

ViewCount Visionary: A Data-Driven Approach to Forecasting YouTube Video Views

1 INTRODUCTION

1.1 Overview

In today's world, social media has become a crucial part of our lives. One such platform that has gained immense popularity over the years is youtube. It is a platform where content creators can share their videos with a global audience, and advertisers can promote their products and services through video ads. Advertisers pay content creators based on the number of adviews and clocks their ads receive In recent years, advertisers have been looking for ways to estimate the number of adviews based on other metrics like comments, likes, dislikes, duration, year and category of the video. This is where machine learning comes in. by training various regression models on the available data, we can predict the number of adviiews that an advertisement is likely to receive.

Catering to the problem stated above, we have developed a model which can predict the number of adviews given the specified inputs. This model can be used by advertisement agencies on deciding whether or not give a particular content creator on youtube to gove the contract for a particular ad or not based on the number of ad-views predicted by our model.

1.2 Purpose

The purpose of this project is to develop and evaluate various regression models to accurately predict the number of adviews for Youtube advertisements based on the engagement metrics.

Additionally, the project aims to deploy the best performing model using the Flask framework.

Allowing advertisers and content creators to input relevant metrics and obtain an estimated number of ad-views. This can provide valuable insights to stakeholders, helping them to make informed decisions and improve their marketing strategies.

2 LITERATURE SURVEY

2.1 Existing problem

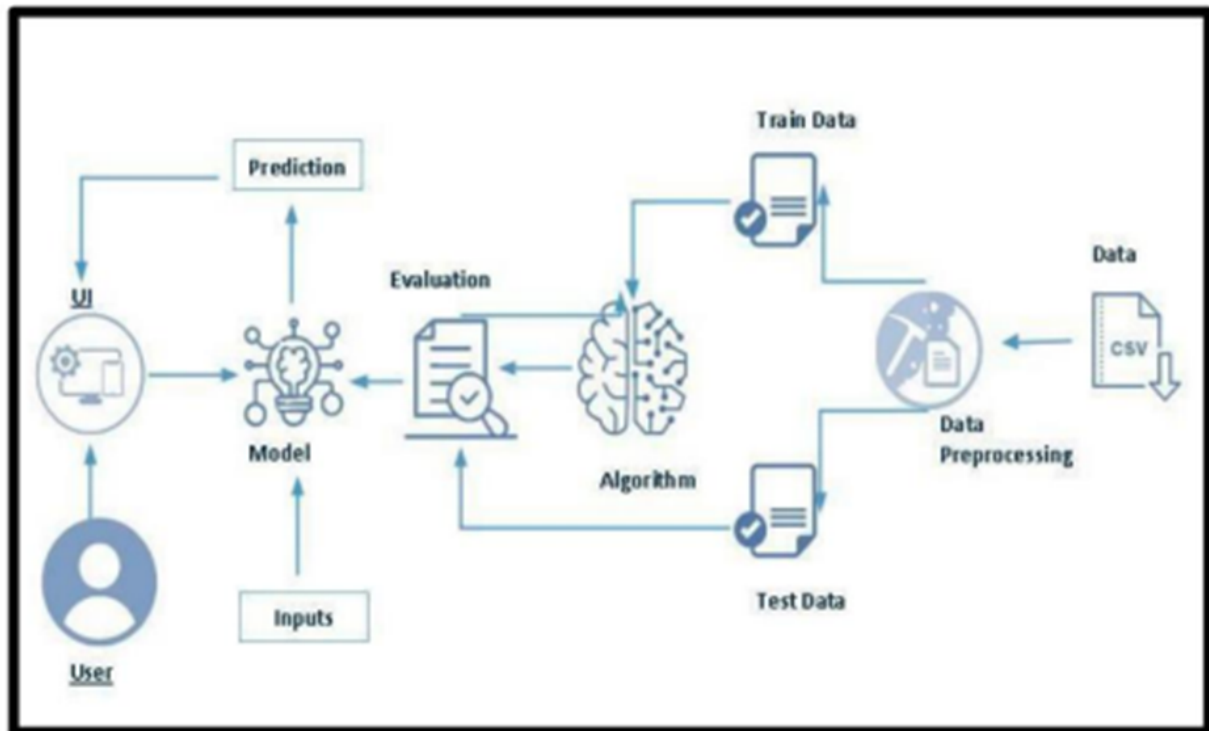
- Time-Series Analysis.
- ARIMA (Auto Regressive Integrated Moving Average).
- Machine Learning Models.
- Regression Models.
- Random Forests and Decision Trees.
- Neural Networks.
- Content-Based Features.

