
7.5	Final Documentation Submission	pending	2 days	1/1/2022	1/2/2022
7.6	End	pending	0 days	12/1/2022	12/2/2022

Figure 3: project plan

## Conclusion

Augmented Reality opens up a variety of new business prospects. Potential real estate buyers can already visit the property in 3D using AR before making the effort to travel there. AR also gives completely new marketing potential for realtors by utilizing location-based services while also offering the buyer with a one-of-a-kind experience. These days when it is becoming incredibly hard to get a buyer's undivided attention, Augmented Reality could make a significant difference in increasing engagement with potential clients and differentiating your company from the competition. AR technology will improve further, and the real estate business will find new and fascinating applications for it. The real estate business has the potential to be reshaped by augmented reality. Embracing augmented reality technology can help realtors differentiate themselves from the competition by giving clients a one-of-a-kind experience.

## SWOT ANALYSIS

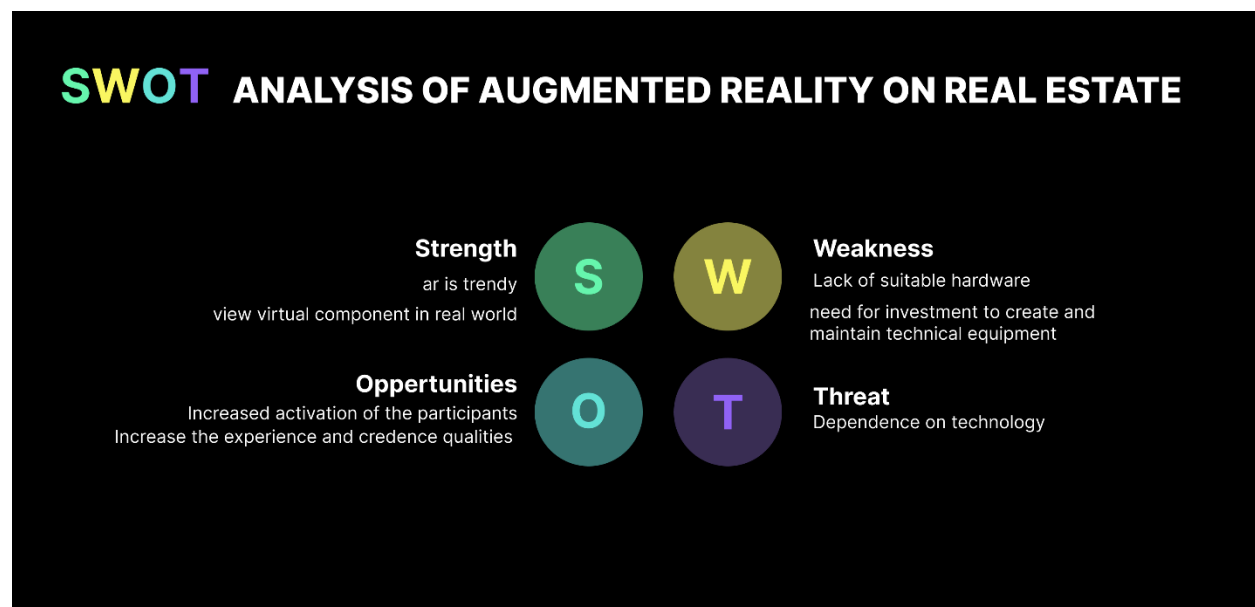


Figure 4: SWOT Analysis of Augmented Reality on Real Estate

## Reference

- Veronika Lang, Peter Sittler, Augmented Reality for Real Estate. 18TH Annual Pacific-Rim Real Estate Society Conference Adelaide, Australia,

- Rankohi, S., Waugh, L. Review and analysis of augmented reality literature for construction industry. Vis. in Eng. 1, 9 (2013). Nilsson, Jonas, Anders C. E. Ödblom, Jonas Fredriksson, Adeel Zafar and Fahim Ahmed. "Performance evaluation method for mobile computer vision systems using augmented reality." 2010 IEEE Virtual Reality Conference (VR).
- J. Chun and B. Lee, "Interactive Manipulation of Augmented Objects in Marker-Less AR Using VisionBased Hand Interaction," in Information Technology: New Generations, Third International Conference on, Las Vegas, Nevada, USA, 2010 pp. 398-403. doi: 10.1109/ITNG.2010.36
- Zhou, F., Duh, H.B.L., Billinghurst, M. (2008) Trends in Augmented Reality Tracking, Interaction and Display: A Review of Ten Years of ISMAR. Cambridge, UK: 7th IEEE and ACM International Symposium on Mixed and Augmented Reality (ISMAR 2008),
- Huang, Yetao & Liu, Yuanan & Wang, Yongtian. (2009). AR-View: an Augmented Reality Device for Digital Reconstruction of Yuangmingyuan. 3 - 7. 10.1109/ISMAR-AMH.2009.5336752.
- Ababsa and M. Mallem, "Robust camera pose estimation combining 2D/3D points and lines tracking," 2008 IEEE International Symposium on Industrial Electronics, 2008, pp. 774-779, doi: 10.1109/ISIE.2008.4676964