OPERATING SYSTEM PROJECT FILE

CBCPC09

Innovate E-Commerce

Submitted To :-

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Chapter 1

INTRODUCTION:

Innovation can be defined as the creation of a new method, idea, product, etc., which leads to the introduction of new goods or services, increases efficiency or facilitates many processes. In terms of e-commerce, innovation also means the practical implementation of new ideas, processes, services, or products to address challenges, boost the bottom line, and raise efficiency.

The world of e-commerce is rapidly evolving and expanding, with new trends and technologies emerging all the time. As consumers increasingly turn to online shopping for convenience, affordability, and variety, e-commerce businesses face mounting pressure to stay competitive and offer innovative solutions that can attract and retain customers.

There are several new technologies that can be used to improve the e-commerce experience for customers. Here are some of the most promising ones:

Artificial intelligence (AI): AI-powered chatbots and virtual assistants can help customers find products, answer questions, and provide personalized recommendations based on their browsing history and preferences. AI can also be used to optimize pricing, personalize promotions, and detect fraud.

Augmented reality (AR): AR technology can allow customers to visualize products in a real-world environment, helping them to make more informed purchase decisions. For example, customers can use AR to see how furniture would look in their home or how clothes would fit on their body.

Virtual reality (VR): VR technology can create immersive shopping experiences, allowing customers to browse products and explore stores in a virtual environment. This can be especially useful for online retailers who want to recreate the in-store experience and build stronger brand connections with customers.

Blockchain: Blockchain technology can help to improve the security and transparency of e-commerce transactions, reducing the risk of fraud and increasing trust between buyers and sellers. It can also be used to create loyalty programs and incentivize customer engagement.

Voice commerce: Voice assistants like Amazon Alexa and Google Assistant can be integrated into e-commerce platforms, allowing customers to make purchases with their voice. This can make the shopping process faster and more convenient, especially for customers who are multitasking or have disabilities.

These are just a few examples of the new technologies that can be used to improve the e-commerce experience for customers. By leveraging these technologies, e-commerce businesses can create more personalized, engaging, and convenient shopping experiences that meet the evolving needs and expectations of modern consumers.

As part of this project we will only explore two such technologies:

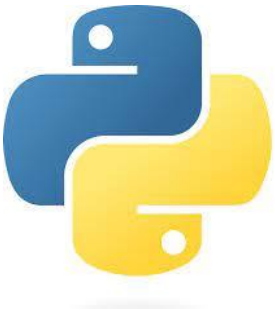
1- Augmented Reality

2- Artificial Intelligence

Tech Stack:

