

AUGMENTED REALITY



Project Guide:

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What is Augmented Reality?

- Augmented reality is a live direct or indirect view of a physical, real-world environment whose elements are augmented by computer-generated sensory input such as sound, video, graphics or GPS data.
- The technology used to enhance images with multiple layers of other information is useful in fields where visualizing images can be difficult.

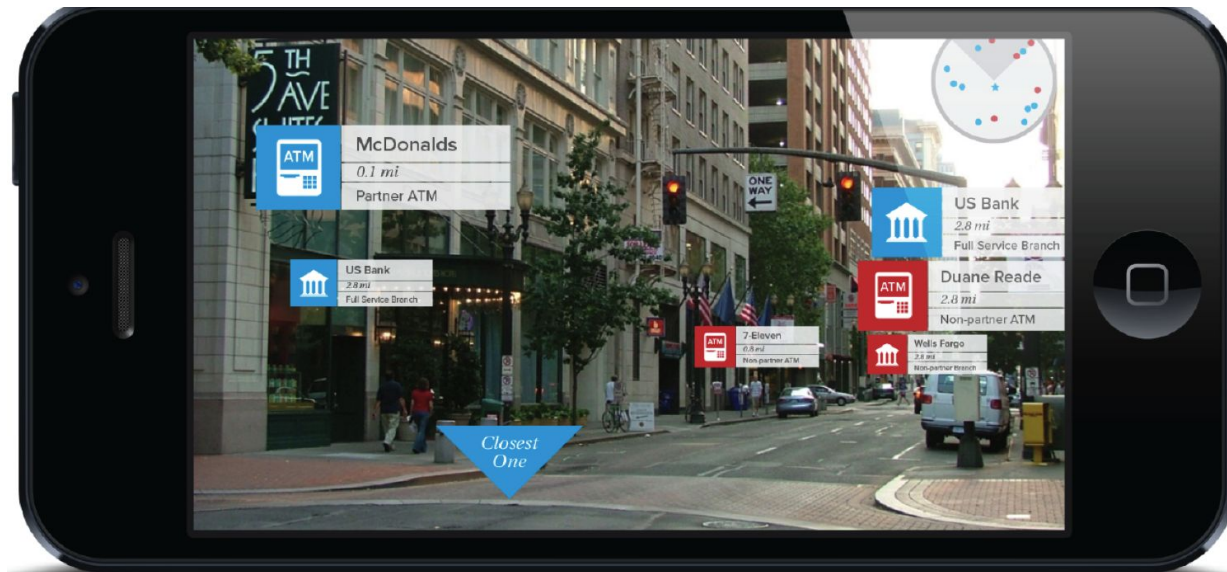


Figure : GPS based location info with AR

Types of AR

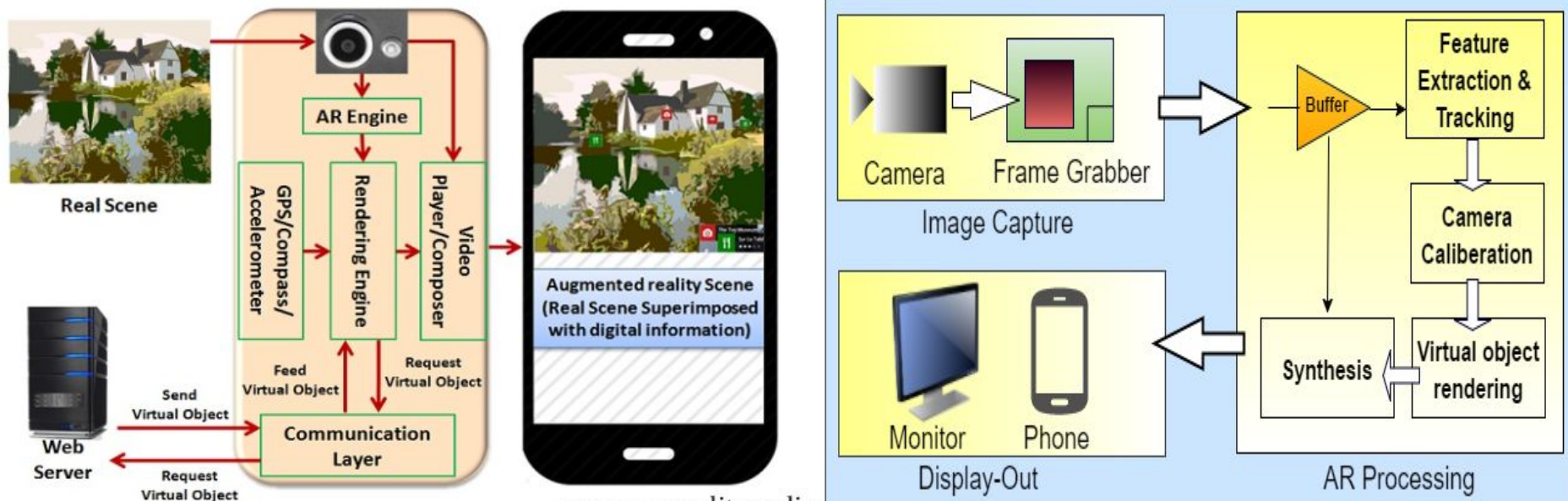
Currently there are two forms of AR available:-

1. Location aware AR

It presents digital information to the users as they move through physical areas with GPS enabled smart phones or similar devices.

2. Vision based AR

It presents digital information to the users as they point camera to a particular object.



