

PERSONAL FINANCE ANALYZE WITH LLMS

11 May 2024

PRESENTED BY
ເກົ່າມນີ ຮັຕບມນີ
6610422006

PRESENTED BY
ຮຽນ ພຣະຈຳກຸລ
6610422009

State of Problem

Managing income and expenses is crucial for personal financial planning, such as budgeting and savings. We can clearly specify spending in each category or type to understand where our money goes and how it impacts our daily lives.

Categorizing expenses correctly can be difficult

Managing daily income and expenses without advanced technology requires manual effort.

Objective :

- To enhance efficiency in categorizing expenses
- To reduce time spent on recording income and expenses
- To aid in assessing expenditures
- To provide financial planning guidance

Project Overview

Our project aims to revolutionize personal financial management through advanced technology and data analytics. By leveraging Dash-Plotly transactional data, we employ cutting-edge Text-Classification, including Large Language Models (LLMs), for precise categorization and analysis of income and expenses. Our primary goal is to empower users to make informed financial decisions by providing transparent views and insightful evaluations of their annual saving rates. Utilizing Text-Generate from LLM technology, we offer personalized recommendations to enhance overall financial well-being.



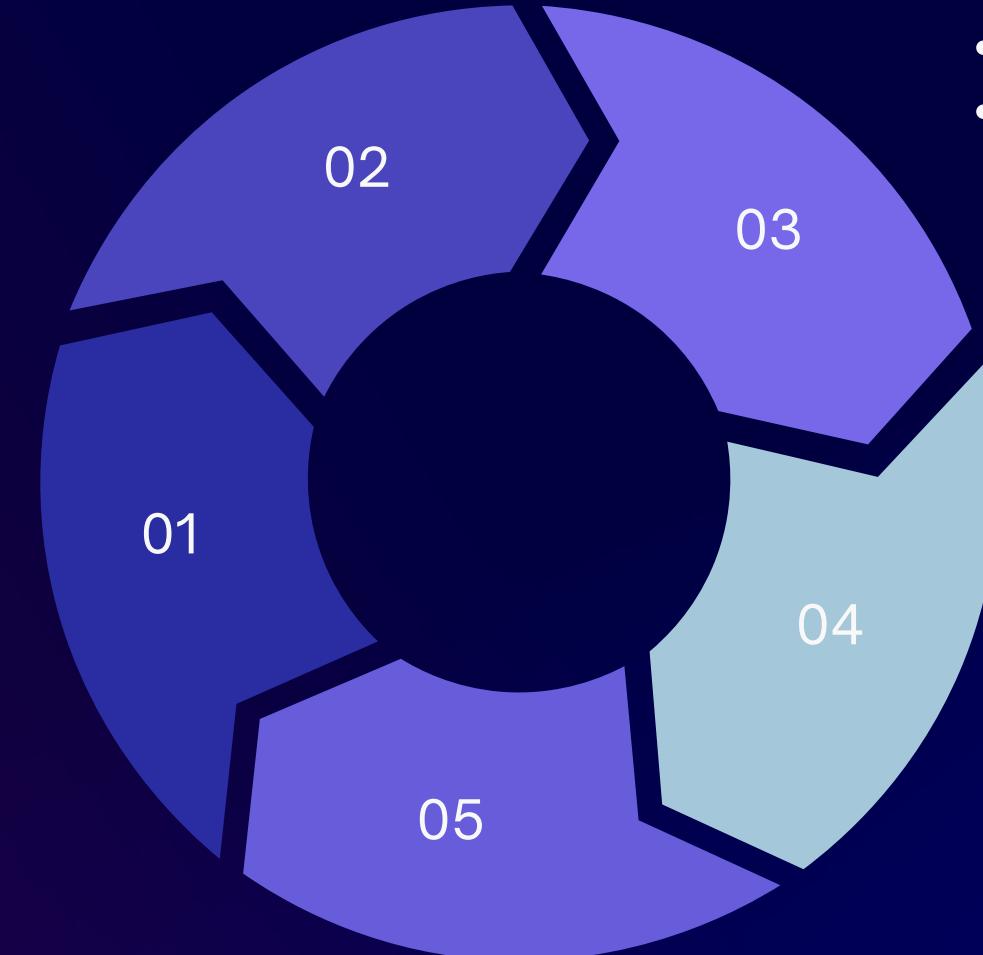
Project Process



1. Input Income - Expense files



2.LLM categorize income-expense bart-large-mnli



5.Dash board visualization



- USE PLOTLY EXPRESS TO CREATE GRAPH
- VISUALIZE ON DASHBOARD

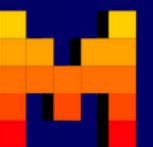
3.Data preparation

- DATA CLEANING
- QUERY DATA
- AGGREGATE DATA



4.Read transaction data with categories

- YEARLY EXPENSE
- GIVE SAVING RATE
- EVALUATE BY OBTAINED MISTRAL



screenshot of Dashboard

Processing techniques, specifically utilizing Large Language Models (LLM) for Text-Classification. Additionally, we provide insightful evaluations of saving rates for each year, generated using the same cutting-edge LLM technology, empowering users to make informed financial decisions.