- Keras
- Flask
- Kotlin

- Java
- Python
- Numpy
- pandas
- Tensorflow
- Unity
- HTML



PROPOSED METHODOLOGY

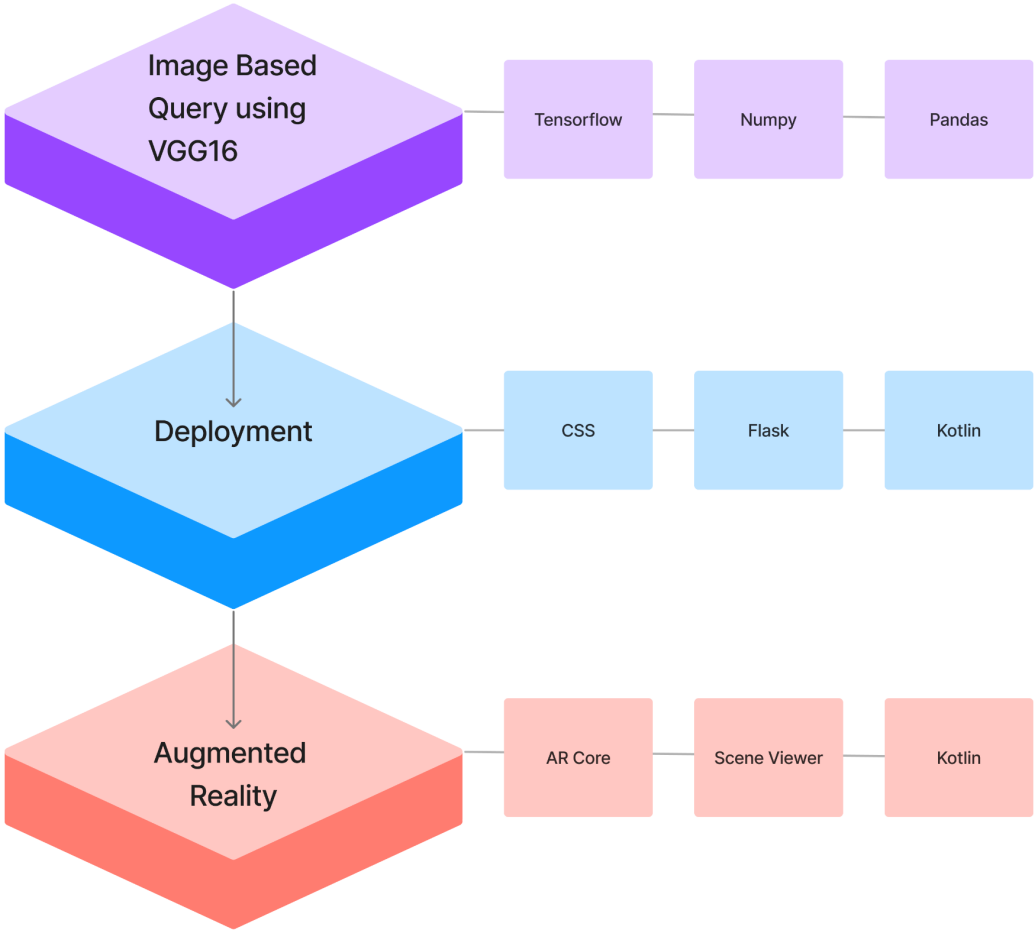
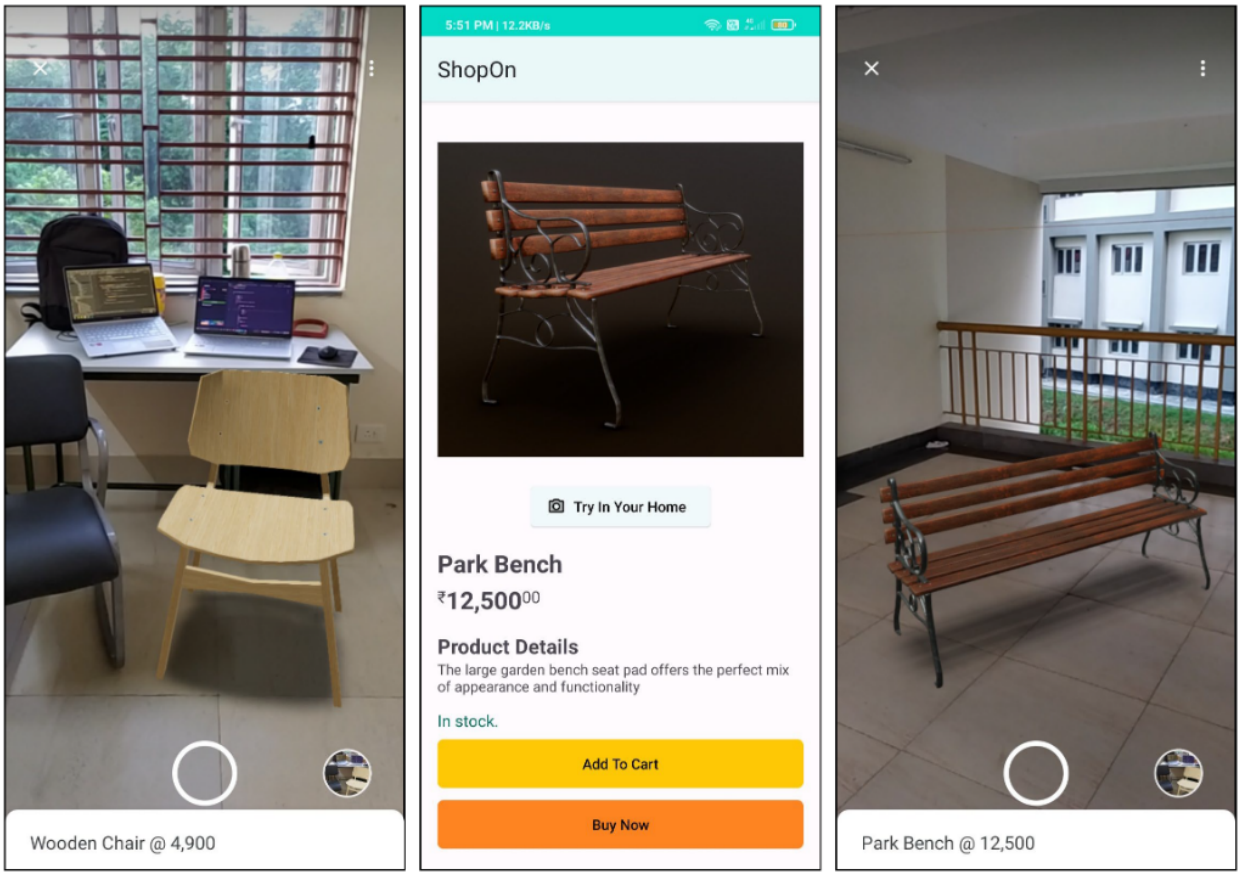
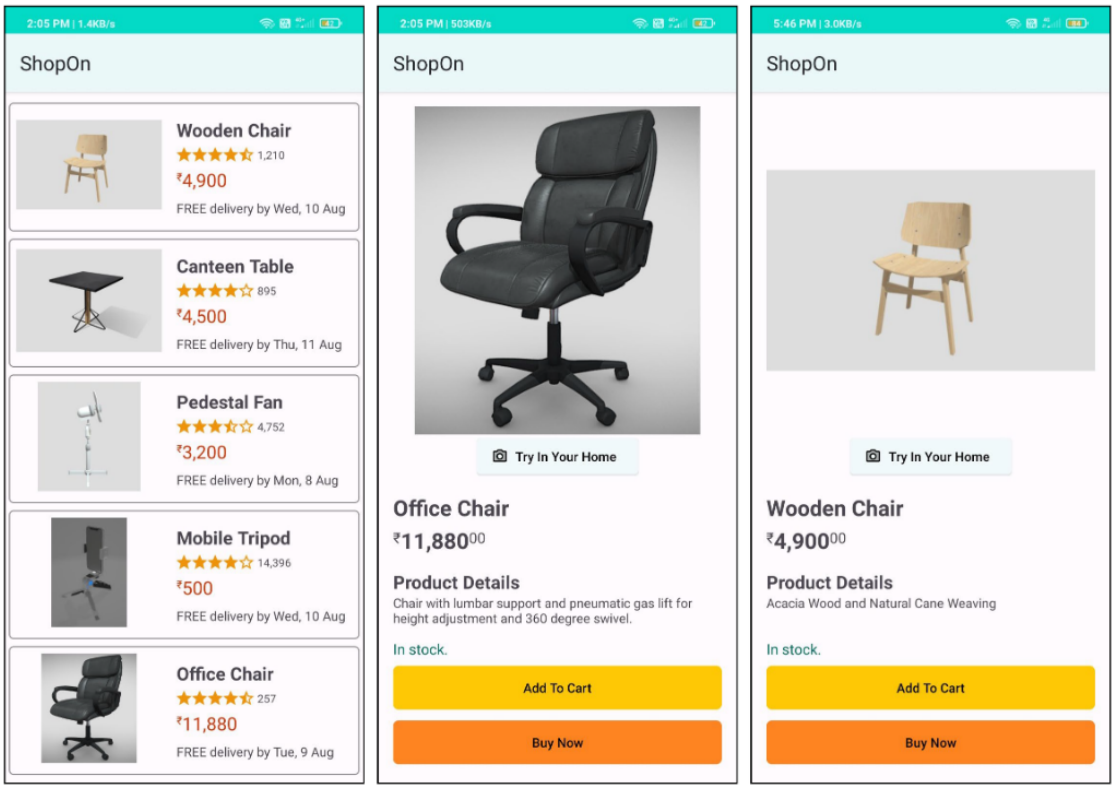


