A Thesis/Project/Dissertation Report

on

Machine Learning Web Application in Django

Submitted in partial fulfillment of the
requirement for the award of the degree of

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Under The Supervision of
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CANDIDATE'S DECLARATION

I/We hereby certify that the work which is being presented in the project, entitled **"Machine Learning Web application in Django"** in partial fulfillment of the requirements for the award of the **BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING** submitted in the **School of Computing Science and Engineering** of Galgotias University, Greater Noida, is an original work carried out during the period of **JULY - 2021 to DECEMBER - 2021**, under the supervision of **Dr. T Ganesh Kumar, Associate Professor, Department of Computer Science and Engineering**, of School of Computing Science and Engineering , Galgotias University, Greater Noida

The matter presented in the thesis/project/dissertation has not been submitted by me/us for the award of any other degree of this or any other places.

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This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

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CERTIFICATE

The Final Thesis/Project/ Dissertation Viva-Voce examination of **18SCSE1010080 - MANEESH KUMAR,**

18SCSE1010402 - Sagar Gulati has been held on and his/her work is recommended for the award of

BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING

Signature of Examiner(s)   **Signature of Supervisor(s)**

Signature of Project Coordinator   **Signature of Dean**

Date:

Place:

Abstract

The intention of this Project is to suggest the sketch and architecture of a testable, adaptable, and adept web-based application that imitations and implements machine learning algorithm. There are many different components that form the architecture of our web- based application involving server, database, programming language, web framework, and front-end design.

There are also other determinant concord with our application such as testability, adaptability, performance, and design pattern. Our main attract in this Project is to find out a real world problem using motion technology like data science machine learning which in mathematical terms is described as an application of artificial intelligence where available information is used through algorithms to process or comfort the processing of statistical data. While Machine Learning includes concepts of automation, it want human counselting.

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Acronyms

ML	Machine Learning
Pyt	Python
SVM	Support Vector Machines
Fig	Figure
AI	Artificial Intelligence
KNN	K-Nearest Neighbour
Tech.	Technology

CHAPTER-1

Introduction

Web application credit to a software system that affords a user interface through a web browser. Examples of web applications contain blogs, onlineshopping, search engines, etc.

Now a Days Web application smash a urgent role from ordering food from a restaurant, ordering any electronic thingsor anything from web apps, vigilant movies, book a seat for a movie theater, for study, download sketches from the internet, and many more. Web applications can be designed for a roomy variance of uses and can be used by anyone; from an standardization to anreserved for thick reasons. Generally used Web applications can cover web- mail, online calculators, or e-commerce shops. Few Web apps can be only secured by a unique browser;however, most are available no concern the browser.

Every Service now a days has applications. If we want to order food but do not like to talk to dignitary, we simply go for the web apps or mobile apps and ordered food and it is the more appropriate and easy procedure.

Machine learning is merely based on predictions made based on experience. It enables machines to make data-driven decisions, which is more efficient than explicitly programming to carry out certain tasks. These algorithms are designed in a fashion that gives exposure to new data that can help organisations learn and improve their strategies.

Future Scopes of Machine Learning

The scope of Machine Learning is not limited to the investment sector. Rather, it is expanding across all fields such as banking and finance, information technology, media & entertainment, gaming, and the automotive industry. As the Machine Learning scope is very high, there are some areas where researchers are working toward revolutionizing the world for the future.

Automotive Industry

The automotive industry is one of the areas where Machine Learning is excelling by changing the definition of 'safe' driving. There are a few major companies such as Google, Tesla, Mercedes Benz, Nissan, etc. that have invested hugely in Machine Learning to come up with novel innovations. However, Tesla's self-driving car is the best in the industry. These self-driving cars are built using Machine Learning, IoT sensors, high-definition cameras, voice recognition systems, etc.

Robotics

Robotics is one of the fields that always gain the interest of researchers as well as the common. In 1954, George Devol invented the first robot that was programmable and it was named **Unimate**. After that, in the 21st century, Hanson Robotics created the first AI-robot, **Sophia**. These inventions were possible with the help of Machine Learning and Artificial Intelligence.