Modes of Tracking

- AR applications based on tracking can be classified into the following:

1. Marker-based AR



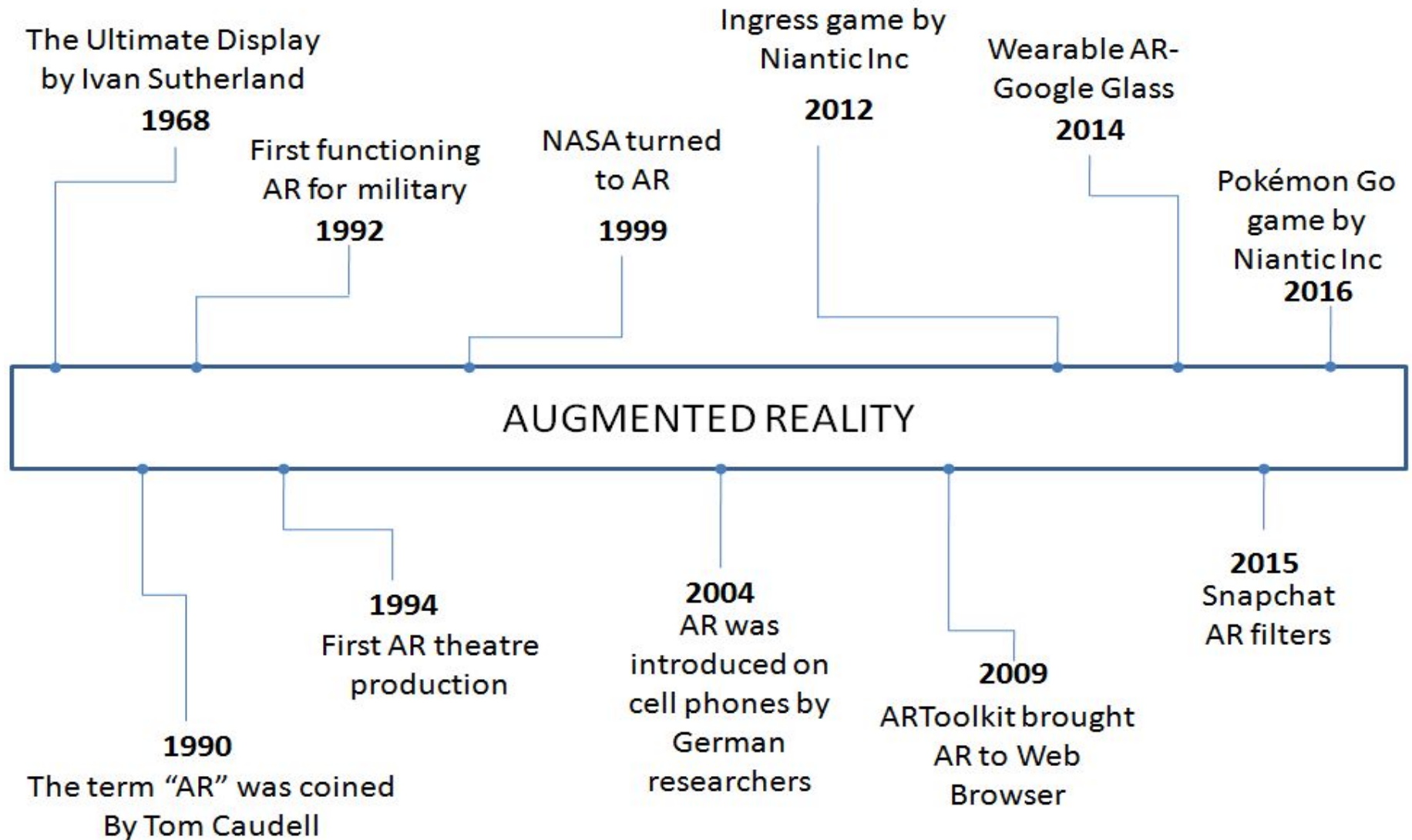
2. Markerless AR



Applications

- Direction
- Sightseeing
- Military
 - Gaming
 - Medical
 - Education
 - Entertainment
- Manufacturing, Maintenance and Repair:
- Home Décor
- Other applications

Evolution of AR



Scope of Project

- After installing Interior Illusions, users can try a variety of products at home before buying from the shop. The entire augmented product line of a shop can be made accessible via a virtual product showroom in 3D augmented reality, to the users from anywhere at anytime as opposed to the current process of interior decor wherein the user has to go visit several shops, take measurements, samples, change placements as per the look, need, etc which is a lot of work, thereby allowing users to try products at home before buying from their shop.
- No longer will one have to guess if the sofa and side table will work with the size, layout and design of the room.
- The users will be more engaged when using the augmented product catalogue compared to a traditional printed one.
- It will also reduce the number of physical samples and costs.

Problem Statement

- These days, markets have a variety of options in furniture, be it the materials, colour, texture or size. It's often difficult for a customer to choose one amongst all the options.
- It would be of great help if the buyer could visualize a set of sofa or dining table in his living room, whether it suits at a particular place or fits in size rather than being disappointed later.
- Our mobile application, helps the user to visualize the furniture from the database options and also allows the user to place the item in the space they're shopping for, view it from different angles, and determine if it is of the right size for their home or office.
- It helps the user simulate furniture and interior design products of their choice in 3D augmented reality in real time in the real environment from the convenience of their smartphone or tablet.



How It Works?

- **Camera, Acquisition & Tracking**

Smartphone camera is matured enough that it can recognize real world objects without markers. The app works with the camera device to interpret the angles and distance of mobile phone from where the object is to be placed.