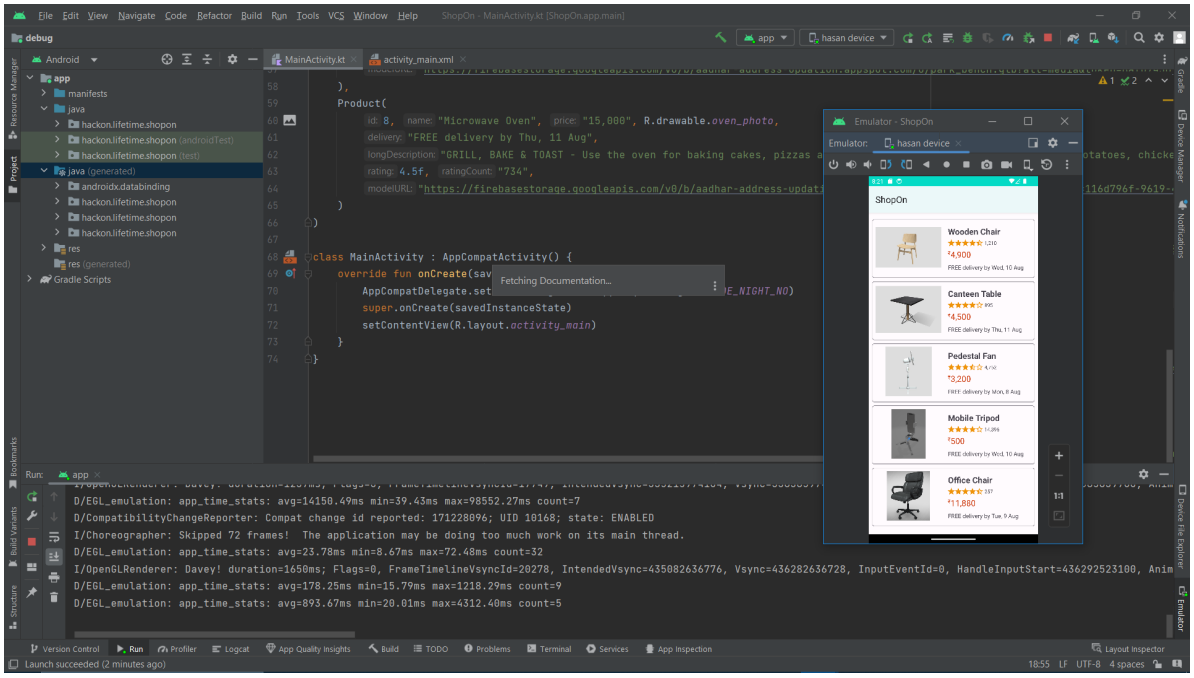
Image Based Query using VGG16
Tensorflow
Numpy
Pandas
Deployment
CSS
Flask
Kotlin
Augmented Reality
AR Core
Scene Viewer
Kotlin

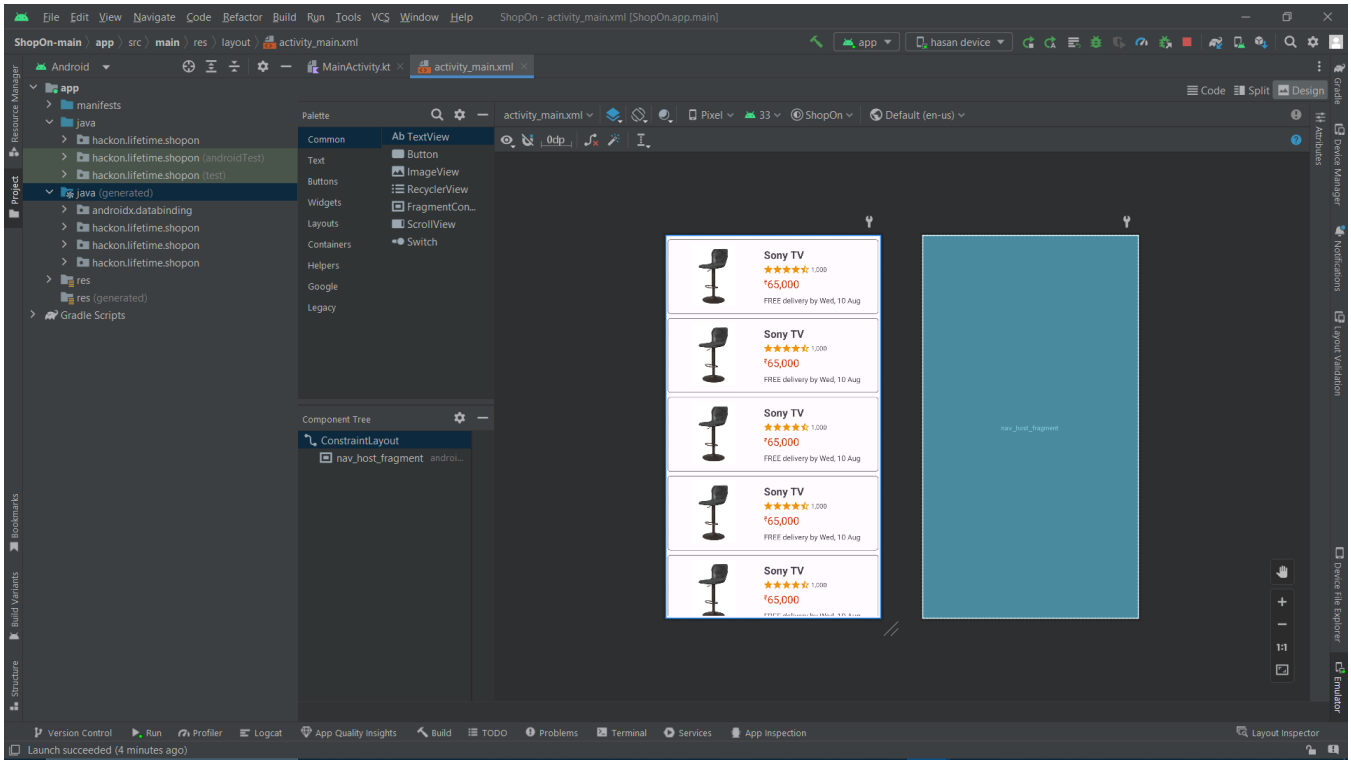
Shopping App prototype:

