Department of Computer Science Gujarat University

M.Sc.(Artificial Intelligence & Machine Learning) – I

Title of the Project: **Personal Finance**

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Introduction

Personalized financial management involves using ML to analyze an individual's financial data and provide customized recommendations for managing their money.

Objectives of Project

To help people to make better financial decisions, manage their money more effectively, and optimize their financial goals.

Predict monthly expenses, optimize Unusual expense, or assess credit risk, Recommendation of saving & investment.

Steps will be implement

1. Prepare the Data:

Financial APIs:

We will retrieve historical transaction data, including geolocation, merchant, and category information from various Financial APIs

Transaction Data

Personal Transaction Data


```
{
    "account_id": "BxBXxLj1m4HMXBm9WZZmCWVbPjX16EHwv99vp",
    "amount": 2307.21,
    "iso_currency_code": "USD",
    "unofficial_currency_code": null,
    "category": [
      "Shops",
      "Computers and Electronics"
    ],
    "category_id": "19013000",
    "check_number": null,
    "date": "2023-01-29",
    "datetime": "2023-01-27T11:00:00Z",
    "authorized_date": "2023-01-27",
    "authorized_datetime": "2023-01-27T10:34:50Z",
    "location": {
      "address": "300 Post St",
      "city": "San Francisco",
      "region": "CA",
      "postal_code": "94108",
      "country": "US",
      "lat": 40.740352,
      "lon": -74.001761,
      "store_number": "1235"
    },
```


Personal Transaction Data


```
"name": "Apple Store",
    "merchant_name": "Apple",
    "payment_meta": {
      "by_order_of": null,
      "payee": null,
      "payer": null,
      "payment_method": null,
    },
    "payment_channel": "in store",
    "pending": false,
    "pending_transaction_id": null,
    "personal_finance_category": {
      "primary": "GENERAL_MERCHANDISE",
      "detailed": "GENERAL_MERCHANDISE_ELECTRONICS"
    },
    "account_owner": null,
    "transaction_id": "lPNjeW1nR6CDn5okmGQ6hEpMo4lLNoSrzqDje",
    "transaction_code": null,
    "transaction_type": "place"
  }
```

Also we will gather category wise spending data from APIs.

Item	Monthly Budget	Actual Spending (cash outflows) Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Totals Actual	Budgeted*
Income	2,730	2,730	2,730	2,730	2,940	2,730	2,730	2,730	2,730	2,850	2,850	2,850	2,850	33,450	32,760
Savings	150	150	150	200	150	90	50	30	100	250	250	150	40	1,610	1,800
Mortgage/rent	826	826	826	826	826	826	826	826	826	826	826	826	826	9,912	9,912
Housing costs (insurance, utilities)	190	214	238	187	176	185	188	146	178	198	177	201	195	2,283	2,280
Telephone	50	43	45	67	56	54	52	65	45	43	52	49	47	618	600
Food (at home)	280	287	277	245	234	278	267	298	320	301	298	278	324	3,407	3,360
Food (away from home)	80	67	78	84	87	123	109	89	83	67	76	83	143	1,089	960
Clothing	100	98	78	123	156	86	76	111	124	87	95	123	111	1,268	1,200
Transportation (auto operation, public transportation)	340	302	312	333	345	297	287	390	373	299	301	267	301	3,807	4,080
Credit payments	249	249	249	249	249	249	249	249	249	249	249	249	249	2,988	2,988
Insurance (life, health, other)	45	—	—	135	—	—	135	—	—	135	—	—	135	540	540
Health care	140	176	145	187	122	111	156	186	166	134	189	193	147	1,912	1,680
Recreation	80	67	98	123	98	67	45	87	98	65	87	87	111	1,033	960
Reading, education	40	32	54	44	34	39	54	12	38	54	34	76	45	516	480
Gifts, donations	100	102	110	94	87	123	89	95	94	113	87	99	134	1,227	1,200
Personal miscellaneous expense	60	89	45	67	54	98	59	54	49	71	65	90	56	797	720
Total	2,730	2,702	2,705	2,964	2,674	2,626	2,642	2,638	2,743	2,892	2,786	2,771	2,864	33,007	32,760
Surplus (deficit)		28	25	(234)	266	104	88	92	(13)	(42)	64	79	(14)	443	—