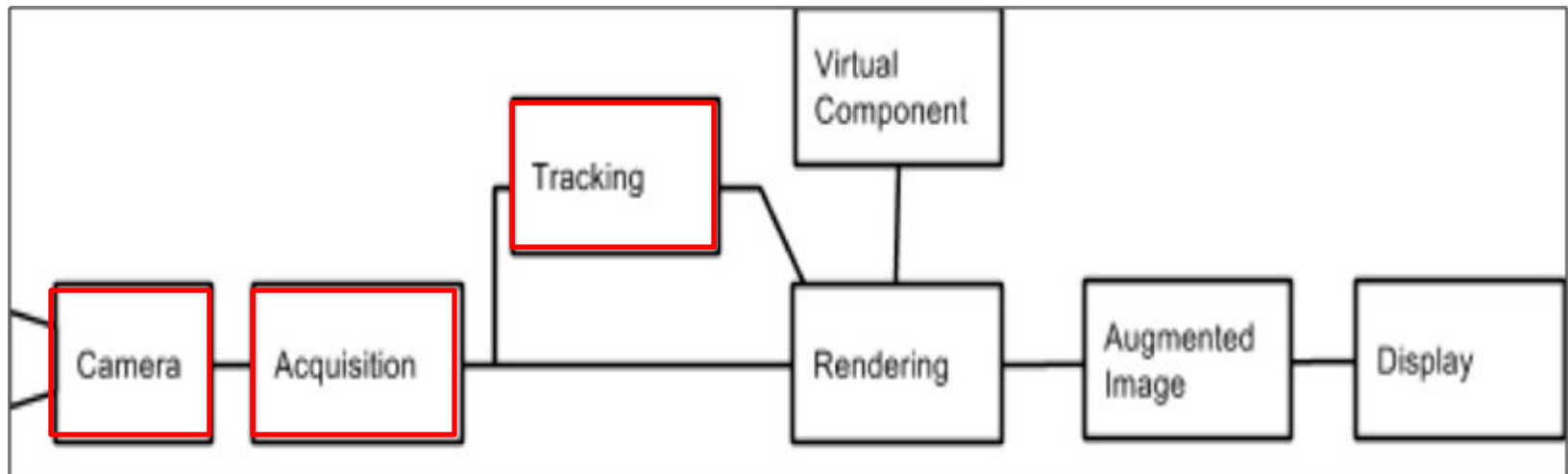


Figure: Procedure Description Block Diagram

How it Works?

•Virtual Component

Models will be created, with reference to rough sketch, in Blender. The texture map can be styled to fit the needs of the project, and it is where much of the realism of the model is conveyed. This virtual component will be imported from database to render with real environment.

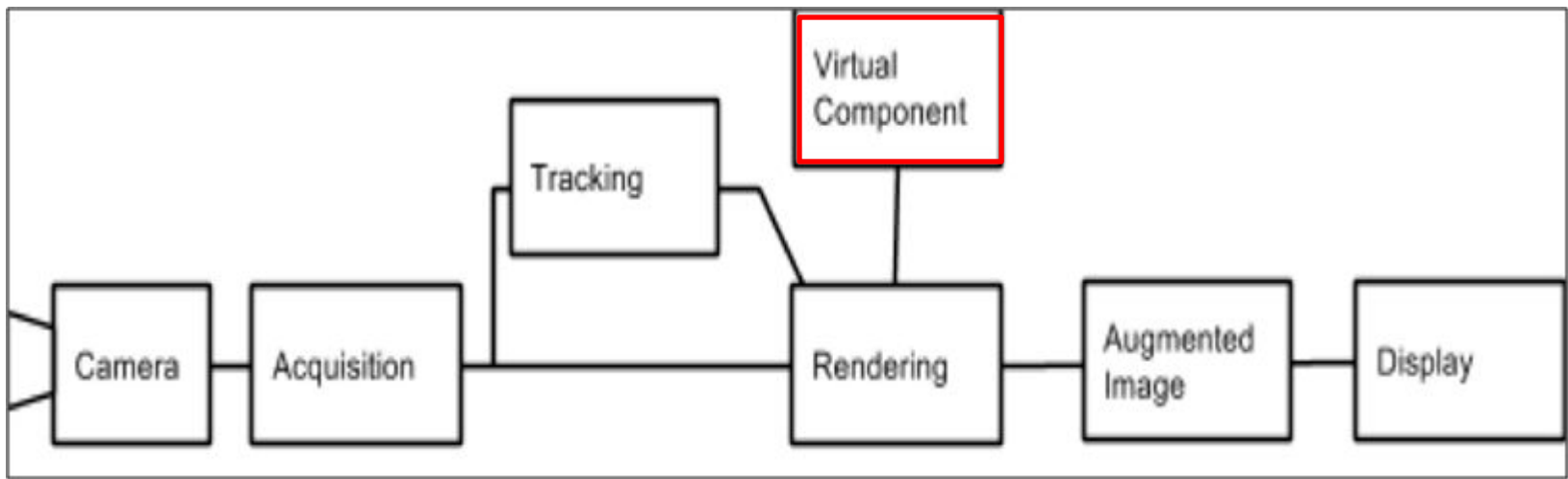


Figure: Procedure Description Block Diagram

How it Works?

•Rendering

In this stage, the virtual object created is overlaid on the real world. It takes care of aligning, positioning the virtual component and projects it in the scene. Scripting languages like C# and Javascript are used for implementing the application.

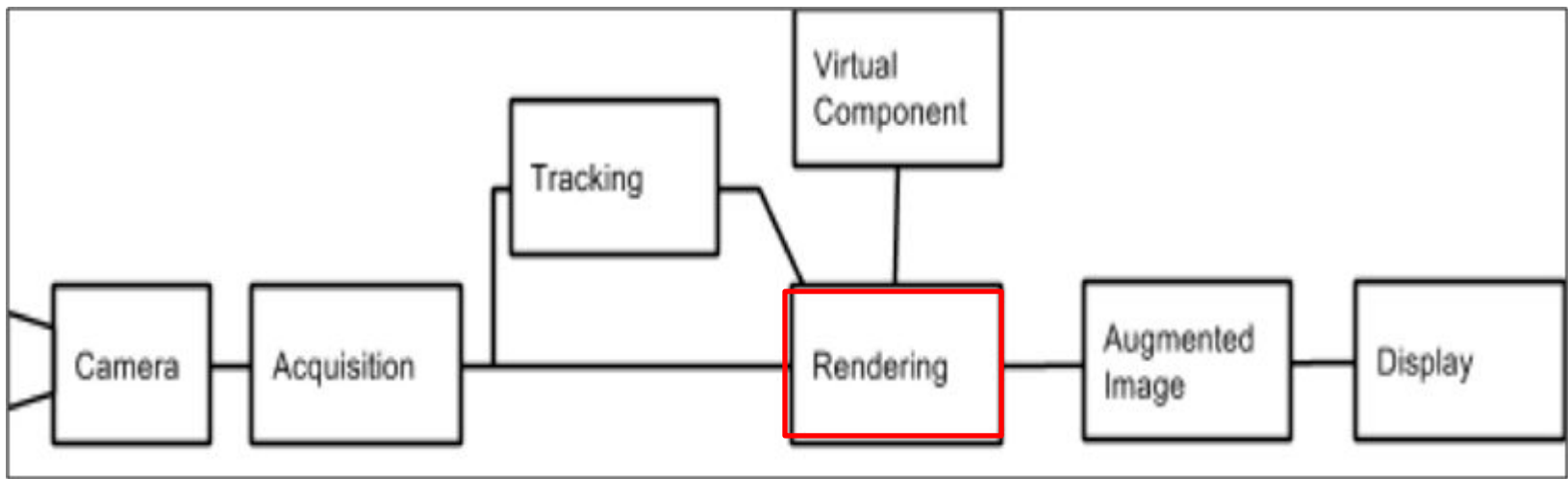


Figure: Procedure Description Block Diagram

How it Works?