What is that one thing that has refrained customers from buying online for a long time? One of the prominent differences between traditional and online shopping has been physically experiencing the products, confirming its size, all of which has been a pain point for a very long time while buying any product online. If we could solve this problem of product trials, checking the product dimensions by comparing it with real world objects, we can onboard many customers who does not buy online because of this gap.




2:05 PM | 1.4KB/s
ShopOn
Wooden Chair
1,210
₹4,900
FREE delivery by Wed, 10 Aug
Canteen Table
895
₹4,500
FREE delivery by Thu, 11 Aug
Pedestal Fan
4,752
₹3,200
FREE delivery by Mon, 8 Aug
Mobile Tripod
14,396
₹500
FREE delivery by Wed, 10 Aug
Office Chair
257
₹11,880
FREE delivery by Tue, 9 Aug
2:05 PM | 503KB/s
ShopOn
Try In Your Home
Office Chair
₹11,88000
Product Details
Chair with lumbar support and pneumatic gas lift for height adjustment and 360 degree swivel.
In stock.
Add To Cart
Buy Now
5:46 PM | 3.0KB/s
ShopOn
Try In Your Home
Wooden Chair
₹4,90000
Product Details
Acacia Wood and Natural Cane Weaving
In stock.
Add To Cart
Buy Now


MainActivity.kt
activity_main.xml
Product(
id: 8, name: "Microwave Oven", price: "15,000", R.drawable.oven_photo,
delivery: "FREE delivery by Thu, 11 Aug",
rating: 4.5f, ratingCount: "734",
class MainActivity : AppCompatActivity() {
override fun onCreate(sav
Fetching Documentation...
super.onCreate(savedInstanceState)
setContentView(R.layout.activity_main)
Emulator - ShopOn
ShopOn
Wooden Chair
Canteen Table
Pedestal Fan
Mobile Tripod
Office Chair
D/EGL_emulation: app_time_stats: avg=14150.49ms min=39.43ms max=98552.27ms count=7
D/CompatibilityChangeReporter: Compat change id reported: 171228096; UID 10168; state: ENABLED
I/Choreographer: Skipped 72 frames! The application may be doing too much work on its main thread.
D/EGL_emulation: app_time_stats: avg=23.78ms min=8.67ms max=72.48ms count=32
I/OpenGLRenderer: Davey! duration=1650ms; Flags=0, FrameTimelineVsyncId=20278, IntendedVsync=435082636776, Vsync=436282636728, InputEventId=0, HandleInputStart=436292523100,
D/EGL_emulation: app_time_stats: avg=178.25ms min=15.79ms max=1218.29ms count=9
D/EGL_emulation: app_time_stats: avg=893.67ms min=20.01ms max=4312.40ms count=5



How does it work?

We will be using SceneViewer by triggering a explicit intent to it. Scene Viewer is an immersive viewer that enables 3D and AR experiences from our Android app. It lets users of our application easily preview, place, view, and interact with web-hosted 3D models in their environment. It uses ARCore, which is Google's platform for building augmented reality experiences. Using different APIs, ARCore enables our application to sense its environment, understand the world and interact with information.

ARCore uses three key capabilities to integrate virtual content with the real world as seen through your phone's camera:

Motion tracking allows the phone to understand and track its position relative to the world.

Environmental understanding allows the phone to detect the size and location of all type of surfaces: horizontal, vertical and angled surfaces like the ground, a coffee table or walls.

Light estimation allows the phone to estimate the environment's current lighting conditions.

How quick can this technology be implemented ?

The solution can instantly be brought to production with the existing shopping applications for different products.

What is the impact of this solution ?

The impact of adding this feature will be huge, as we've now reduced the gap between our customers and the actual product. More and more people would be eager to try the product and ultimately increase the sales by a very large factor.

Is the solution scalable ?

The solution is highly scalable as it can be implemented with the existing shopping applications.

Business Relevance :

After bringing the idea to production, more and more users will be tempted to check out the products and the transition barrier from traditional offline buying to online would be reduced, thus increasing the sales

Chapter 2

Image based query Search:

Image querying refers to the problem of finding objects that are relevant to a user query within image databases (Image DBs). The classical solutions to deal with such problem include the semantic-based approach, where an image is represented through metadata (e.g., keywords), and the content-based solution, commonly called content-based image retrieval (CBIR), where the image content is represented by means of low-level features (e.g., color and texture). While with the semantic-based approach the image querying problem is transformed into an information retrieval problem, for CBIR more sophisticated query evaluation techniques are required.

