# Customer Segmentation with Flask & Machine Learning

This project is a complete end-to-end customer segmentation web app using Flask and K-Means clustering. The app helps businesses understand their customers by analyzing their age, income, and spending behavior.

## Features

* Upload customer CSV file via a web interface
* Segment customers using K-Means Clustering based on age, income, and spending score
* Assign behavioral segments such as Luxury Shopper, Wealthy Saver, Impulsive Buyer, and Budget Conscious
* Recommend offers tailored to each segment
* Suggest likely products for each segment
* Display segment-wise summary including average income, average spending score, and estimated revenue
* Provide downloadable CSV files of segmented customer data and summary

## Technologies Used

* Python 3
* Flask (Web Framework)
* Pandas, NumPy (Data Processing)
* Scikit-learn (Machine Learning)
* HTML + Tailwind CSS for frontend

## Dataset

If you don’t have a dataset, use the provided: [Patterned\_Mall\_Customers.csv](./Patterned_Mall_Customers.csv)

It contains:

* CustomerID
* Gender
* Age
* Annual Income (k$)
* Spending Score (1-100)

## Segmentation Logic

| Segment | Description | Offer Type |
| --- | --- | --- |
| Luxury Shopper | High income + High spending | Premium Products |
| Wealthy Saver | High income + Low spending | Targeted Discounts |
| Impulsive Buyer | Low income + High spending | Buy 2 Get 1 Free |
| Budget Conscious | Medium income + Medium spending | Budget Combos |

## How to Run Locally

1. Clone the repository:

* git clone https://github.com/your-username/customer-segmentation-app.git  
  cd customer-segmentation-app

1. Install dependencies:

* pip install -r requirements.txt

1. Run the Flask app:

* python app.py

1. Open your browser and go to:

* http://localhost:5000

1. Upload your Mall\_Customers.csv or use the sample file.

## Folder Structure

customer-segmentation-app/  
├── app.py  
├── uploads/  
├── static/  
│ ├── segmented\_customers.csv  
│ └── segment\_summary.csv  
├── templates/  
│ ├── index.html  
│ └── results.html  
├── Patterned\_Mall\_Customers.csv  
└── README.md

## Output Summary

Each customer is tagged with a segment, offer, and product category. Segment summaries include average income, average spending score, and estimated revenue.

## Author

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For any queries or suggestions, feel free to open an issue or reach out.

## License

This project is for educational and demonstration purposes. Modify and use freely.