2.2 Proposed solution

The aim of this project is to develop, evaluate and deploy the best performing regression model to predict the number of adviiew for Youtube advertisements based on ther engagement metrics using Flask Framework.

3 THEORITICAL ANALYSIS

3.1 Block diagram



3.2 Hardware / Software designing

Hardware Requirements:

- **CPU:** A modern multi-core CPU is essential for data preprocessing, feature engineering, and model training. T
- **RAM:** Sufficient RAM is crucial. Depending on your data size.
- **Storage:** Adequate storage space is required for storing your dataset and any intermediate files. High-speed SSDs are recommended for improved data read/write performance.

Software Requirements:

- **Operating System:** Your choice of operating system may depend on personal preference, we done this using windows 8.
- **Python:** Python is the most commonly used programming language for data-driven forecasting projects. Install Python and manage packages using a package manager like Visual Studio and Collab.
- **Front End:** Html, CSS, Bootstrap.

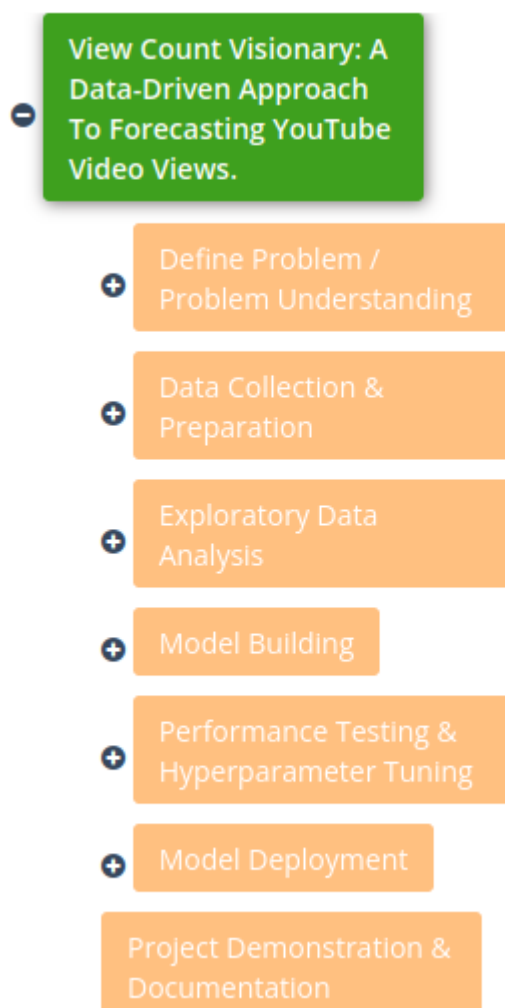
- **Back End:** Flask, Python.