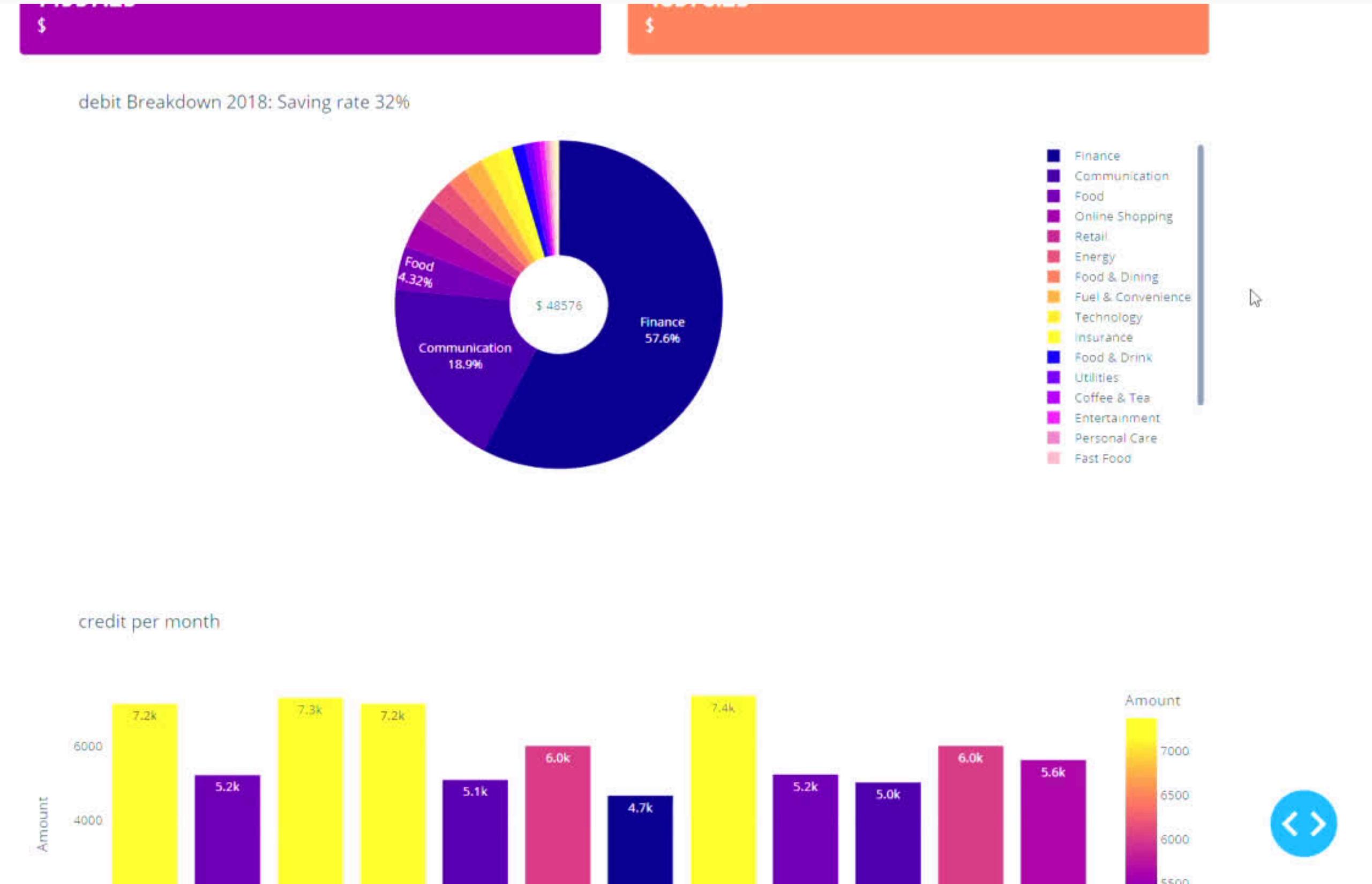
Saving Rate evaluate of 2018:

Based on the given savings rate of 32%, the recommended personal finance management level would be "Good". This savings rate demonstrates financial discipline and the ability to build wealth over time. It is likely that individuals saving 32% of their income are able to cover emergencies and make progress towards their financial goals. However, it is important for them to continue to maintain and possibly increase their savings rate to maximize their financial potential. Here's a summary of

Saving Rate evaluate of 2019:

Based on the given savings rate of 9%, the recommended personal finance management level would be "Good". This savings rate demonstrates financial discipline and the ability to build wealth over time. However, it may not be enough to cover unexpected emergencies or achieve some long-term financial goals at an accelerated pace. Therefore, it's important to continue maintaining and possibly increasing the savings rate to ensure financial security and progress towards financial goals.