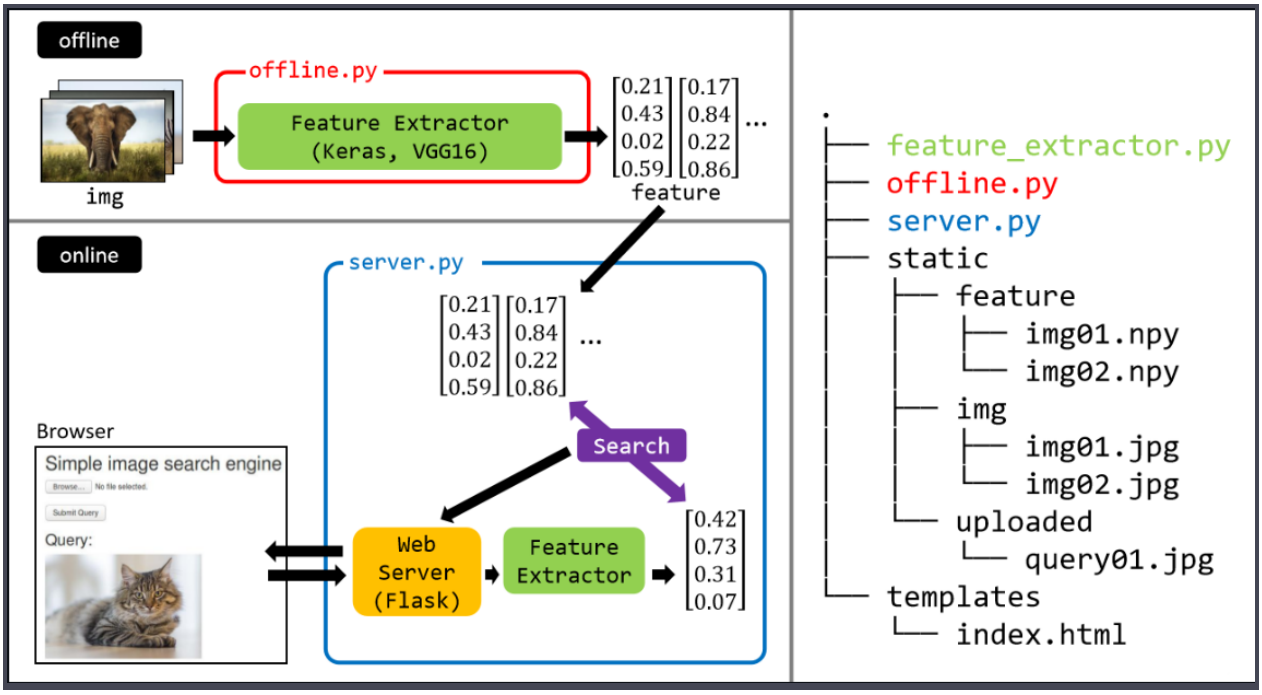


Image-based query search is an emerging technology that can revolutionize the e-commerce industry. Traditionally, e-commerce searches have relied on text-based queries, which can be time-consuming and may not accurately capture what the customer is looking for. Image-based search, on the other hand, allows customers to upload an image and find similar products based on visual features such as color, shape, and texture.
This technology can greatly enhance the customer experience by simplifying the search process and improving the accuracy of product recommendations. For example, a customer could take a picture of a dress they saw on the street and use it to find similar dresses on an e-commerce website. This eliminates the need for the customer to describe the dress in words, which can be difficult and time-consuming.