4 EXPERIMENTAL INVESTIGATIONS

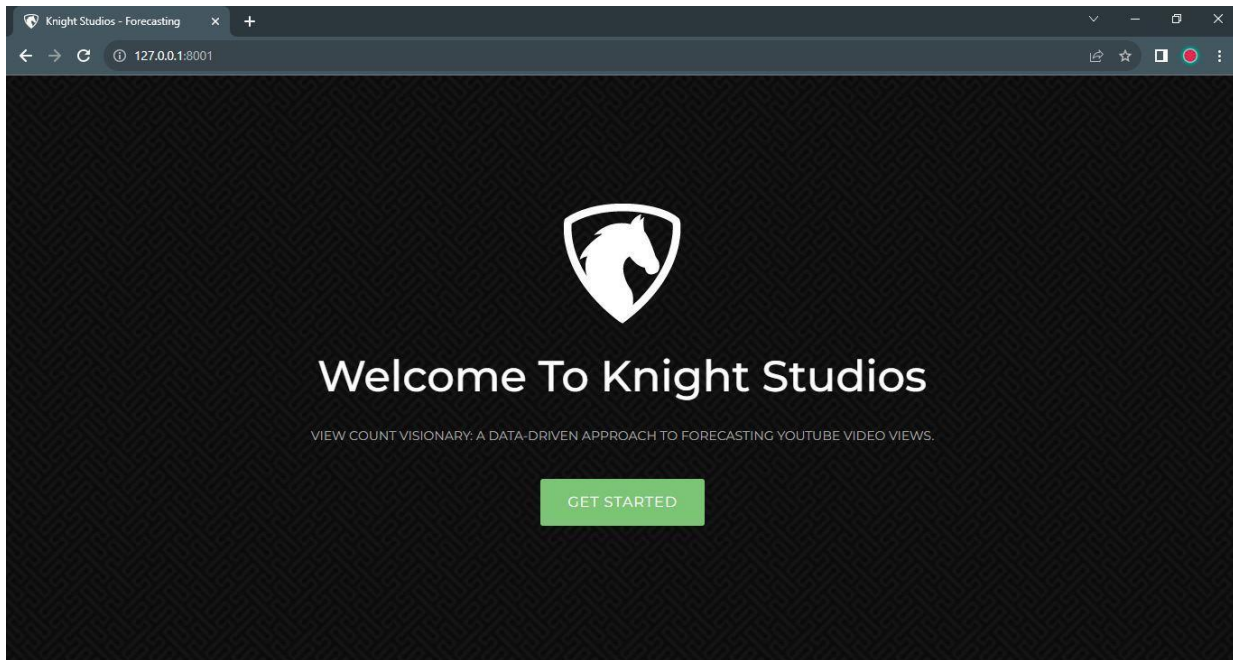
When working on a data-driven approach to forecasting YouTube video views, thorough analysis and investigation play a crucial role in understanding the data, identifying patterns, and refining the forecasting model.

- Data Exploration, Descriptive Statistics, Data Visualization.
- Time-Series Analysis, Feature Importance, Lag Analysis.
- Seasonal Patterns, User Behavior, Model Residuals,
- Hyperparameter Tuning ,Cross-Validation, Error Metrics.
- Anomaly Detection, Feature Engineering Iteration.
- Model Interpretability, Predictive Maintenance.
- Documentation and Reporting.

5 FLOWCHART



6 RESULT

A screenshot of the 'Knight Studios - Forecasting' application's prediction interface. The browser's address bar shows '127.0.0.1:8001/pred'. The page features a dark background with a subtle geometric pattern and a large, glowing yellow triangular shape on the right side. At the top, there is a navigation bar with the Knight Studios logo on the left and the links 'HOME', 'PREDICT', and 'ABOUT' on the right. The main content area contains a series of input fields for video data: 'Number of views in video:', 'Number of likes in video:', 'Number of dislikes in video:', 'Number of comments in video:', 'Year of publish of video:', 'Duration of video (in seconds):', and 'Category of the video:'. The 'Category of the video:' field is a dropdown menu currently showing 'Video tutorials'. Each input field is a white rectangle with a thin border, and the labels are in a small, white, sans-serif font.

Knight Studios - Forecasting

127.0.0.1:8001/pred

HOME PREDICT ABOUT

102001

Number of likes in video:

13754

Number of dislikes in video:

5908

Number of comments in video:

15328

Year of publish of video:

2022

Duration of video (in seconds):

5667

Category of the video:

Vlogs

Predict

Knight Studios - Forecasting

127.0.0.1:8001/predict

Knight Studios

Prediction Result

The estimated number of Ad-Views is: **1.34**

[Back to Home](#)