Here are some recommendations for personal finance



Income and Expense Analysis

Our platform offers a comprehensive overview of income and expense trends derived from transactional data. Categories are meticulously curated through advanced Natural Language Processing techniques, specifically utilizing Large Language Models (LLM) for Text-Classification. Additionally, we provide insightful evaluations of saving rates for each year, generated using the same cutting-edge LLM technology, empowering users to make informed financial decisions.

Saving Rate evaluate of 2018:

Based on the given savings rate of 32%, the recommended personal finance management level would be "Good". This savings rate demonstrates financial discipline and the ability to build wealth over time. It is likely that the individual can cover emergencies and make progress towards financial goals. However, it is important for the individual to continue to maintain and possibly increase their savings rate to accelerate their progress towards financial independence. Here's a summary of the savings rate categories and recommendations based

Saving Rate evaluate of 2019:

Based on the given savings rate of 9%, the recommended personal finance management would fall under the "Good" category. This savings rate demonstrates financial discipline and the ability to build wealth over time. It is likely that individuals saving 9% of their income are able to cover emergencies and make progress towards their financial goals. However, it's important to note that everyone's financial situation is unique, and there may be other factors to consider beyond just the savings

Evaluate of each year from Text-Generate



```
def generate_payload(saving_rate):
    """
    Args:
        saving_rate:
    Returns:
    """

    API_URL = "https://api-inference.huggingface.co/models/mistralai/Mistral-7B-Instruct-v0.2"
    headers = {"Authorization": "Bearer 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"}
    input_question = f"If you are professional personal finance consultant,\n    Can you summarize and recommend personal finance management with a saving rate of {saving_rate}% \\\n    by using {saving_rate_evaluate} reference for recommend?"
    chunk_payload = {
        "inputs": input_question,
        "options" : {"max_new_tokens":10000},
        "parameters": {"return_full_text": True}
    }
    response = requests.post(API_URL, headers=headers, json=chunk_payload)
    response_text = response.json()[0]['generated_text']

    # Remove the input question from the generated text
    response_text = response_text.replace(input_question, "").strip()

    return response_text

# Call the function to get recommendations for 2018
payload_2018 = generate_payload(saving_rate18)
payload_2018
```

