

Smart Home Interior Design for Accomplished Features Using Image Processing

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ABSTRACT:

It's difficult to decorate your home with the right things. Our goal is to create an Android app that will take a picture of the user's bedroom and allow them to visualise it with various interior design elements, such as wall paint, carpeting, and curtains. Applications that imitate a furniture arrangement frequently take advantage of augmented reality. We'll talk about an augmented reality system for home displays that leverages fast corner detection and provides real-time tracking without identification markerse. Though generally limited to a 2D tablet or phone interface, such systems frequently demand users to physically and regularly alter their viewpoint of the real world, which necessitates human manipulation of the same. We have created a system that automatically determines the best view point to enhance comprehension of the room layout overall and makes it simple for the user to change the view point in order to help solve this issue.

Key Words: Augmented reality, interior design.

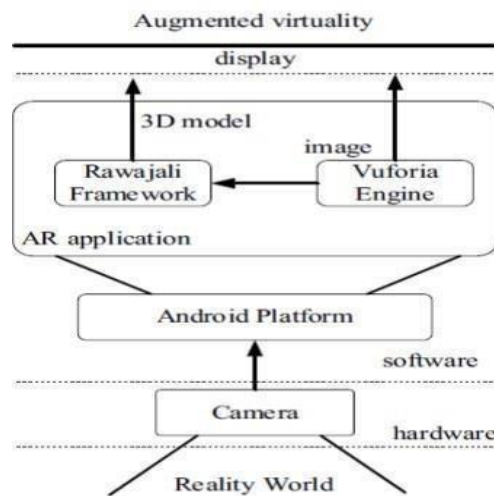
INTRODUCTION:

Incorporating computer-generated sensory input including music, video, graphics, or GPS data, augmented reality (AR) is a live, direct or indirect depiction of a physical, real-world environment whose elements are improved (or supplemented). It is associated with the more general idea of reality when a computer alters (perhaps even lessens rather than augments) the perception of reality. Technology thus enhances the way that people now perceive reality. The elements of the digital world are revealed in our perception of the real world thanks to augmented reality. As an end-user application (for a customer looking to buy furniture), this effort on the use of augmented reality for home furnishings could be quite beneficial. It provides furniture models in 3-D animation as well as instructions that are connected to the job domain. A popular field of research in recent years, augmented reality (AR) exploits innovation to bring together the physical and digital realms. AR incorporates digital objects into the real scene while offering users the feeling of realistic immersion because it is based on computer graphics and related techniques for image processing. AR focuses more emphasis on transferring the real scene to the virtual world that Virtual Reality (VR) would. The user experiences the digital image as if it resembled an authentic scenario given that it selects a real-world scene and adds an imaginary thing to it. In AR technology, marker systems and markerless systems are the two methods for connecting virtual and physical objects.

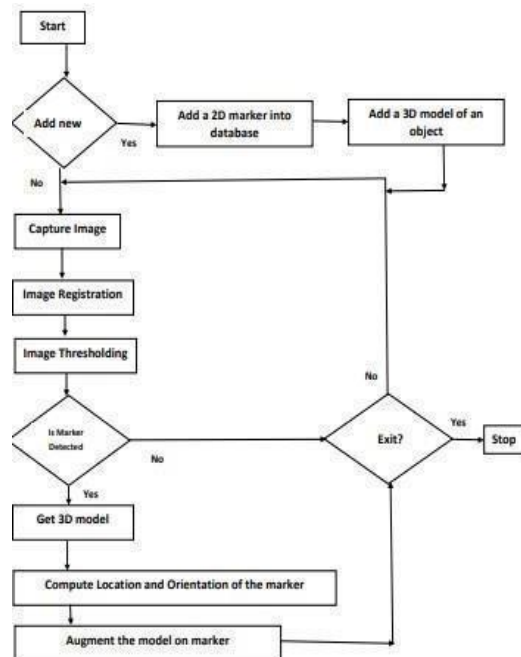
DESIGN:

This picture depicts all of the entities that are currently incorporated into the system in a succinct and understandable manner. The figure depicts how the various actions and options are linked together. the entire process and how it was carried out may be described as a picture. The diagram below depicts the functional relationships between distinct things.