- **Augmented Image & Display**

As can be seen in the image, an augmented object, in this case a table has been placed in the real life environment pointed by the camera. The object is movable as well as resizable as per the user's view and satisfaction.

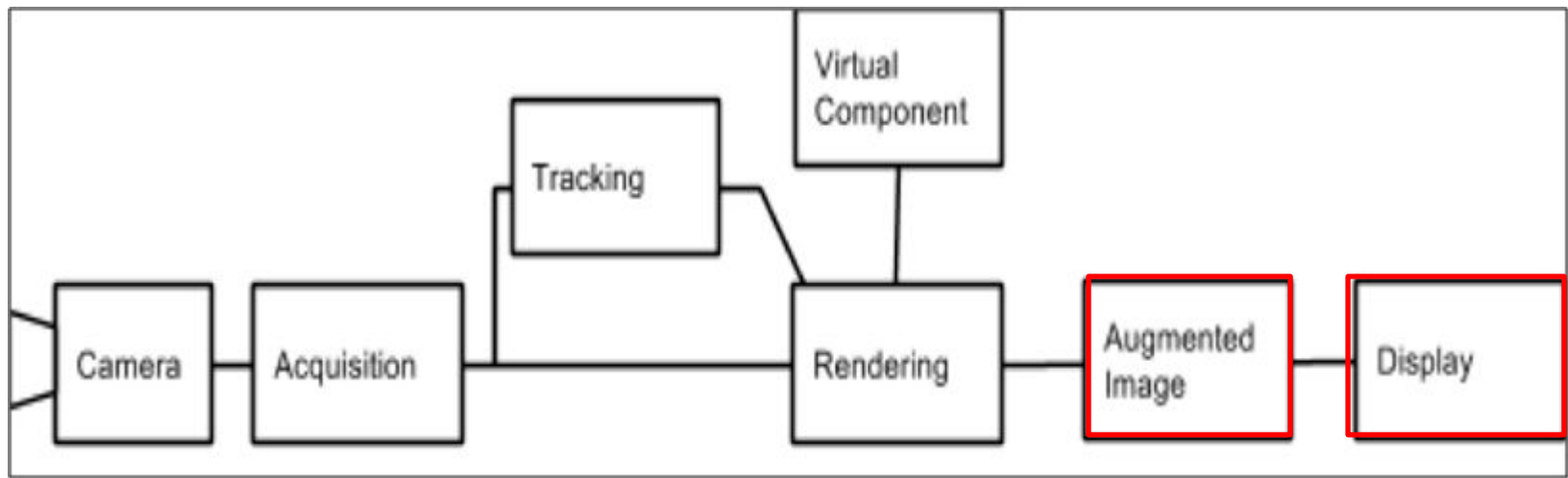


Figure: Procedure Description Block Diagram

Workflow

Objects are **modeled** using Blender.

Apply **Texture** to these 3D objects

3D models are then **imported** to Unity as **assets**

Rotate AR object: This feature is added to view furniture from different angles.

3D model assets are superimposed onto real environment. (**AR scene**)

User Interface : Various items are displayed along with their details according to their types.

Database: All the information is stored. It includes item details, images, blender objects, etc.

PHP server is implemented to retrieve data from the database into our application.

