## **📄 Project Report**

### **Project Title**

Product Recommender System (Category-Based**)**

### **1. Introduction**

This project is a simple and effective product recommendation system built using Python. It helps suggest similar products based on a given product, by analyzing its category and brand.  
 The goal is to mimic how e-commerce websites like Amazon and Flipkart provide recommendations to improve the user shopping experience.

### **2. Objectives**

* To develop a lightweight product recommendation system
* To provide relevant product suggestions based on category
* To demonstrate machine learning-based filtering using cosine similarity
* To create a GUI-based user-friendly interface

### **3. Technologies Used**

* Python 3.x
* Pandas
* Scikit-learn
* Tkinter (for GUI)

### **4. Dataset Features**

The dataset is a custom CSV file named products.csv containing the following fields:

* **ProductID**: Unique product identifier
* **Name**: Name of the product
* **Category**: Type of product (e.g., Clothing, Shoes, Sports)
* **Brand**: Brand name of the product

### **5. Methodology**

1. Load the product dataset using Pandas
2. Combine product features (e.g., brand) to use as similarity input
3. Use **TF-IDF vectorization** to convert text data into numerical form
4. Calculate **cosine similarity** between all product vectors
5. Filter products in the **same category** as the selected one
6. Recommend the top 3 similar products based on similarity score
7. Display results in a clean graphical interface using Tkinter