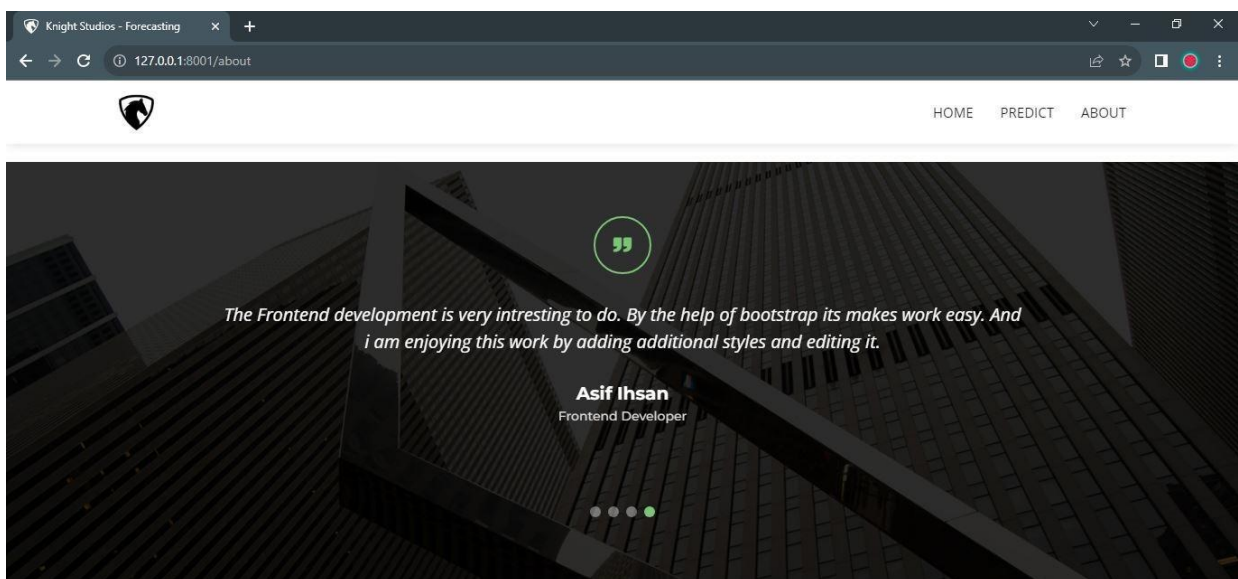
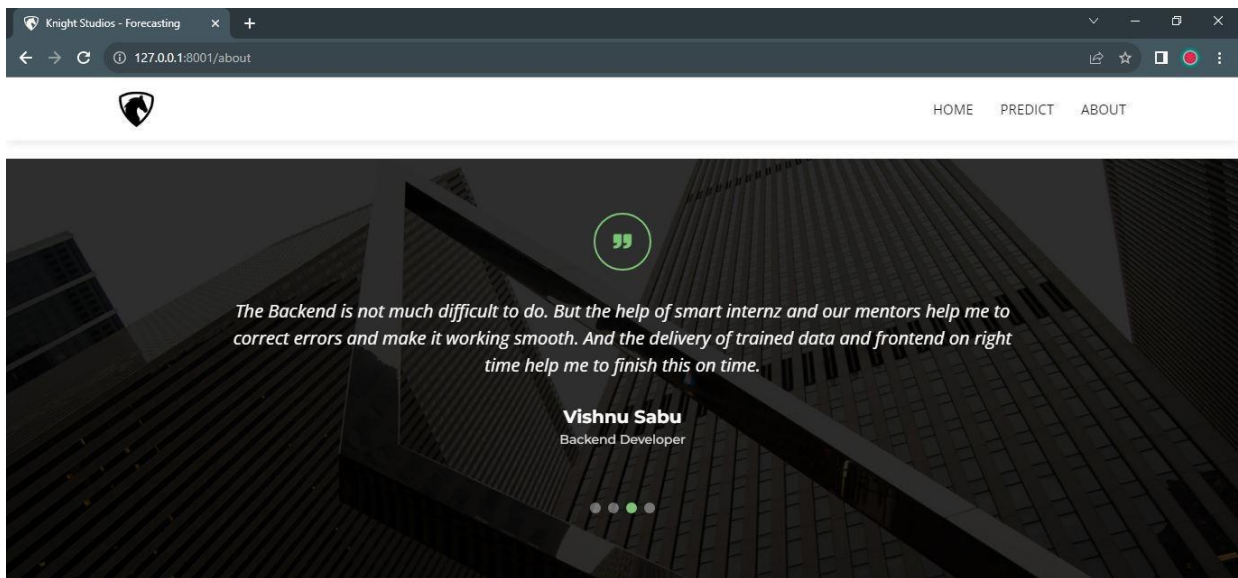
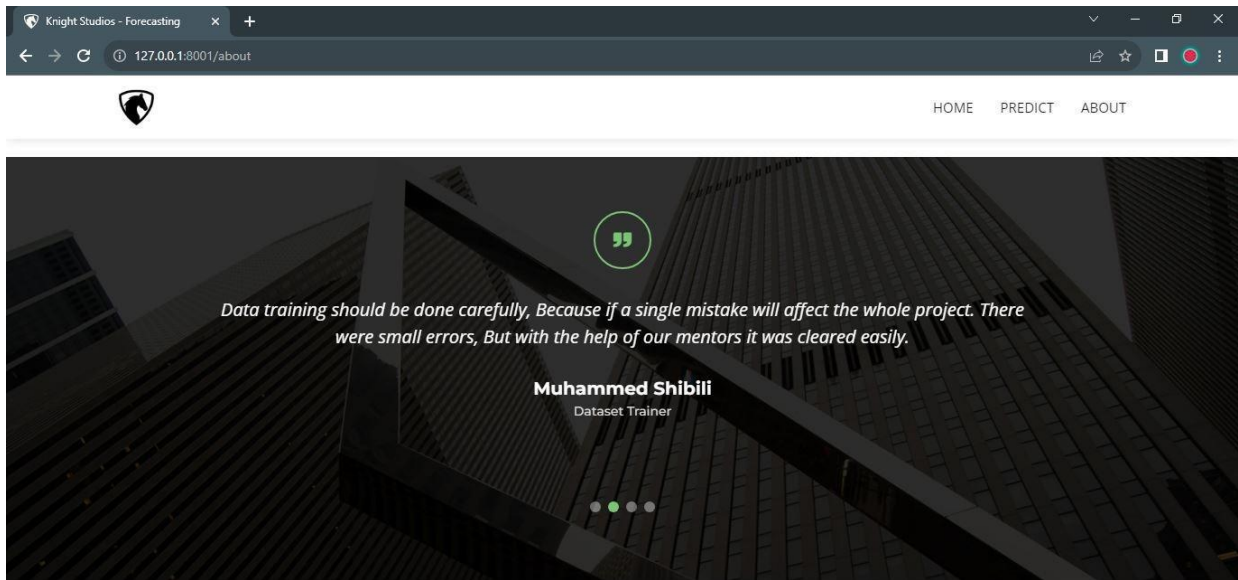
Knight Studios - Forecasting