Quantum Computing

We are still at an infant state in the field of Machine Learning. There are a lot of advancements to achieve in this field. One of them that will take Machine Learning to the next level is Quantum Computing. It is a type of computing that uses the mechanical phenomena of quantum such as entanglement and superposition. By using the quantum phenomenon of superposition, we can create systems (quantum systems) that can exhibit multiple states at the same time. On the other hand, entanglement is the phenomenon where two different states can be referenced to each other. It helps in describing the correlation between the properties of a quantum system.

Improved cognitive services

With the help of machine learning services like SDKs and APIs, developers are able to include and hone the intelligent capabilities into their applications. This will empower machines to apply the various things they come across, and accordingly carry out an array of duties like

vision recognition, speech detection, and understanding of speech and dialect. Alexa is already talking to us, and our phones are already listening to our conversations— how else do you think the machine "wakes up" to run a google search on 9/11 conspiracies for you? Those improved cognitive skills are something we could not have ever imagined happening a decade ago, yet, here we are. Being able to engage humans efficiently is under constant alteration to serve and understand the human species better.

Multi-agent learning, robot vision, self-supervised learning all will be accomplished through robotisation. Drones have already become a normality, and have now even replaced human delivery men. With the rapid speed technology is moving forward, even the sky is not the limit. Our childhood fantasies of living in an era of the Jetsons will soon become reality. The smallest of tasks will be automated, and human beings will no longer have to be self-reliant because you will have a bot following you like a shadow at all times.

CHAPTER-2

Literature Survey / Project Design

Machine Learning has been a trending technology and is being evolved so much in the recent couple of decades. The demand is growing so much and it is expected that in the coming to years this particular technology will be used in most of the real world problems. Some most common uses of Machine learning technology are like in Gmails it is used for filtering out the emails, In medicals it is used for analysing various healthreports .

AI and ML today are widely used in recommendation systems. Like on Netflix, Facebook (now known as Meta), Amazon, YouTube are using this technology on a large scale. They are directly targeting their customers according their likes. This is what we call as targeted marketing strategy.

Machine learning is also used for various classification techniques like it is used in the process of biometric authentication. It is used in Eye scanning which is used for security purposes .Iris scanning is a process in which iris of a man is recognized and the unique pattern is used for various authentication purposes.

Today we focus a lot on the safety features hence this is one of the best way of authenticating a human being. In recent studies the scientists a few algorithms of Machine Learning have gained popularity like to name a few we have Logistic Regression, Support Vector Machines , Random Forest Classification Algorithm.

Chapter 3: Requirements, Feasibility and Scope/Objective

Machine Learning is the sub-field of <u>Artificial Intelligence</u>. It helps to build automated systems that can learn by themselves. Then, the system enhances their performance by learning from experience without any human intervention. This helps the machines make data-directed choices. Whatever the machines learn from past experience using the available data, the machines use it to make predictions. For example, you must have used Google Maps for navigation. It tries to show the fastest route with less traffic and congestion. It accomplishes this task by using Machine Learning algorithms.

Engineers create the Machine Learning algorithms in such a way that the algorithm gets used to explore and experience new data for prediction. This gives the benefit to the organization for making effective business strategies as per the predictions of the ML algorithms. Now, let us check the future scope of Machine Learning in various sectors.

The automotive industry is one of the areas where Machine Learning is excelling by changing the definition of 'safe' driving. There are a few major companies such as Google, Tesla, Mercedes Benz, Nissan, etc. that have invested hugely in Machine Learning to come up with novel innovations. However, Tesla's self-driving car is the best in the industry. These self-driving cars are built using Machine Learning, IoT sensors, high-definition cameras, voice recognition systems, etc.

- **Technology Used**

1. **Python-** Python is an interpreted, high-level, general-purpose programming language. Created by Guido van Rossum and first released in 1991, Python's design philosophy emphasizes code readability with its notable use of significant whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects. Python is dynamically typed and garbage-collected. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming. Python is often described as a "batteries included" language due to its comprehensive standard library.

2. **Jupyter Notebook-** The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text. Uses include: data cleaning and transformation, numerical simulation, statistical modeling, data visualization, machine learning, and much more.

3. **HTML**: Hypertext Markup Language is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets and scripting languages such as JavaScript.

4. **CSS:** Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a markup language such as HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript. Django: Django is a Python-based free and open-source web framework that follows the modeltemplat-views

maintained by the Django Software Foundation, an American independent organization established as a 501 non-profit.