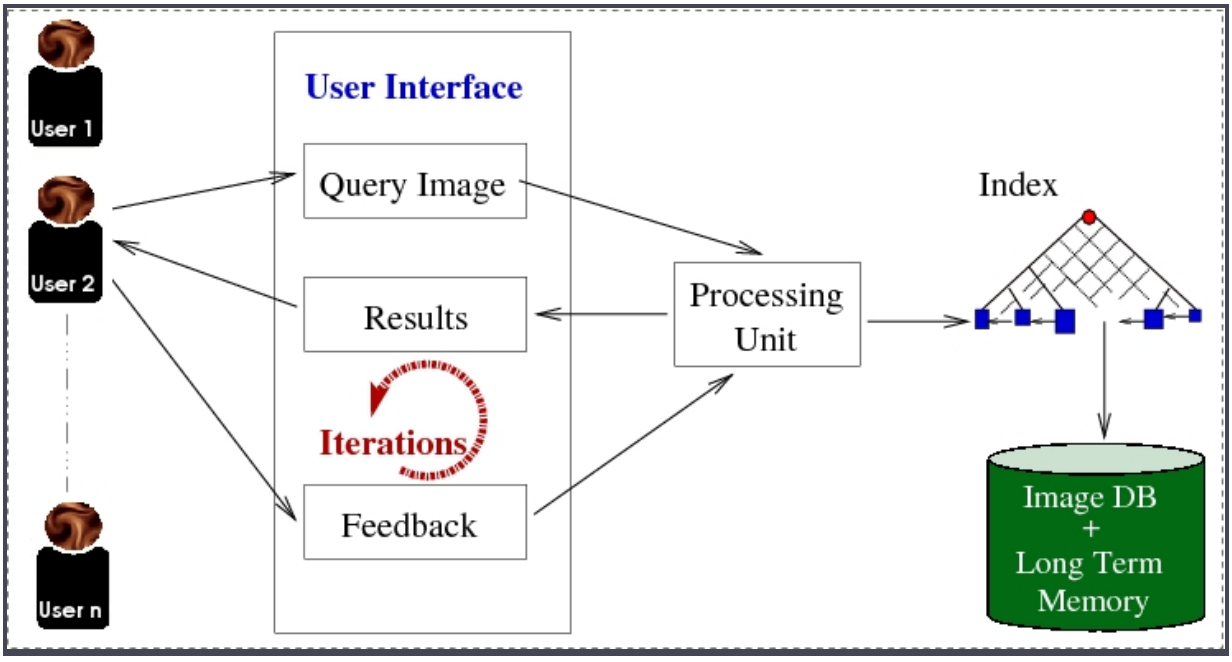
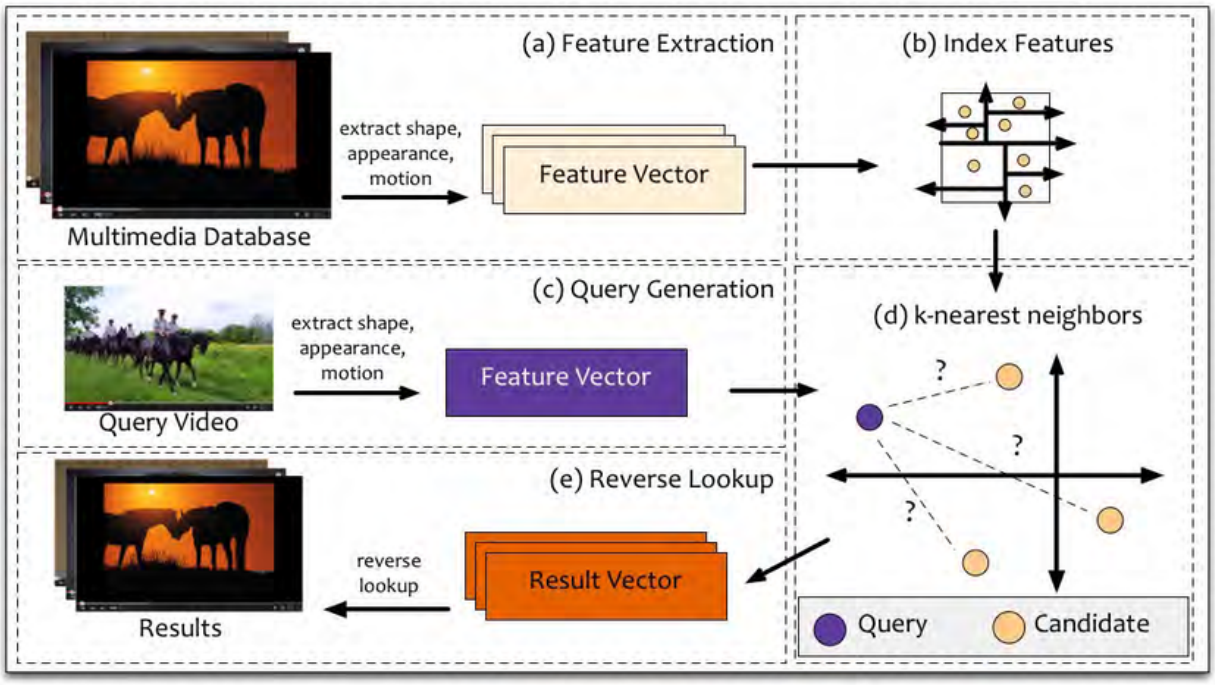


Image-based search also has the potential to increase customer engagement and conversion rates by making the shopping experience more interactive and intuitive. By allowing customers to browse products based on visual cues, e-commerce businesses can create a more engaging and immersive shopping experience that better meets the needs and preferences of modern consumers.

However, implementing image-based search can be challenging as it requires advanced machine learning and computer vision techniques to accurately identify and classify visual features. E-commerce businesses will need to invest in the necessary technology and expertise to ensure that image-based search is reliable, accurate, and user-friendly. Despite these challenges, the potential benefits of image-based search are significant, and it is likely to become an increasingly important technology in the e-commerce industry in the years to come.



ML model :

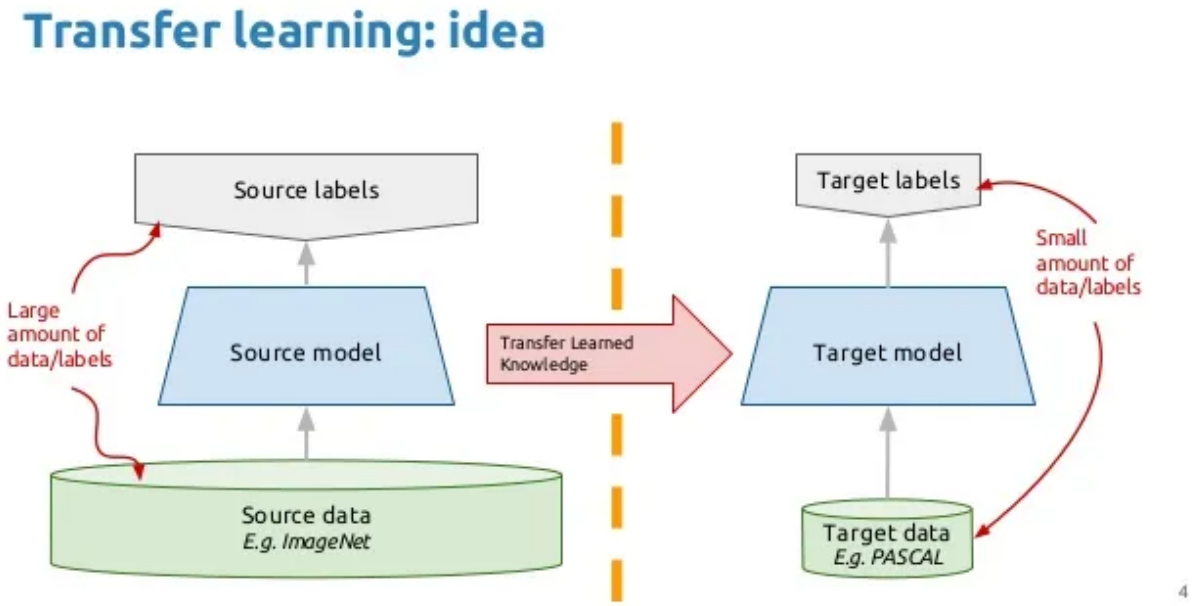
Transfer learning

Transfer learning in the context of ML means using a pre-trained model on a new problem. We have utilized transfer learning in our project by using a pre-trained CNN model (VGG-16).