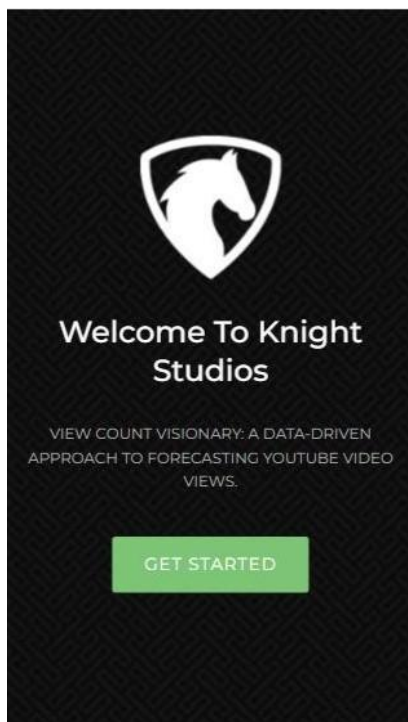
127.0.0.1:8001/about

HOME PREDICT ABOUT

Our project aim is To Forecasting YouTube Video AdViews. This app is for those who want to know the score of youtubers to give Ads or you can check whether the Ad is given to the right youtube channel or not. About my team, From beggining to end they supports me very well for completing our work on time.