5. **SQL lite Database:** SQLite is a relational database management system contained in a C library. In contrast to many other database management systems, SQLite is not a client–server database engine. Rather, it is embedded into the end program.

Chapter 4

System Implementation

4.1 Hardware Requirement

The hardware system required must be of atleast 4GB of RAM with windows 10 or more as operating system. The other operating systems that can be used for successful execution of the software application are MAC Os, Linux etc.

4.2 Software Requirement

The system must have any IDE (Integrated Development Environment) to run and execute the code. Also it should have a good internet connection to load all the styles from the CDN's embedded in the code.

4.3 Software Description

The software product created is a web application created in Django framework. The software takes the input from the users and it tries to classifies the plant species based on the 4 inputs (sepal length , sepal width , petal length , petal width)

4.3.1 Machine Learning (ML)

Machine Learning Features of Python:

 Machine Learning are popular technologies that allow web applications to learn and observe from a user's preferences and habits. ML-enabled websites are on-trend everywhere. One reason is that ML uses genetic algorithms and neural networks to build artificial intelligence into web applications from scratch. And this is now easy to implement for most companies.

In machine the browser can understand all html tags and when we make a webpage or web layout using HTML tags and run on browser then browser can understand the tags and show it. In development programming language logic is not understand in browsers so that programming language is run by server like php server name is Apache.

Compiled and Interpreted:

Compilers take source code, such as C or Basic, and compile it into machine code. Interpreted languages differ from compiled languages; for example, interpreted code, such as shell code, is compiled on the fly each time the program is run. *Bytecode*, such as Java bytecode, is also interpreted code. Bytecode exists as an intermediary form that is converted from source code, but still must be converted into machine code before it can run on the CPU. Machine Learning are popular technologies that allow web applications to learn and observe from a user's preferences and habits. AI-enabled websites are on-trend everywhere. One reason is that AI uses genetic algorithms and neural networks to build artificial intelligence into web applications from scratch. And this is now easy to implement for most companies.

Object-Oriented:

Python supports object-oriented language and concepts of classes and objects come into existence. It supports inheritance, polymorphism, and encapsulation, etc. The object-oriented procedure helps to programmer to write reusable code and develop applications in less code.

Rebust and Secure:

The application is fully robust as all the code is written within try and catch statements so to avoid unnecessary crashing of the application by unwanted inputs.
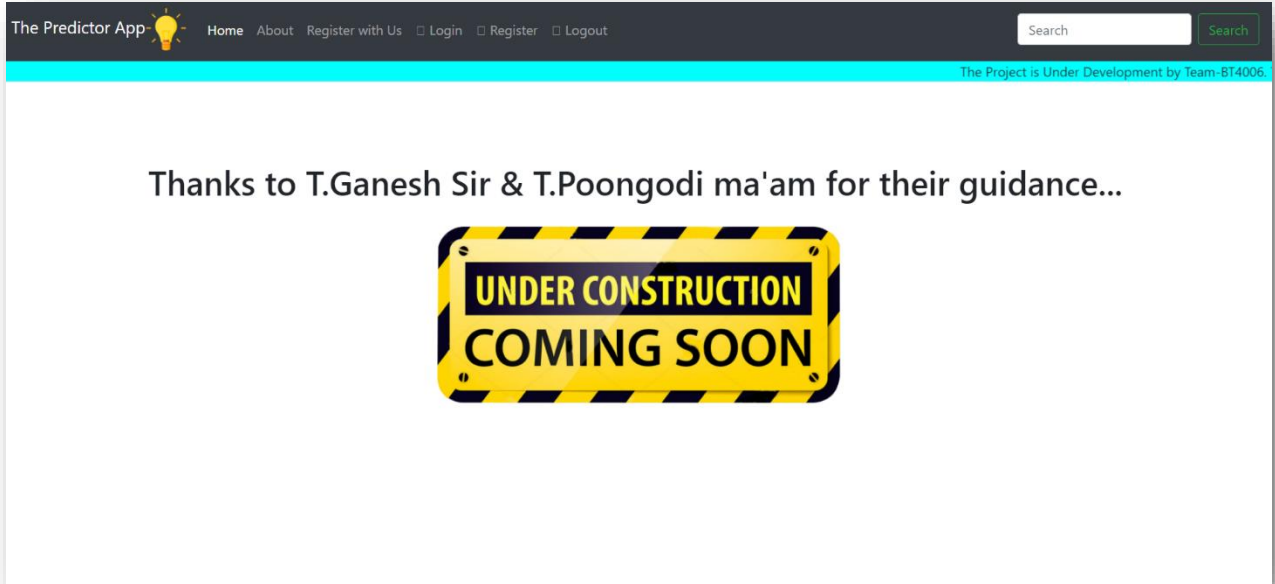
Distributed:

The application is totally modularized into various modules like accounts, model , database etc. This helps achieving easy accessibility of the code and to make changes or making advancements in the code.

Simple, Small and Familiar:

The application is overall simple and easy to use. The application is far away from complexities.

Project Design

Home Page

Responsive Footer

About The application page

The input form


```
YT-Django-Iris-App-3xj9B0qqps-master > predict >  views.py > ...
 1    from django.shortcuts import render
 2    from django.http import JsonResponse
 3    import pandas as pd
 4    from .models import PredResults
 5
 6
 7  ∨ def predict(request):
 8        return render(request, 'predict.html')
 9
10  ∨ def predict_chances(request):
11
12  ∨     if request.POST.get('action') == 'post':
13
14            # Receive data from client
15            sepal_length = float(request.POST.get('sepal_length'))
16            sepal_width = float(request.POST.get('sepal_width'))
17            petal_length = float(request.POST.get('petal_length'))
18            petal_width = float(request.POST.get('petal_width'))
19
20            # Unpickle model
21            model = pd.read_pickle(r"C:\Users\azander\Downloads\new_model.pickle")
22            # Make prediction
23            result = model.predict([[sepal_length, sepal_width, petal_length, petal_width]])
24
25            classification = result[0]
26
27  ∨         PredResults.objects.create(sepal_length=sepal_length, sepal_width=sepal_width, petal_length=petal_length,
28                                         petal_width=petal_width, classification=classification)
29
30  ∨         return JsonResponse({'result': classification, 'sepal_length': sepal_length,
31                                  'sepal_width': sepal_width, 'petal_length': petal_length, 'petal_width': petal_width},
32                                  safe=False)
```

Database Display

Prediction Results

#	Sepal length	Sepal width	Petal length	Petal width	Prediction
11	1.1	2.0	2.0	4.0	Iris-virginica
12	1.1	2.0	3.0	4.0	Iris-virginica
13	1.0	2.0	3.0	4.0	Iris-virginica
14	1.1	2.0	2.0	4.0	Iris-virginica
15	1.1	2.0	3.0	4.0	Iris-virginica
16	1.0	2.0	3.0	4.0	Iris-virginica
17	1.1	2.0	3.0	4.0	Iris-virginica
18	1.1	2.0	3.0	4.0	Iris-virginica
19	2.0	2.0	2.0	2.0	Iris-virginica
20	1.1	2.0	3.0	4.0	Iris-virginica
21	1.3	4.1	3.4	2.3	Iris-virginica

```
{% extends "base.html" %}

{% block main %}
<!-- Modal -->
<div class="modal fade" id="exampleModal" tabindex="-1" role="dialog" aria-labelledby="exampleModalLabel" aria-hidden="true">
    <div class="modal-dialog" role="document">
        <div class="modal-content">
            <div class="modal-header">
                <h5 class="modal-title" id="exampleModalLabel">Prediction Results</h5>
                <button type="button" class="close" data-dismiss="modal" aria-label="Close">
                    <span aria-hidden="true">&times;</span>
                </button>
            </div>
            <div class="modal-body">
                <h5>Prediction Input:</h5>
                <div>Sepal Length: <span id="sl"></span></div>
                <div>Sepal Width: <span id="sw"></span></div>
                <div>Petal Length: <span id="pl"></span></div>
                <div>Petal width: <span id="pw"></span></div>
                <h5 class="pt-3">Prediction Classification:</h5>
                <div id="prediction"></div>
            </div>
            <div class="modal-footer">
                <button type="button" class="btn btn-secondary" data-dismiss="modal">Close</button>
                <a class="btn btn-primary" href="/results" role="button">View DB</a>
            </div>
        </div>
    </div>
</div>

<div class="container pt-5">
    <div class="row justify-content-md-center">
```

Research Paper

Machine Learning Application in Django

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Abstract

The intention of this Project is to suggest the sketch and architecture of a testable, adaptable, and adept web-based application that imitations and implements machine learning algorithm. There are many different components that form the architecture of our web-based application involving server, database, programming language, web framework, and front-end design.
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Keywords: Django, Machine Learning, Multi-threading, Real-Time-Application, Task Queue.