Book Source:-

Personal Finance

- Jack R Kapoor, Les R Dlabay

Features of Dataset

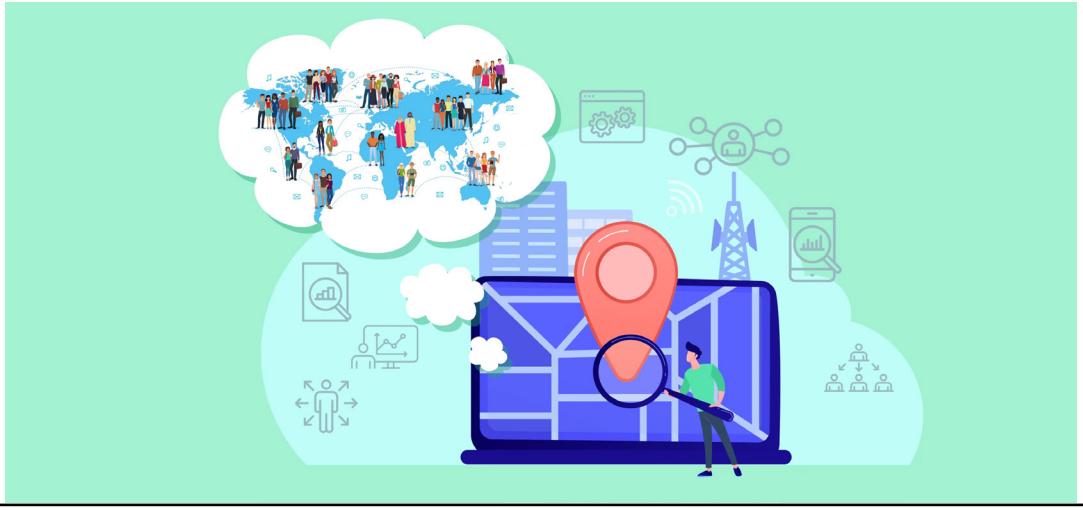
- Date
- Expense Cateogry
- Expense Amount
- Payment Method
- Merchant/Vendor
- Location of Expense
- Expense Frequence - Recurring or one time
- Income
- Income Frequence - Monthly, weekly
- Savings
- Invesment
- Demographic Infomation - Age, Family size
- Previous Expense History
- Future Financial Commitments - Upcomming bills, Planned Expenses

Steps will be implement

2. Location-Based Segmentation:

Group data by location:

Analyzing data based on geographic locations can account for varying income-expense ratios due to cost of living differences.



Steps will be implement

3. Build the Model

Regression:

Predicting numerical values.

Use Linear regression, decision trees, and random forests

For Expense Forecasting.

Classification:

Use logistic regression, support vector machines, or neural networks.

For Anomaly Detection, Expense Categorization.

Expected Application (Output)

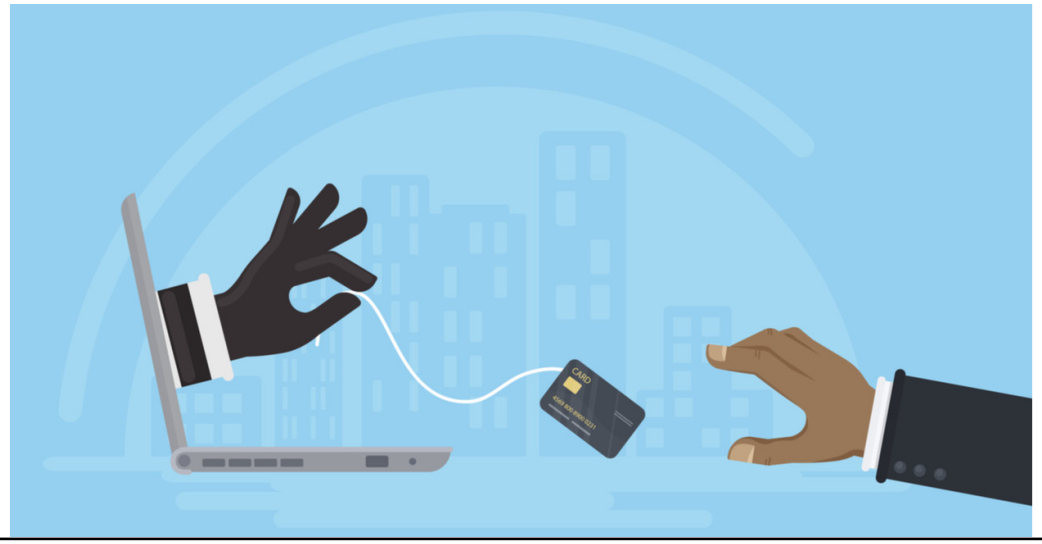
1. Predicted Expenses:

The primary output is the prediction of future expenses.
This output can take the form of numerical values representing the estimated expenses for specific time periods (e.g., monthly, quarterly, annually).

Expected Application (Output)

2. Anomaly Detection:

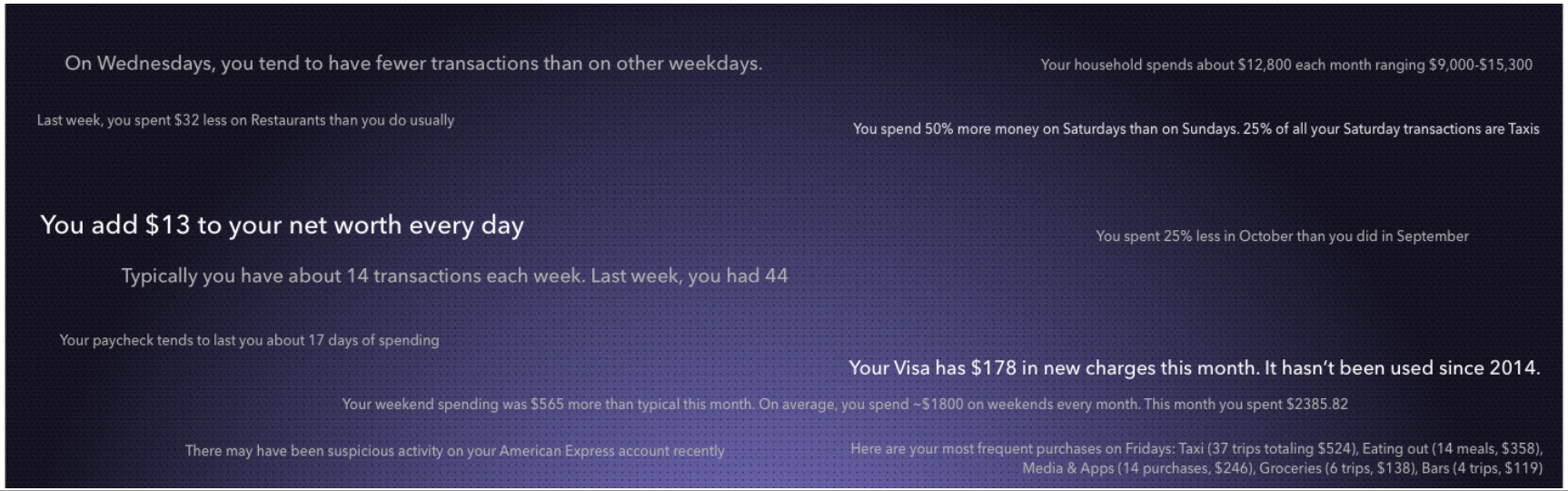
The model can flag unusual or unexpected expense patterns, helping users identify potential errors or fraud in their financial transactions.



Expected Application (Output)

3. Recommendations:

Based on predicted expenses and user preferences, the model may provide personalized recommendations. For instance, it could suggest ways to save money or allocate funds more efficiently.



Expected Application (Output)

4. Notifications and Alerts:

In real-time applications, the model may send notifications or alerts to users when it detects significant deviations from predicted expenses or budget thresholds.

You Overspend 5000 every month !!

Implementation Overview

Backend Framework:

For server-side development,
data processing, &
model integration.

Frontend:

Thank You