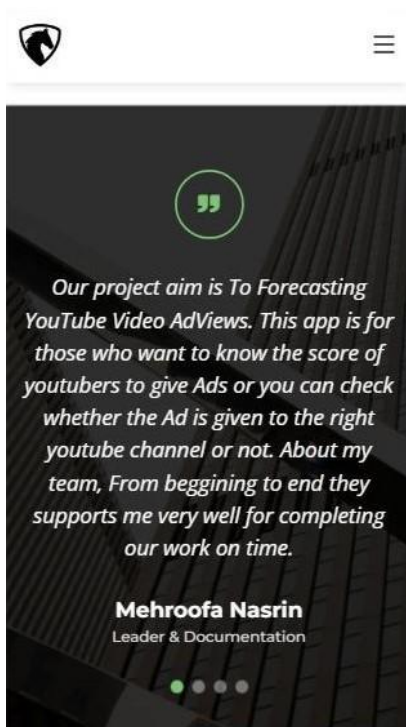
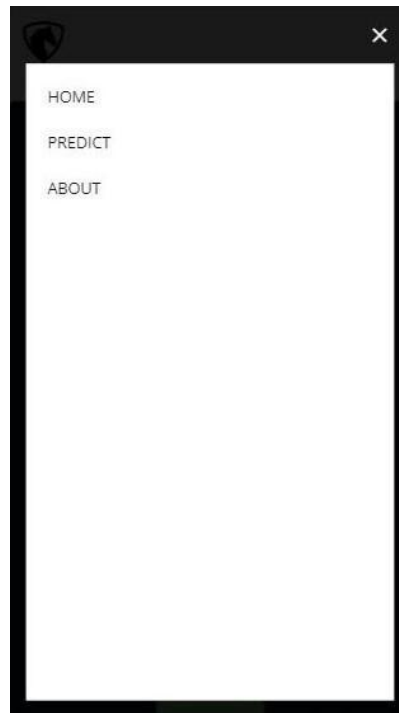
Mehroofa Nasrin
Leader & Documentation





A form for predicting video metrics. It has a dark background and a white header with a logo and a menu icon. The form contains several input fields and a dropdown menu, each preceded by a label. The labels are: "Number of views in video:", "Number of likes in video:", "Number of dislikes in video:", "Number of comments in video:", "Year of publish of video:", "Duration of video (in seconds):", and "Category of the video:". The "Category of the video:" dropdown is currently set to "Video tutorials". At the bottom center, there is a green button labeled "Predict".

The same form as above, but with data entered into the input fields. The values are: "23144323" for views, "2342233" for likes, "2344" for dislikes, "234333" for comments, "2023" for the year, "10343" for duration, and "Challenge Videos" for the category. The "Predict" button remains at the bottom.





7 ADVANTAGES & DISADVANTAGES

7.1 Advantages

- Improved Decision-Making, Accurate Predictions, Resource Allocation.
- Content Strategy Optimization, Effective Marketing, Scalability.
- Better Timing, Enhanced Monetization, Competitive Advantage, Educational Value.
- Adaptation to Trends, Engagement Improvement, Content Diversification.

- Effective Audience Growth Strategies, Data-Backed Sponsorship, Evolving Insights.

7.2 Disadvantages

- Data Quality Issues, Data Privacy Concerns, Data Volume and Storage.
- Data Acquisition Costs, Data Bias, Overfitting.

8 APPLICATIONS

- **Content Creation Strategy:** Video Ideas, Optimal Video Length.
- **Content Release Timing:** Publishing Schedule, Event Planning.
- **Promotion and Marketing:** Paid Promotion, Social Media Sharing.
- **Audience Engagement:** Viewer Retention, Interactive Elements.
- **Monetization:** Ad Revenue Estimation, Sponsorship Opportunities.
- **Resource Allocation:** Production Resources, Content Quality.
- **Competitive Analysis:** Benchmarking, Trend Analysis.
- **Long-Term Strategy:** Audience Growth, Content Diversification.
- **A/B Testing:** Experimentation.
- **Feedback Loop:** Continuous Improvement.

9 CONCLUSION

In conclusion, the project on "A Data-Driven Approach to Forecasting YouTube Video Views" has yielded valuable insights and findings that can significantly enhance content creators' decision-making processes and content strategies on the YouTube platform. Through a thorough analysis of historical data and the implementation of predictive models. In essence, the project provides content creators, marketers, and channel managers with a powerful toolkit for optimizing their YouTube channel's performance. By harnessing the predictive capabilities of data analysis and machine learning, creators can stay ahead of the curve, deliver more engaging content, and achieve greater success in the ever-evolving landscape of online video content.

10 FUTURE SCOPE

The future scope for "A Data-Driven Approach to Forecasting YouTube Video Views" is promising, as advancements in data analytics, machine learning, and the online video industry continue to evolve. As technology and the online video landscape continue to evolve, there will be ongoing opportunities to enhance the accuracy and utility of forecasting models, providing content creators with valuable insights to optimize their content strategies and engage with their audience effectively.