I. INTRODUCTION

Web application credit to a software system that affords a user interface through a web browser. Examples of web applications contain blogs, online shopping, search engines, etc.
Now a Days Web application smash a urgent role from ordering food from a restaurant, ordering any electronic things or anything from web apps, vigilant movies, book a seat for a movie theater, for study, download sketches from the internet, and many more. Web applications can be designed for a roomy variance of uses and can be used by anyone; from an standardization to an reserved for thick reasons. Generally used Web applications can cover web-mail, online calculators, or e-commerce shops. Few Web apps can be only secured by a unique browser; however, most are available no concern the browser.

Every Service now a days has applications. If we want to order food but do not like to talk to dignitary, we simply go for the web apps or mobile apps and ordered food and it is the more appropriate and easy procedure.

II. ABOUT MACHINE LEARNING

Machine learning is a class of artificial intelligence that delegates software applications to become more strict at presage outcomes without being surely programmed to do so. Machine learning algorithms use historical data as input to envision new output values. Endorsment engines are a ordinary use case for machine learning. Other famous uses include trickery detection, spit clarify, malware threat strike, business process_automation (BPA) and arguring maintenance.Machine learning is most important because it gives enterprises a view of trends in customer morals and business useful patterns, still flotations

the development of new products. Many of today's executive companies, such as Facebook, Google and Uber, make machine learning a main limb of their movements. a machine learning impractical is a computer looking at data and naming patterns, and then using those judgement to complete its delegated task more finally. Any task that await upon a set of data points or rules can be motorized using machine learning, even those more complex burden such as responding to customer service calls and reviewing CVs.

Depending on the district, machine learning algorithms function using approximately human arbitration/support. The four bigger machine learning models are supervised learning, unsupervised learning, semi-supervised learning and support learning.

With supervised learning, the computer is support with a labelled set of data that enables it This is the least complex model, as it attempts to replicate human learning.

With unsupervised learning, the computer is supported with clear data and physique old unknown patterns or insights from it.

III. LITERATURE REVIEW

Machine Learning has been a trending technology and is being evolved so much in the recent couple of decades. The demand is growing so much and it is expected that in the coming to years this particular technology will be used in most of the real world problems. Some most common uses of Machine learning technology are like in Gmails it is used for filtering out the emails, In medicals it is used for analysing various health reports .

 AI and ML today are widely used in recommendation systems. Like on Netflix, Facebook (now known as Meta), Amazon, YouTube are using this technology on a large scale. They are directly targeting their customers according their likes. This is what we call as targeted marketing strategy.

Machine learning is also used for various classification techniques like it is used in the process of biometric authentication. It is used in Eye scanning which is used for security purposes .Iris scanning is a process in which iris of a man is recognized and the unique pattern is used for various authentication purposes.

Today we focus a lot on the safety features hence this is one of the best way of authenticating a human being. In recent studies the scientists a few algorithms of Machine Learning have gained popularity like to name a few we have Logistic Regression, Support Vector Machines , Random Forest Classification Algorithm .

Example of authentication using iris Recognition is Iris recognition.

Iris

It is a round shaped circular pigment which imparts colour to the eye. It has the ability to control the size of the pupil which acts as the entry point of light in the eye. This iris recognition is the method of biometric authentication of a person.

Pupil

It is an opening which is present at the center of the iris from which the light enters in the eye. This opening expands and contracts with the light present in the environment.

Sclera

It is the white outer layer that protects The White outer layer of the eye. It is Flexible In length and provides strength
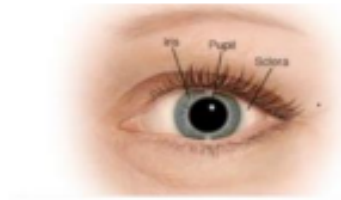
to the eye.