The basic premise of transfer learning is simple: take a model trained on a large dataset and transfer its knowledge to a smaller dataset. For object

recognition with a CNN, we freeze the early convolutional layers of the network and only train the last few layers which make a prediction. The idea is the convolutional layers extract general, low-level features that are applicable across images — such as edges, patterns, gradients — and the later layers identify specific features within an image such as eyes or wheels.

Thus, we can use a network trained on unrelated categories in a massive dataset (usually Imagenet) and apply it to our own problem because there are universal, low-level features shared between images. The images in the Caltech 101 dataset are very similar to those in the Imagenet dataset and the knowledge a model learns on Imagenet should easily transfer to this task.



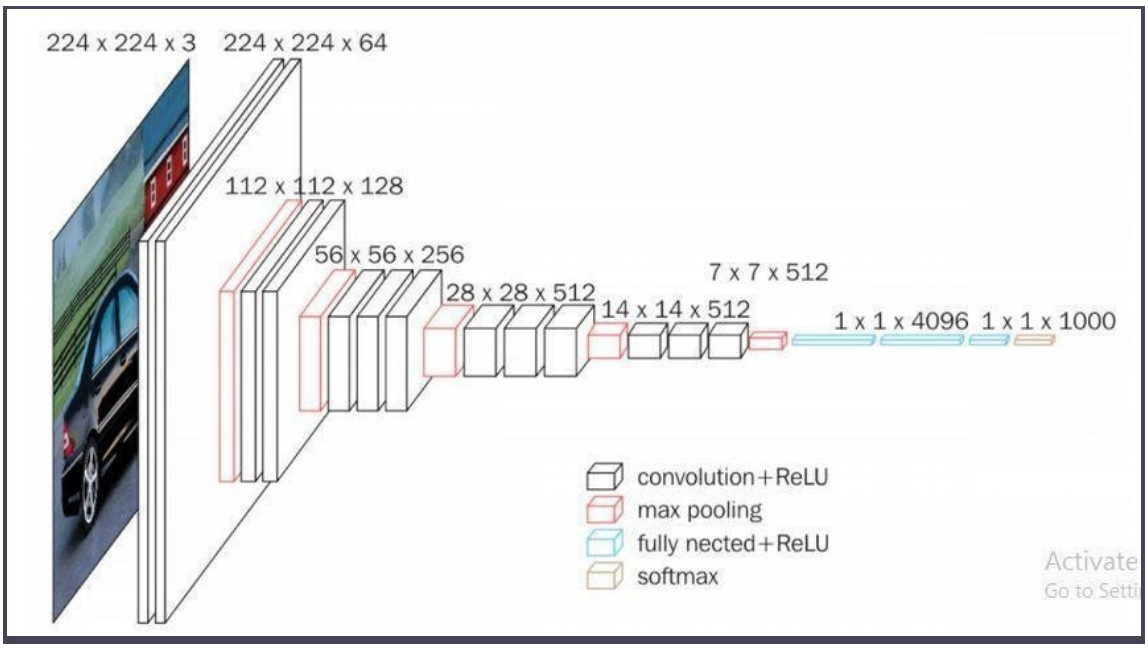
VGG-16.

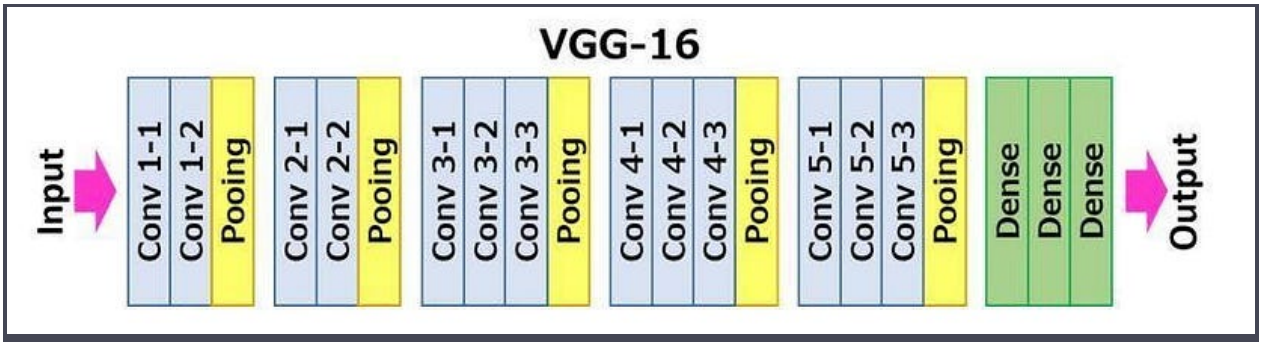
The neural network used for this project is VGG-16.

A convolutional neural network is also known as a ConvNet, which is a kind of artificial neural network. A convolutional neural network has an input layer, an output layer, and various hidden layers. VGG16 is a type of CNN (Convolutional Neural Network) that is considered to be one of the best computer vision models to date. The creators of this model

evaluated the networks and increased the depth using an architecture with very small (3 × 3) convolution filters, which showed a significant improvement on the prior-art configurations. They pushed the depth to 16–19 weight layers making it approx — 138 trainable parameters.

VGG16 is object detection and classification algorithm which is able to classify 1000 images of 1000 different categories with 92.7% accuracy. It is one of the popular algorithms for image classification and is easy to use with transfer learning.