11 APPENDIX

Source Code:

base.html

```

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="utf-8">

<meta content="width=device-width, initial-scale=1.0" name="viewport">

<title>Knight Studios - Forecasting</title>

<meta content="" name="description">

<meta content="" name="keywords">

<link href="{{ url_for('static', filename= 'img/hero-logo.png') }}" rel="icon">

<link href="{{ url_for('static', filename= 'img/hero-logo.png') }}"
rel="apple-touch-icon"><link href="https://fonts.googleapis.com/css?family=Open+Sans:300
,300i,400,400i,600,600i,700,700i|Montserrat:300,300i,400,400i,500,500i,600,600i,700,700i|
Poppins:300,300i,400,400i,500,500i,600,600i,700,700i" rel="stylesheet">

<link href="{{ url_for('static', filename= 'vendor/aos/aos.css') }}" rel="stylesheet">

<link href="{{ url_for('static', filename= 'vendor/bootstrap/css/bootstrap.min.css') }}"
rel="stylesheet">

<link href="{{ url_for('static', filename= 'vendor/bootstrap-icons/bootstrap-icons.css') }}"
rel="stylesheet">

<link href="{{ url_for('static', filename= 'vendor/boxicons/css/boxicons.min.css') }}"
rel="stylesheet">

<link href="{{ url_for('static', filename= 'vendor/glightbox/css/glightbox.min.css') }}"
rel="stylesheet">

<link href="{{ url_for('static', filename= 'vendor/swiper/swiper-bundle.min.css') }}"
rel="stylesheet">

<link rel="stylesheet" href="{{ url_for('static', filename= 'css/style.css') }}">

</head>

<body>

{%block content%}

{%endblock%}

<script src="{{ url_for('static', filename= 'vendor/aos/aos.js') }}"></script>

<script src="{{ url_for('static', filename= 'vendor/bootstrap/js/bootstrap.bundle.min.js')
}}"></script>

<script src="{{ url_for('static', filename= 'vendor/glightbox/js/glightbox.min.js') }}"></script>

```

```

<script src="{{ url_for('static', filename= 'vendor/isotope-layout/isotope.pkgd.min.js')
}}"></script>
<script src="{{ url_for('static', filename= 'vendor/swiper/swiper-bundle.min.js') }}"></script>
<script src="{{ url_for('static', filename= 'vendor/php-email-form/validate.js') }}"></script>
<script src="{{ url_for('static', filename= 'js/main.js') }}"></script>
</body>
</html>

```

nav.html

```

{% extends 'base.html'%}
{%block content%}
<header id="header" class="d-flex align-items-center">
<div class="container d-flex align-items-center justify-content-between">
<div class="logo">
<a href="{{ url_for('index') }}"></a>
</div>
<nav id="navbar" class="navbar">
<ul>
<li><a class="nav-link scrollto " href="{{ url_for('index') }}">Home</a></li>
<li><a class="nav-link scrollto" href="{{ url_for('pred') }}">Predict</a></li>
<li><a class="nav-link scrollto " href="{{ url_for('about') }}">About</a></li>
</ul>
<i class="bi bi-list mobile-nav-toggle"></i>
</nav>
</div>
</header>
{%block main%}
{%endblock%}
{%endblock%}
home.html
{% extends 'base.html'%}
{%block content%}

```

```

<section id="hero">
<div class="hero-container">
<a href="{{ url_for('index')}}" class="hero-logo" data-aos="zoom-in"></a>
<h1 data-aos="zoom-in">Welcome To Knight Studios</h1>
<h2 data-aos="fade-up">View Count Visionary: A Data-Driven Approach To Forecasting
YouTube Video Views.</h2>
<a data-aos="fade-up" data-aos-delay="200" href="{{ url_for('pred')}}"
class="btn-get-started scrollTo">Get Started</a>
</div>
</section>
</main>
<a href="#" class="back-to-top d-flex align-items-center justify-content-center"><i class="bi
bi-arrow-up-short"></i></a>
{%endblock%}

```

ind.html

```

{% extends 'nav.html'%}
{%block main%}
<div>
<section id="contact" class="contact section-bg">
<div >
<form action="{{ url_for('predict')}}" method="post" class="pf" >
<label>Number of views in video:</label><br>
<input type="number" name="views" required><br><br>
<label>Number of likes in video:</label><br>
<input type="number" name="likes" required><br><br>
<label>Number of dislikes in video:</label><br>
<input type="number" name="dislikes" required><br><br>
<label>Number of comments in video:</label><br>
<input type="number" name="comments" required><br><br>
<label>Year of publish of video:</label><br>
<input type="number" name="year" required><br><br>