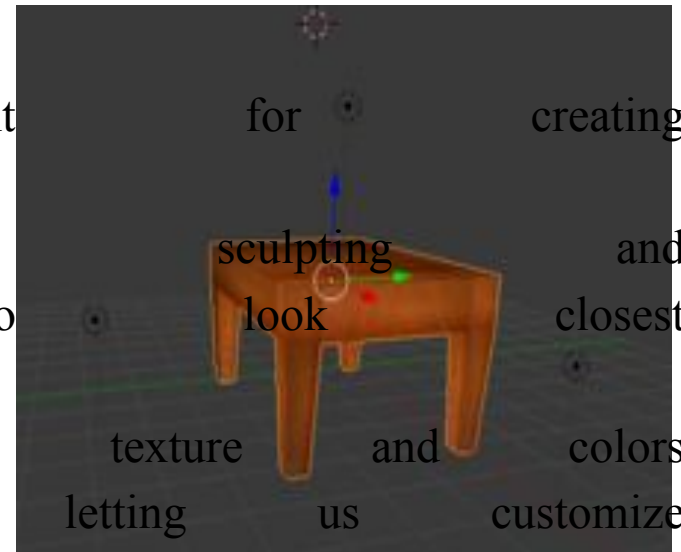
Softwares Used



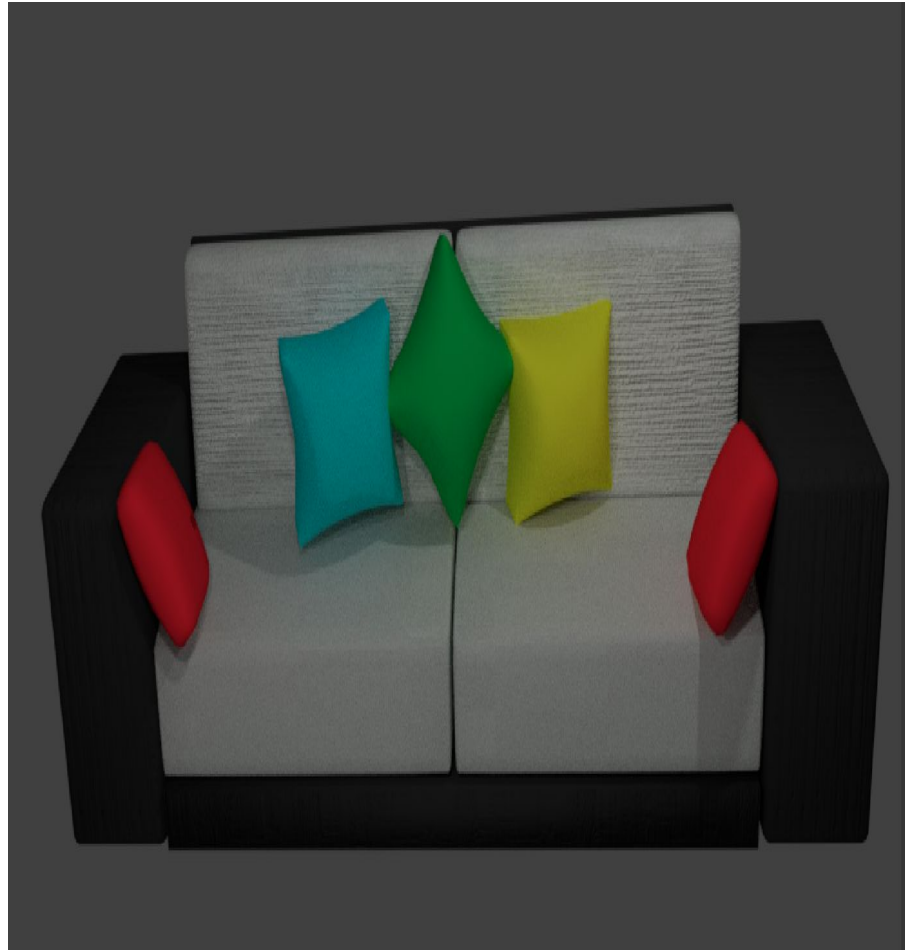
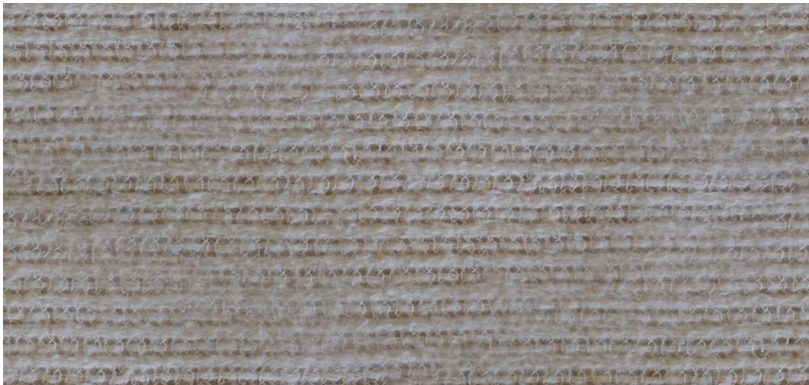
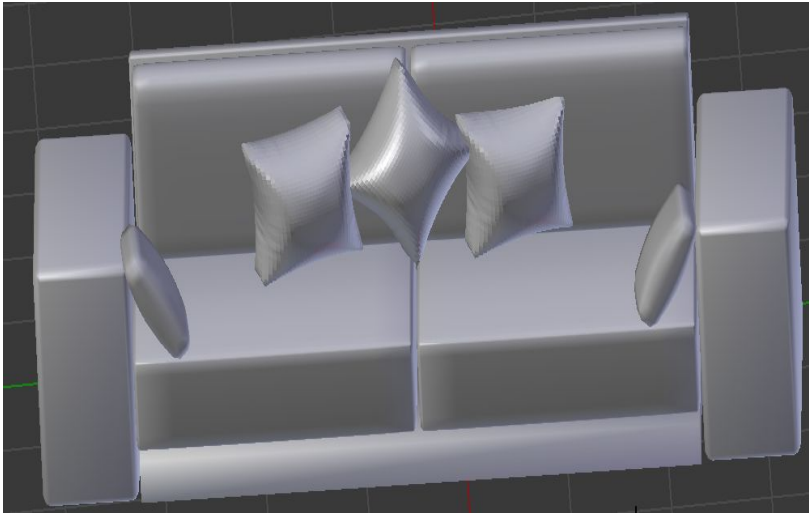
Blender is a open-source 3D computer graphics software product used for 3D modeling, UV unwrapping, texturing, sculpting, animating, camera tracking.

Use in Interior Illusions:

- Blender is important for creating 3D models of furniture.
- It allows modelling, sculpting and animating objects, to look and closest to real life objects.
- It also lets us add texture and colors to the furniture, thus letting us customize it as per manufacturer's demands.
- This 3D models are later imported as assets in unity.



Object Modeling

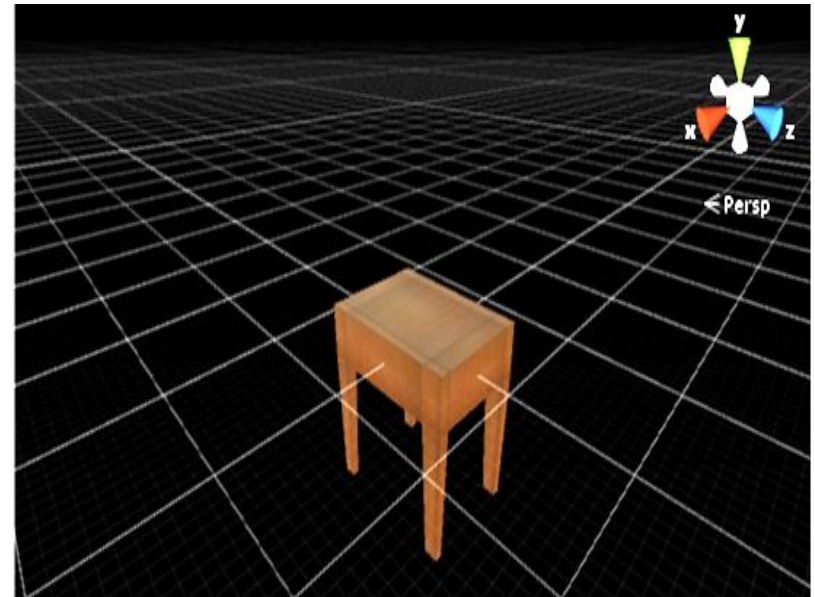




Unity is a cross-platform game engine developed by Unity Technologies and used to develop video games for PC, consoles, mobile devices and websites.