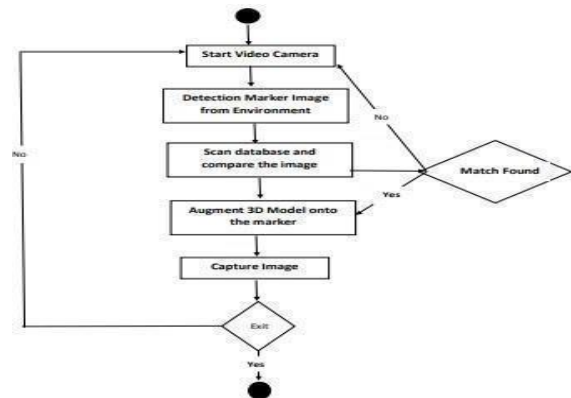
Architecture diagram:



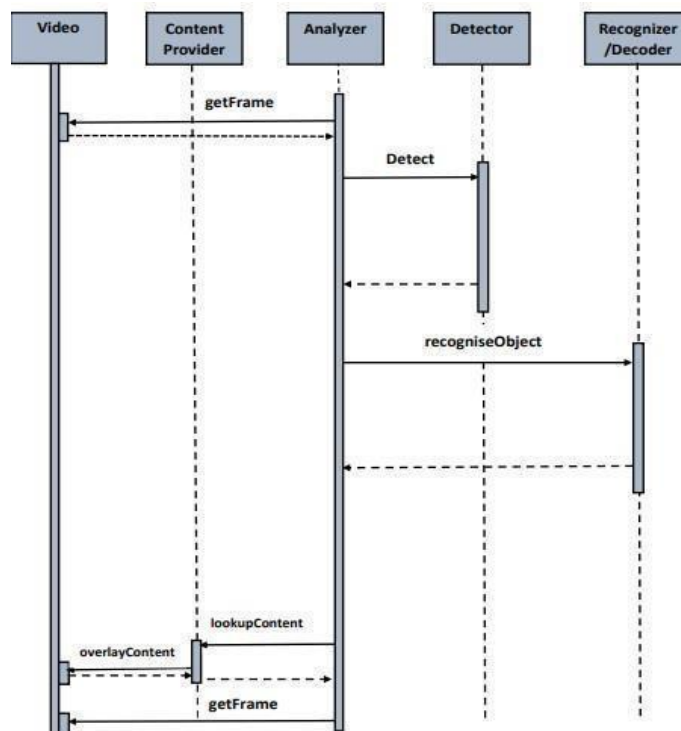
Data Flow Diagram:



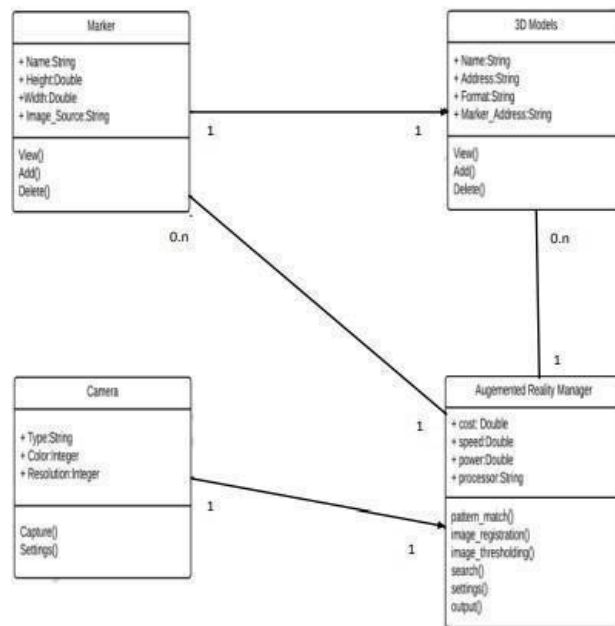
Activity Diagram:



Sequence Diagram:



Class Diagram:



LITERATURE SURVEY:

Using floor plans based on planar object tracking,[1] Taiki Fuji, Yasue Mitsukura, and Toshio Moriya created the furniture layout AR application.