```

```

<label>Duration of video (in seconds):</label><br>
<input type="number" name="duration" required><br><br>
<label>Category of the video:</label><br>
<select name="category" required>
<option value="1">Video tutorials</option>
<option value="2">Educational videos</option>
<option value="3">Product reviews</option>
<option value="4">Challenge Videos</option>
<option value="5">Product Launch Videos</option>
<option value="6">Short Videos</option>
<option value="7">Vlogs</option>
<option value="8">Video Testimonials</option>
</select><br><br>
<input type="submit" value="Predict">
</form>
</div></div>
</section>
</div>
{%endblock%}

```

about.html

```

{% extends 'nav.html'%}
{%block main%}
<section id="testimonials" class="testimonials">
<div class="container" data-aos="zoom-in">
<div class="quote-icon">
<i class="bx bxs-quote-right"></i>
</div>
<div class="testimonials-slider swiper" data-aos="fade-up" data-aos-delay="100">
<div class="swiper-wrapper">
<div class="swiper-slide">
<div class="testimonial-item">

```


<p>

Our project aim is To Forecasting YouTube Video AdViews. This app is for those who want to know the score of youtubers to give Ads or you can check whether the Ad is given to the right youtube channel or not. About my team, From beggining to end they supports me very well for completing our work on time.

</p>

<h3>Mehroofa Nasrin</h3>

<h4>Leader & Documentation</h4>

</div></div>

<div class="swiper-slide">

<div class="testimonial-item">

<p>

Data training should be done carefully, Because if a single mistake will affect the whole project. There were small errors, But with the help of our mentors it was cleared easily.

</p>

<h3>Muhammed Shibili</h3>

<h4>Dataset Trainer</h4>

</div></div>

<div class="swiper-slide">

<div class="testimonial-item">

<p>

The Backend is not much difficult to do. But the help of smart internz and our mentors help me to correct errors and make it working smooth. And the delivery of trained data and frontend on right time help me to finish this on time.

</p>

<h3>Vishnu Sabu</h3>

<h4>Backend Developer</h4>

</div></div>

<div class="swiper-slide">

<div class="testimonial-item">

<p>

The Frontend development is very intresting to do. By the help of bootstrap its makes work easy. And i am enjoying this work by adding additional styles and editing it.

```

</p>
<h3>Asif Ihsan</h3>
<h4>Frontend Developer</h4>
</div>
</div></div>
<div class="swiper-pagination"></div>
</div></div>
</section>
{%endblock%}

```

result.html

```

{% extends 'base.html'%}
{%block content%}
<p></p>
<footer id="footer">
<div class="footer-top">
<div class="container">
<div class="row justify-content-center">
<div class="col-lg-6">
<a href="#header" class="scrollto footer-logo"></a>
<h2>Knight Studios</h2>
<h3>Prediction Result</h3>
<h4>The estimated number of Ad-Views is: <span style="color: #ff0000; font-weight:
bold;">{{ prediction_text }}</span></h4>
</div></div>
<a href="{{ url_for('index')}}" class="pf">Back to Home</a>
</div></div>
</div></div>
</footer>
{%endblock%}

```

app.py

```

import numpy as np

from flask import Flask, jsonify, request, render_template

import joblib

import pickle

model = pickle.load(open('model.pkl','rb'))

app = Flask(__name__)

@app.route('/')

def index():

return render_template('home.html')

@app.route('/about')

def about():

return render_template('about.html')

@app.route('/pred')

def pred():

return render_template('ind.html')

@app.route('/predict', methods=['GET','POST'])

def predict():

views = float(request.form['views'])

likes = float(request.form['likes'])

dislikes = float(request.form['dislikes'])

comments = float(request.form['comments'])

year = float(request.form['year'])

duration = float(request.form['duration'])

category = float(request.form['category'])

features = np.array([[views, likes, dislikes, comments, year, duration, category]])

prediction = model.predict(features)

output =round(prediction[0],2)

return render_template('result.html', prediction_text='{}'.format(output))

if __name__ == '__main__':

app.run(debug=True, port=8001)

```