Use in Interior Illusions:

- a. Kudan supports unity 64-bits.
- b. It will be used developing and components of the app.
- c. It also deploys the app in mobiles, tablets, etc.
- a. It will allow i.e. zoom in and zoom out.



Rotating Augmented Object



For the ease of user, the feature is added to view furniture in all angles.





The Kudan SDK gives developers a robust and lightweight Augmented Reality engine for iOS, Android and Windows powered devices. Compared to what is currently available in the Augmented Reality market today it offers greater flexibility and more features to aid the creation of quality computer vision based applications, without the need for specialized knowledge.

Use in Interior Illusions:

Kudan will be used to build major components of our app. Some of them being

- a. Superimposing objects(furnitures,etc) in environment without marker.
- b. Tracking the object placed.
- c. Camera acquisition and placing objects at desired position.



Augmented Scene

A lightweight Augmented Reality engine Kudan is used.

It allows superimposition and tracking of 3D objects onto the real environment.





MySQL, Apache & PHP

Use in Interior Illusions:

- MySQL is used to store models, images and descriptions of individual items along with their cost and availability.
- Apache is used for client server communication. The app in individual mobiles are clients and server side displays pages for admin to insert or update the stock of furnitures.
- Apache helps connect to right webpage.
- PHP, being server side scripting language is used for communication.
- Blended with HTML, it is used for displaying options and menus from database on UI.

Why Interior Illusions?

- Without marker**

The use of markers everytime can be annoying, also markers need to be taken proper care of as they are specific and cannot be replaced for markers designed for other objects, unless a totally, new, similar unscratched marker is used.

- Wide range of products**

Augmented reality technology makes it possible for the customer to test drive different products in real time.

- Removing Barriers to Purchase**

Interior Illusions will help decrease common objections furniture shoppers often have when making the decision to purchase. Will it fit in my living room? How will it look? AR for retail is helping customers answer these questions themselves.

•Increasing engagement

Interior Illusions deliver personalized experiences that capture the attention of shoppers and stimulate them to engage with products. A greater level of customer engagement means higher conversion and loyalty rates.

•Increase in sales

Consumers are increasingly tech savvy who tend to make their purchasing decision from home or on a mobile device and once our app is downloaded it can be used anytime.

•Minimizing Returns

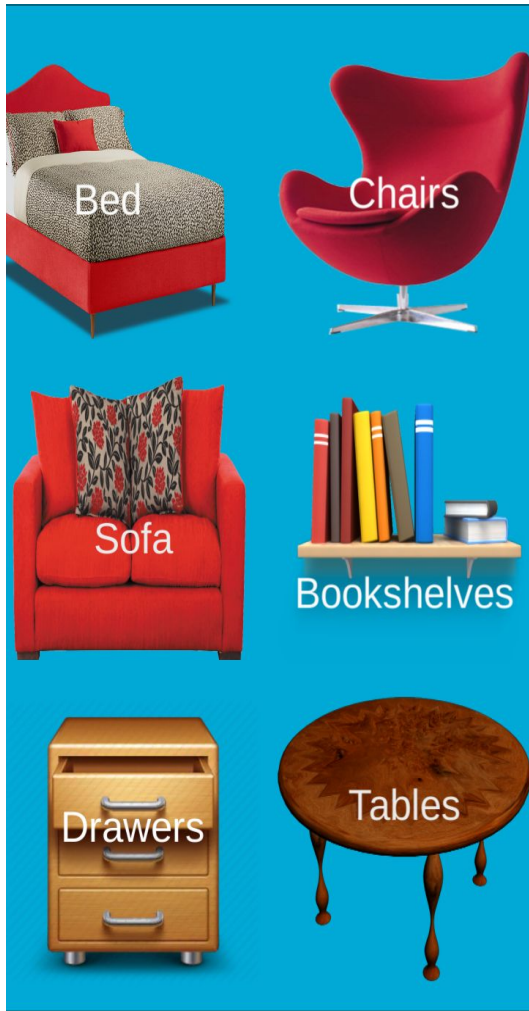
Ikea reports that up to 14 percent of its customers buy furniture that turns out to be the wrong size. Interior Illusions uses technology that accurately represents the scale of furniture, thus allowing customers to preview how they will fit in their rooms before taking them home.