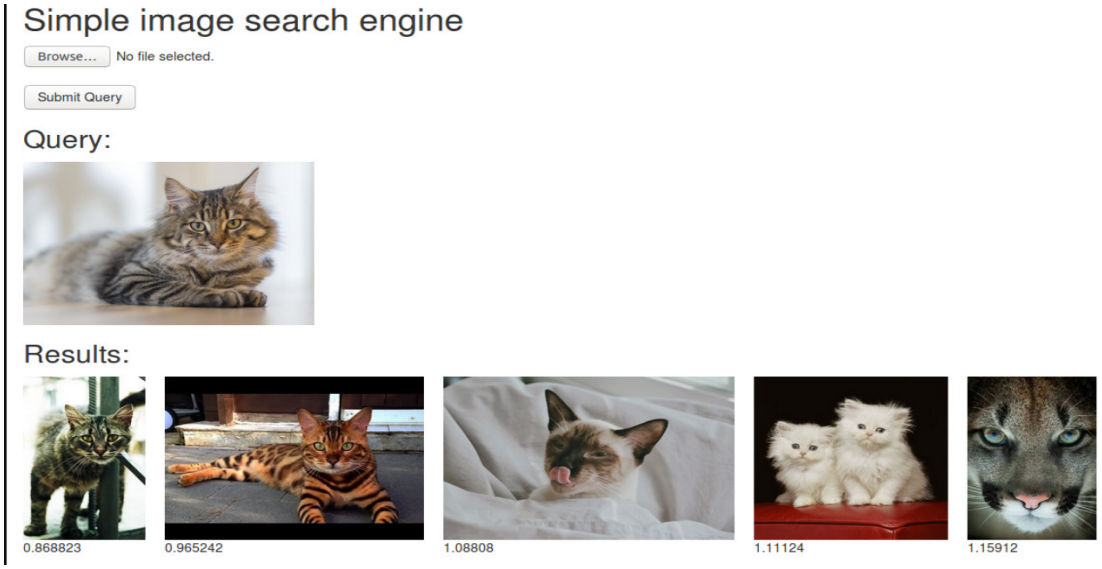


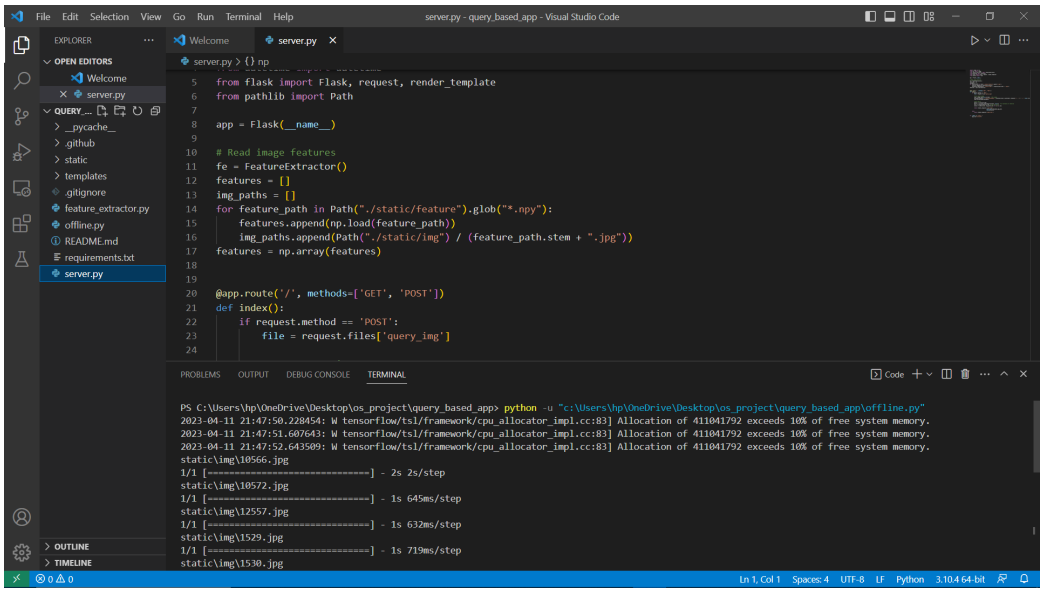
Web Application:

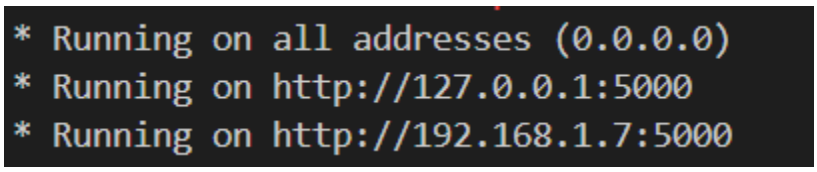
To deploy our project on web, we have used following technologies:

1) CSS:- Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML or XML (including XML dialects such as SVG, MathML or XHTML). CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.
   CSS is designed to enable the separation of content and presentation, including layout, colors, and fonts. This separation can improve content accessibility; provide more flexibility and control in the specification of presentation characteristics; enable multiple web pages to share formatting by specifying the relevant CSS in a separate .css file, which reduces complexity and repetition in the structural content; and enable the .css file to be cached to improve the page load speed between the pages that share the file and its formatting.

2) Flask:- Flask is a backend framework that is used to build web applications. A framework is a foundation for developing applications and it contains several in-built modules and libraries which makes the process easier for developers. It provides a structure for developers to follow while creating a web app.







Results:


0.0


0.49662316


0.60246694


0.6091564


0.64784706


0.6509868


0.6567675


0.6748969

Chapter 3:

Future Improvements:

1. Deployment on cloud : Currently, our server runs locally. We will deploy this application on cloud and host it on a website, so that it is accessible remotely. This has two benefits :

- Local resources will be saved as the computational tasks will be done on a remote server. This will also save time as we can choose a machine with high resources as a remote server.
- Deploying it will make the application accessible remotely.

2. Using a large dataset : We are using a local dataset currently in our application. This limits our algorithm as neural networks work better on large datasets. We can use a large dataset such as google images for searching for similar images.