Fig. 1 Eye Image Acquisition

IV Algorithms in Machine Learning

There are three types of Machine Learning. The first is supervised learning in which Data is labelled i.e the outputs of inputs already known. The second type is Unsupervised learning in which the data is Unlabelled where the machine learning.

itself finds patterns from the data and creates an algorithm. The third category isthe reinforcement learning in which the model interacts with the environment in such a way to get the maximum rewards.

The following are commonly used supervised Machine Learning Algorithms:
1. Linear Regression
2. Logistic Regression
3. Decision Tree
4. Support Vector Machines
5. Naïve Bayes Classification
6. K nearest neighbours

Support Vector Machines

Support vector machines has been recently developed in the field of mathematics and statistical theories. It is one of the most famous supervised machine Learning algorithms used for both regression as well as classification. However mostly it is used for the classification purposes. It is used for problems like classifying the plants to its specific categories based on its features

of petals and sepals like sepal length and width and petal length and width.

This algorithm mainly creates a best line which is the actual decision boundry. This boundry is used for classification. This algorithm takes two extreme points from the data provided and those two points are known as support vectors and hence this algorithm is named to be support vector machines. These support vectors creates an imaginary plane known as hyperplane.
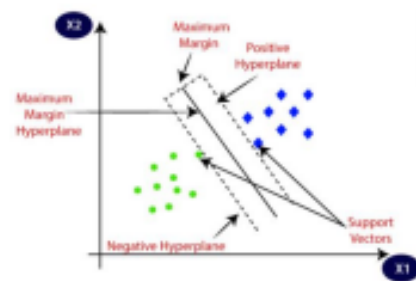
The support vector machine algorithm we can understand with the help of an example. Suppose we see one cat which has some features like that of a dog so in order to classify such species with accuracy we need a machine learning model which can be created using SVM algorithm. For the accuracy of this model we need to train it with lots and lots of images of actual cats and dogs so the model will be able to learn all the features of cats and dogs and hence will be able to classify further the given input.

V. TERMINOLOGIES USED IN SVM ALGORITHM

Hyperplane
These are imaginary lines which are passing through the data points known as support vectors. These imaginary lines

are the actual decision boundaries. There can be more than one decision boundaries but our aim is to find the most efficient decision boundary.

This hyperplane can be straight or can be bent or curved. It depends on the number of features present in the dataset like if there are only two features that means the hyperplane would be straight however with 3 or more features more chances are that it will be curved.
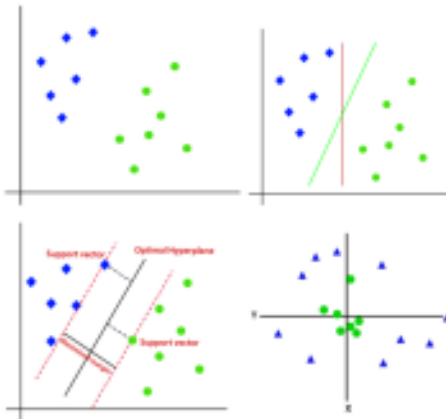
Future Scope

Python: Python is a famous programming language that was worked in the industry for 25-30 years. Since its origin, it has gone wound up many different upgrades and cultivation.

Django: Django, on the other hand, is a strong open-source base discharged in premier 2005. Components such as modesty, reliability and restriction have provided significantly to its growth over the years.
Django has a bulky number of generators divided to other web development languages, addiction management tools, different libraries, and API platform.
Django has an unified CSS framework.
Django is a current Python-based tool that is used in Web applications.
Django framework mostly resides of beneath elements.

Template: It concludes what a user discern on the browser. Create and format information toward view.

View: It includes all the files. This elements attract information from the authority and presents the information on the gateway using templates.

VI. CONCLUSION

With the advancements in the technology in the recent years machines are playing a very important role. Everyday single day lots of data is generated and everyday this data is increasing tremendously. Thanks to these technologies and the machines which are using this daya very effectively. Today all big companies, businesses and financial institutions are using Machine Learning for advancing incrementing their profits and to know their customer bases for a targeted strategy. The firms that have already recognized this Machine Learning and Artificial Intelligence and have started adopting these are gaining good profits and achieving good success. In the coming years some business firms will be shut down and some new business firms will emerge playing with this technology. Hence, the power of information technology and the machines must be strictly taken into consideration and continuous improvements and developments should be made.

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