•Better Marketing

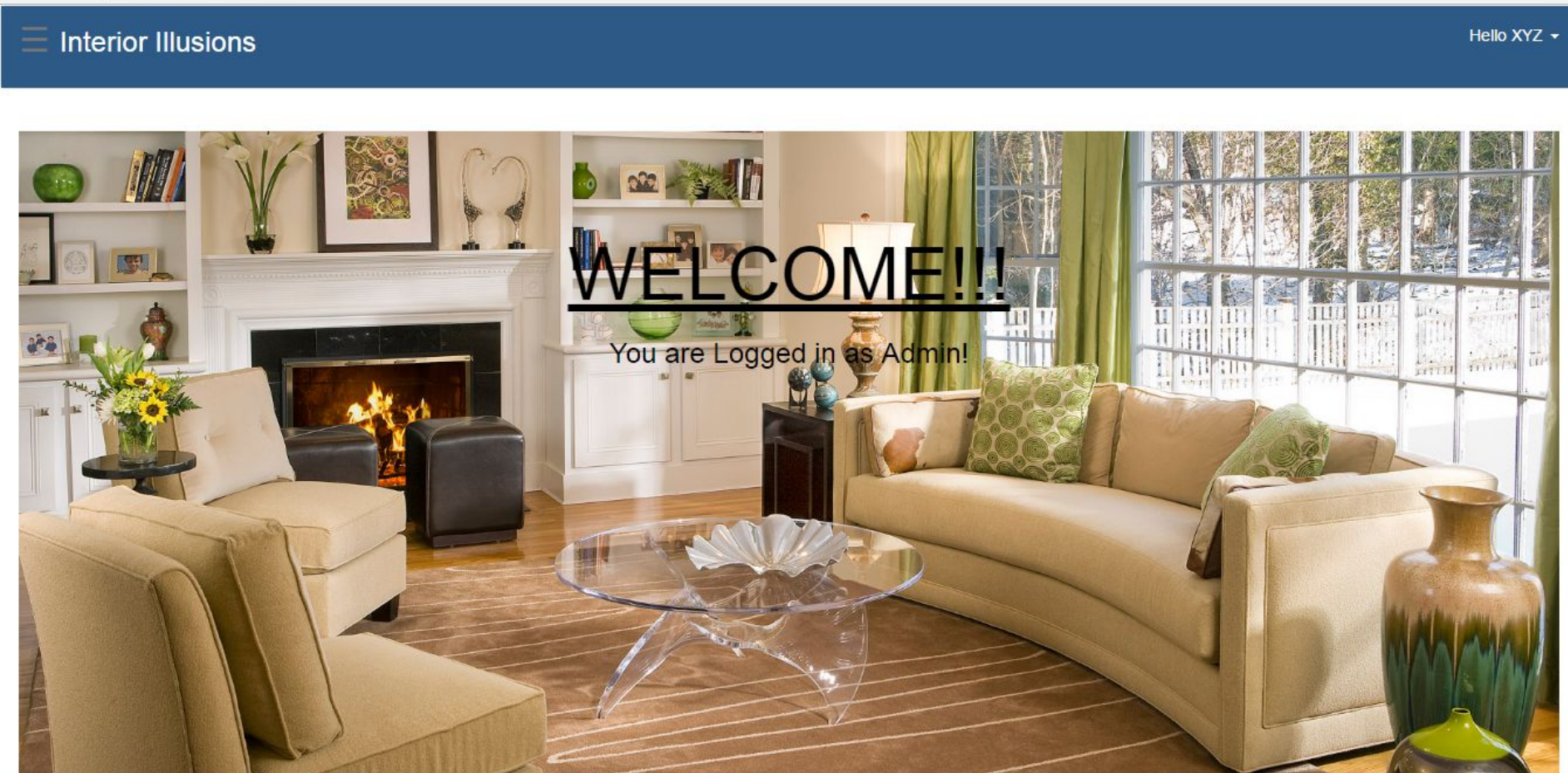
Interior Illusions uses Augmented reality which is fresh, fun technology that customers can play with and share with their friends through social media.

Some screenshots from our Project

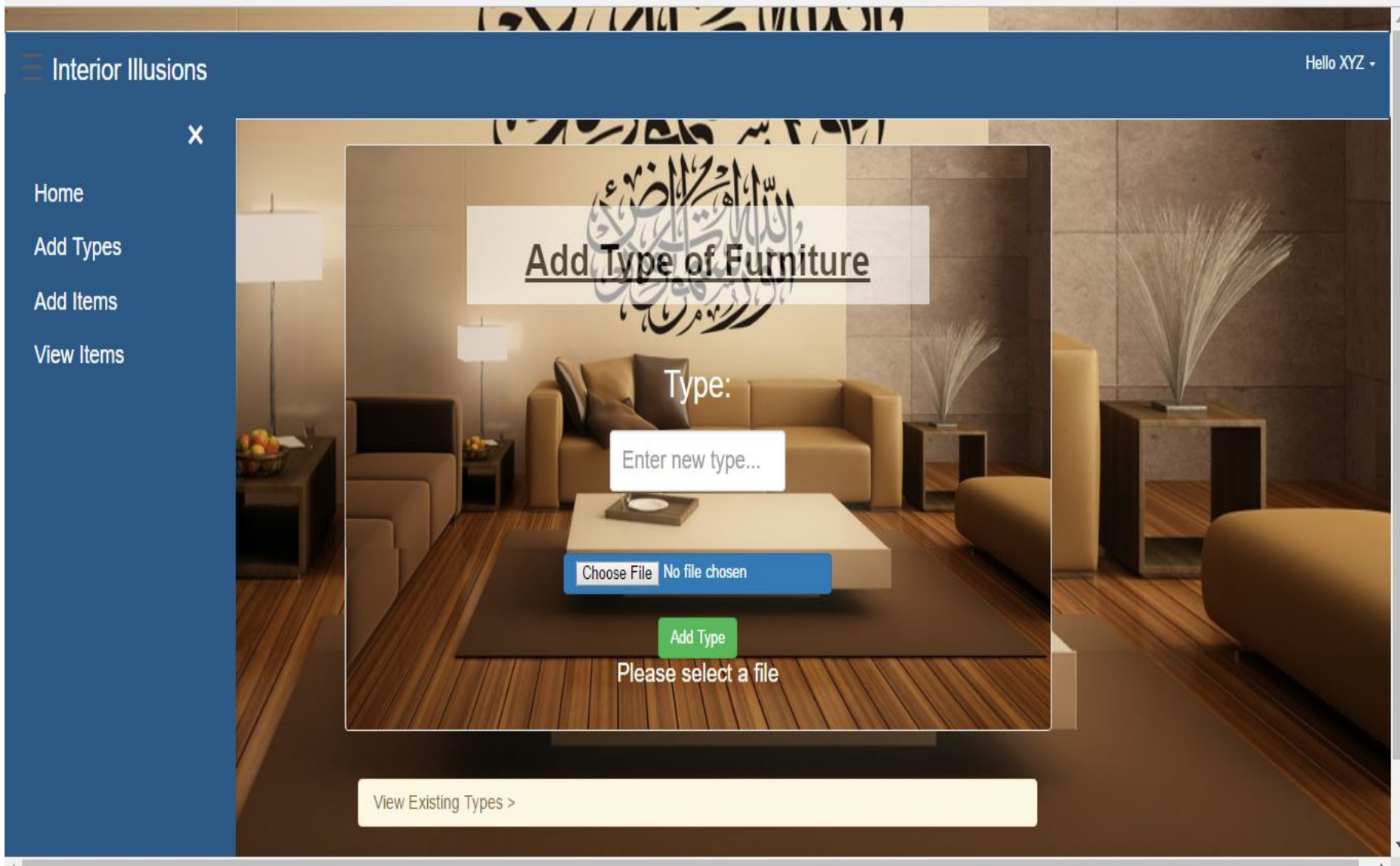
User Interface



Main page of web site









To add types of furniture into database



To view Types of furniture from database

View Existing Types v

Sr.	Type	Icon
1	Bed	
2	Sofa	
3	Table	
4	Chair	
5	Drawers	
6	Book Shelf	

To add objects details into database

Interior Illusions

Hello XYZ ▾

Name:

Name the item...