Advanced Computer and Communication Engineering International Journal This system will help buyers who want to buy furniture in a real environment. Customers will use it to determine how to set up furniture in the house. Customer has no option to choose his desired furniture. 2019

For a video-based augmented reality conferencing system,[2] Hiro Kazu Kato, Mark Billingshurst, marker tracking, and head-mounted display calibration were used. the ICIP, an annual conference of the IEEE on image processing, a technique for following fiducial markers and a calibration method for optical see-through HMD based on the marker tracking.2018

EXISTING SYSTEM:

Hiring a pro and viewing the store: This is one of the most conventional and prevalent methods for assisting the user with comprehending the required furniture and interiors.

Ikea Place is an iOS app that demonstrates furniture that can be seen in Ikea outlets, manufactured by the Swedish furniture powerhouse.

PROPOSED SYSTEM:

You can design interiors on your own with the aid of a portable, self-governing Android application that uses modern technologies.

Using the current live video stream, this programmer adds a 3D model of the desired furniture in real-time.

As an outcome, it supports the customer who is interested in purchasing a particular piece of furnishing through allowing them to engage with the system virtually and in actual time to ensure that the piece fits precisely.

Through the help of the suggested approach, the individual using it can have a rough idea of the furnishings in the position they want.

MODULES:

Module	Primary Actor
1. Capture Image Module	Camera
2. Add a Marker Module	Developer
3. Add a 3D Model Module	Developer
4. Detect Marker in Environment Module	Augmented Reality Manager
5. Capture marker image with database Module	Augmented Reality Manager
6. Augment 3D model on the marker Module	Augmented Reality Manager

Module-1: Capture Image Module

Primary Actor: Camera

In this module the image of the environment is captured using a camera that is available in the mobile device. This module has the primary actor as a camera. The goal is to capture live images which will be used for detection. The main step is to capture the image with a plain background like a wall, which does not have many colours or textures. This will reduce the time required for marker detection.

Module-2 Add a Marker Module

Primary Actor: Developer

This module helps the user to augment new modules into the database. When a user requests for new models, the developer creates it hence making the developer as the primary actor. In case, if the end user wants new objects to be augmented, then the developer has to create a new marker. A new 2-D, black and white marker is created and added into the database of existing markets.

Module-3 Add a 3D Model Module

Primary Actor: Developer

In this module if the user wants new models to be augmented, the developer adds a new model into the database. Hence, developers are the primary actor. In case, if the end user wants new objects to be augmented, then the developer has to create a new model.

- 1) A new 3-D model, similar to the objects to be augmented, then the developer has to create a new model.
- 2) Add this new model in the database of existing models.

Module-4 Detect Marker in Environment Module

Primary Actor: Augmented Reality Manager

In this module, the system captures a live stream of images in order to compare them with predefined markers by separating the foreground and background. The primary actor here is an augmented reality manager. The system captures a live stream of images in order to compare them with predefined markers. In order to simplify the above procedure, we make use of black and white markers and thereby first perform image thresholding onto the captured image, to obtain a binary image.

Module-5 Capture marker image with database Module

Primary Actor: Augmented Reality Manager

In this module, the manager provides a Boolean result by checking if the item is present in the database or not. Here the primary actor is the Augmented Reality Manager. Manager must perform pattern matching to provide a Boolean result i.e. present or not. The system first extracts the salient features of the image like corners, edges, curves etc. which will help in comparison with existing markers. Based on comparison, if the match is above a particular threshold level then true is given as the output else false.

CONCLUSION:

The application is beneficial and useful for managing the interior design tasks. Everyone can utilize it as it was developed for Android devices. No signup or chat bot prerequisites. You can pick from an extensive collection of furnishings, no matter where the store. Time and economic efficiency. The potential uses of this project have been determined to be suitable for e-commerce and can be implemented for expanding the range of furniture companies' services can be implemented by one individual to design their own residence.

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