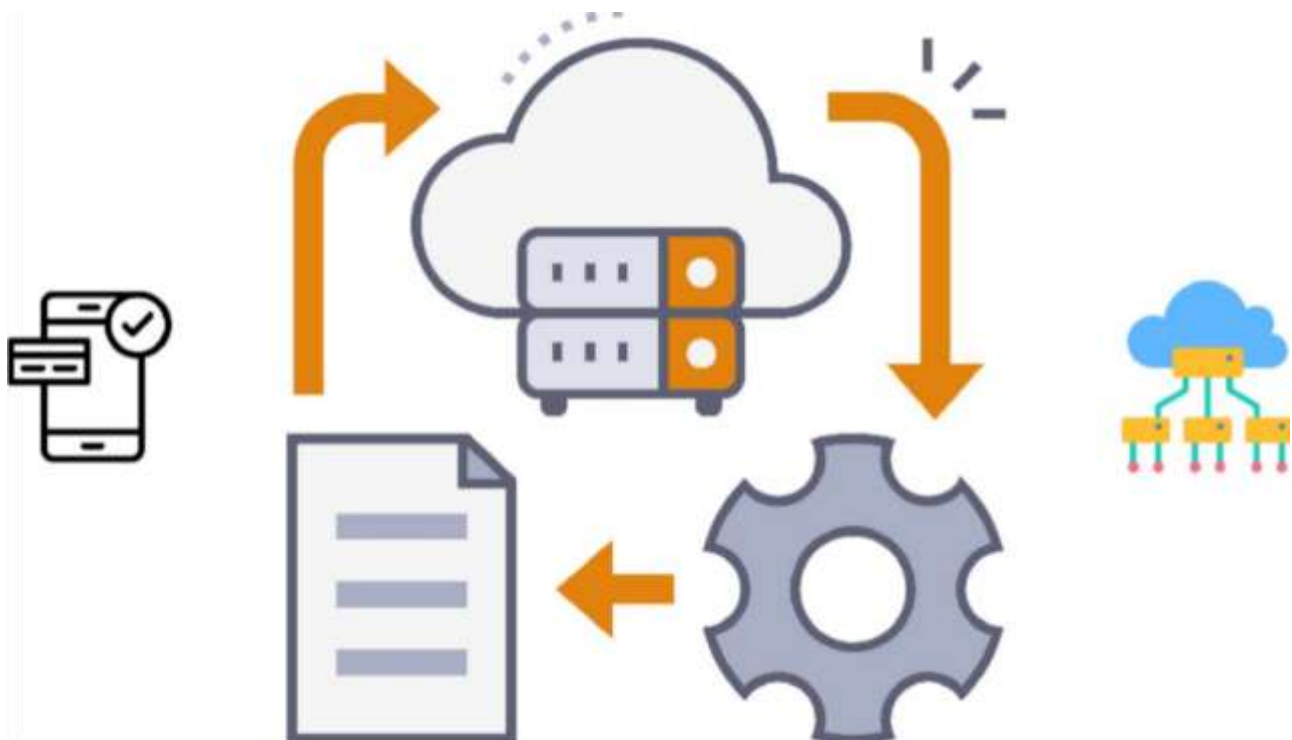


# MODEL DEPLOYMENT PROCESS



# Overview

## Goals

This document outlines the deployment process for the Ad Campaign Recommender application, developed as part of the capstone project. The application leverages machine learning models to predict user demographics (age and gender) based on mobile phone usage patterns, enabling personalized ad campaigns.

# App Architecture

## Frontend

The web application is built using Streamlit, providing an interactive interface for users to input data and receive predictions. Key components of the frontend include:

- Input fields for mobile phone usage data
- Dropdowns for selecting phone models, days of the week, and weeks of the month
- Sliders for app usage counts
- Map integration for geospatial location inputs

## Backend

The backend includes:

- **Gender Prediction Model:**

- **Input features:** Phone brand category, cluster data, day of the week, time of day, and app usage.
- **Output:** Predicted gender (Male/Female).

- **Age Group Prediction Model:**

- **Input features:** Similar to the gender model, with additional location-based clustering.
- **Output:** Predicted age group (e.g., Less than 20, 20-24 years, etc.).

## App Screenshot

### Ad Campaign Recommender

What is this about?