Type:

Bed ▾

Description:

Enter description...

Availability :

Enter availability...

Cost (INR) :

Enter price...

Upload Display Icon :

Choose File

No file chosen

Upload 3D-Model :

Choose File

No file chosen

Upload Texture File :

Choose File

No file chosen

Add Item

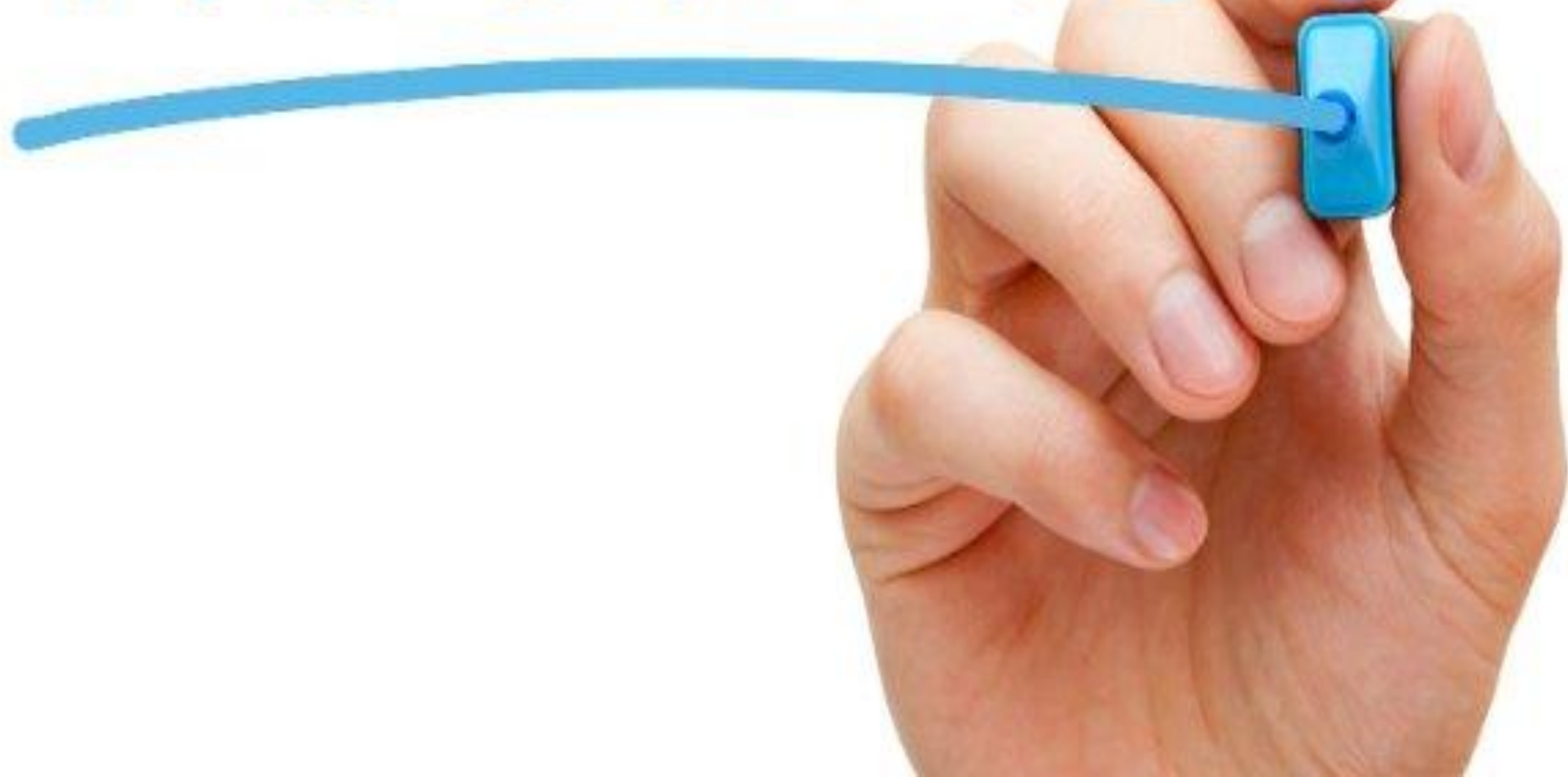
To view saved objects details from database

Interior Illusions

Hello XYZ

ID.	Name	Type	Description	Cost	Availability	Delete
39	My Super Slim Closet	Wardrobes	Single door, 6-foot tall, light brown color	10000	3	Delete
40	Inverted L-shape	Wardrobes	Black colored, 2 6-foot long doors, 4 Short doors	15000	5	Delete
41	Study desk	Table	Light-brown wide desk with drawers	9500	2	Delete
48	Simple Chair	Chair	Wooden, white colored chair	1500	10	Delete
49	Dining Chair	Chair	Wooden, simple chair	1250	10	Delete
50	Dining Room Sofa	Sofa	2-seater black-gray sofa with cushions	15000	3	Delete
51	Comfy Sofa	Sofa	Peach colored sofa with cushions	12250	4	Delete
54	King Bed	Bed	King-size wooden bed	25000	3	Delete
56	Kid's bed	Bed	Steel small bed	20000	3	Delete
59	Simple Table	Table	Wooden, brown colored table	8500	5	Delete
60	Fine Dine	Dining Set	4-chair dining set	30000	2	Delete

THANK YOU



Demo