#### Input Data for Prediction

Select the Phone Model

☐ Xiaomi
 ☐ Samsung
 ☐ Vivo
 ☐ Redmi
 ☐ Oppo
 ☐ Huawei
 ☐ Lenovo
 ☐ Google
 ☐ OnePlus
 ☐ HTC
 ☐ Others

Select Week of the month

Week 1

Select Day of the week

Sunday

Select Time of the day

Morning

Enter the App usage

0 100%

Enter Location


Enter Latitude

5.00

Enter Longitude

0.00

See details for Country



#### Perform Prediction

Predict

## Dockerfile

The backend includes:

- **Base image:** Python 3.9-slim
- **System dependencies:** Build-essential tools
- **Environment variables:** PYTHONPATH and PATH
- **Working directory:** /app

# Key Features

## Input Data

- Phone model selection (e.g., Xiaomi, Samsung)
- Week of the month selection
- Day of the week selection
- Time of day selection
- App usage count
- Geospatial location data (latitude and longitude)

### Select the Phone Model

Xiaomi Samsung Miui Meizu Oppo Huawei Lenovo Google OnePlus HTC Others

### Select Week of the month

Week 1

### Select Day of the week

Sunday

### Select Time of the day

Morning

### Enter the App usage

0 1000

### Enter Location

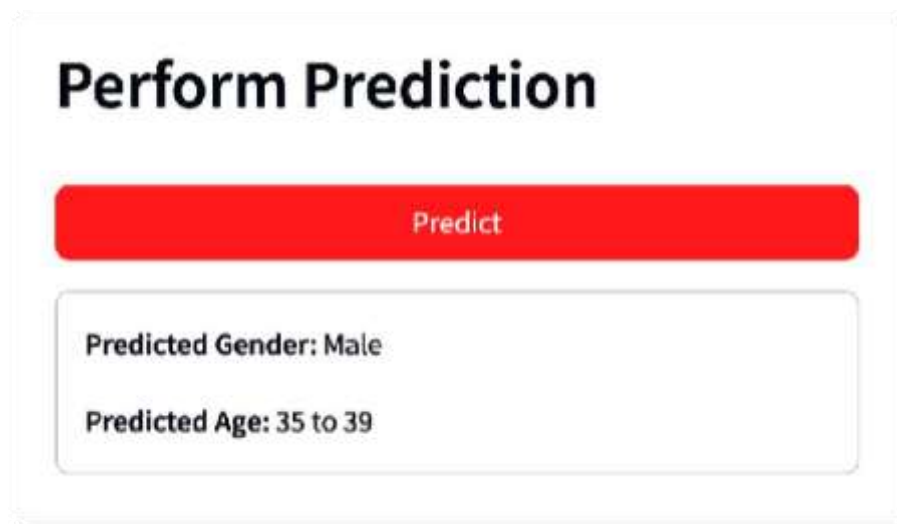
Enter Latitude 0.00

Enter Longitude 0.00

Map showing the location of the user (marked with a red dot).

## Output Predictions

- Predicted gender
- Predicted age group
- Geospatial clustering based on latitude and longitude



## Deployment Features

- Containerized using Docker for portability
- Streamlit interface for user interaction
- BallTree algorithm for geospatial clustering
- Machine learning models loaded from serialized files

## Source code

The code is published on GitHub at,  
<https://github.com/nmurthyr/Ad-Campaign-Predictor.git>

## Web App access

The web app can be accessed at,  
<https://ad-campaign-predictor-nmurthyr.streamlit.app/>

# Campaign Mapping

## Gender-Based Campaigns

- **Campaign 1: Fashion-related campaigns:** Target - Female users
- **Campaign 2: Cashback offers on special days (e.g., International Women's Day):** Target - Female users
- **Campaign 3: Personalized call and data packs:** Target - Male users

## Age-Based Campaigns

- **Campaign 4: Bundled smartphone offers:** Target - Users aged <20 years
- **Campaign 5: Payment wallet offers:** Target - Users aged 24-32 years
- **Campaign 6: Privilege membership cashback offers:** Target - Users aged 24-32 years

# Model Deployment Steps

## Build Docker Image

Run the following command to build the Docker image:

```
dockerbuild-tad-campaign-recommender.
```

## Run the Application Locally

Start the application using:

```
dockerrun-p8501:8501ad-campaign-recommender
```

## Deploy on Cloud Platform (e.g., AWS EC2)

- Upload the Docker image to an S3 bucket.
- Launch an EC2 instance and attach it to the S3 bucket.

- Run the application on the EC2 instance using the Docker container.

## Monitor and Scale

Use monitoring tools like CloudWatch (AWS) or Prometheus to track performance metrics. Scale horizontally by launching additional EC2 instances during peak load.

## Conclusion

The Ad Campaign Recommender application is a fully functional, deployable solution that leverages predictive analytics to enhance marketing strategies in the telecom sector. By providing personalized ad campaigns based on user demographics, this application bridges the gap between data and business outcomes.