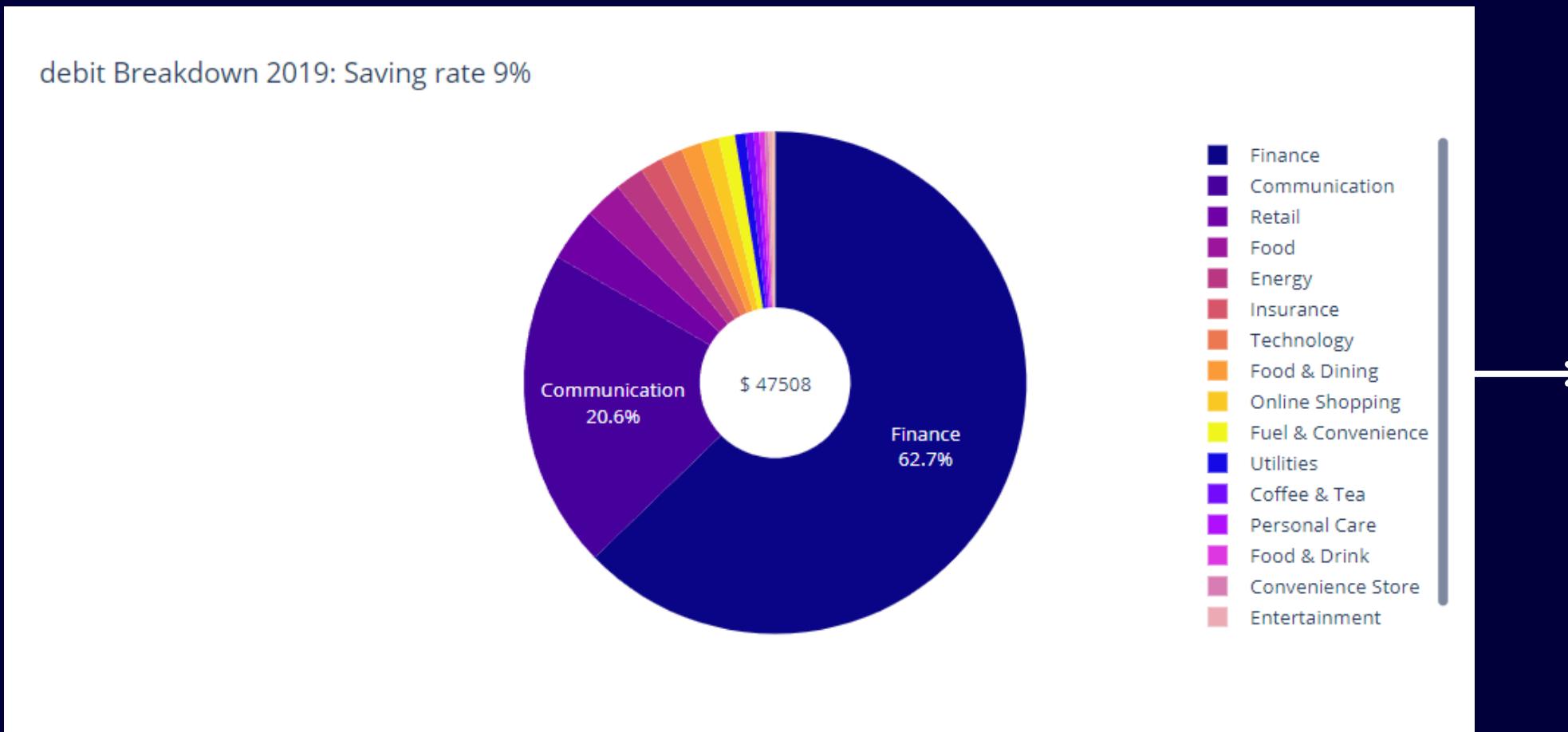
Summary of Income and Expense visualize by Card component

The screenshot shows a dashboard interface with two cards. The first card, titled 'Overview 2018' and colored purple, displays 'Total income' as \$71937.25. The second card, colored orange, displays 'Total expense' as \$48576.25. At the top, there are tabs for '2018' and '2019', with '2018' being active.

```
# Card 2018
income2018c = dbc.Card(
    dbc.CardBody([
        html.H6("Total income", className="card-Title"),
        html.H4(total_income18, className="card-subtitle"),
        html.P("$", className="card-text")
    ], style={'background-color': "#9A169F", "color": "white", 'border-radius': '4px'}),
    style={"width": "100%"}
)

expense2018c = dbc.Card(
    dbc.CardBody([
        html.H6("Total expense", className="card-Title"),
        html.H4(total_expense18, className="card-subtitle"),
        html.P("$", className="card-text")
    ], style={'background-color': "#ED7C50", "color": "white", 'border-radius': '4px'},
    style={"width": "100%"}
)
```

Categorize Transaction obtain by Text-Classification



```
# เลือกข้อมูลในคอลัมน์ที่ 1 ของ DataFrame เป็นตัวอย่างข้อความที่ต้องการทำนายป้ายกำกับ
sequence_to_classify = df["Description"].unique().tolist()

# ป้ายกำกับที่เป็นไปได้
candidate_labels = ['None', 'Online Shopping', 'Housing', 'Food & Dining', 'Finance',
                    'Entertainment', 'Retail', 'Energy', 'Music & Audio',
                    'Communication', 'Fuel & Convenience', 'Utilities', 'Coffee & Tea',
                    'Technology', 'Personal Care', 'Food & Drink', 'Transportation',
                    'Gas Station', 'Grocery Store', 'Insurance', 'Home Services',
                    'Fast Food', 'Convenience Store', 'Electronics', 'Food']

# ทำนายป้ายกำกับสำหรับข้อความในตัวอย่าง
results = llm(sequence_to_classify, candidate_labels)

# แสดงผลลัพธ์การทำนาย

# สร้างรายการข้อมูลที่เก็บได้จากการวนลูปผลลัพธ์การทำนาย
data = []

for text, result in zip(sequence_to_classify, results):
    max_score_index = result["scores"].index(max(result["scores"]))
    max_label = result["labels"][max_score_index]
    max_score = result["scores"][max_score_index]
    data.append([text, max_label])

# สร้าง DataFrame จากรายการข้อมูล
df_unique_results = pd.DataFrame(data, columns=["Text", "Predicted Label"])

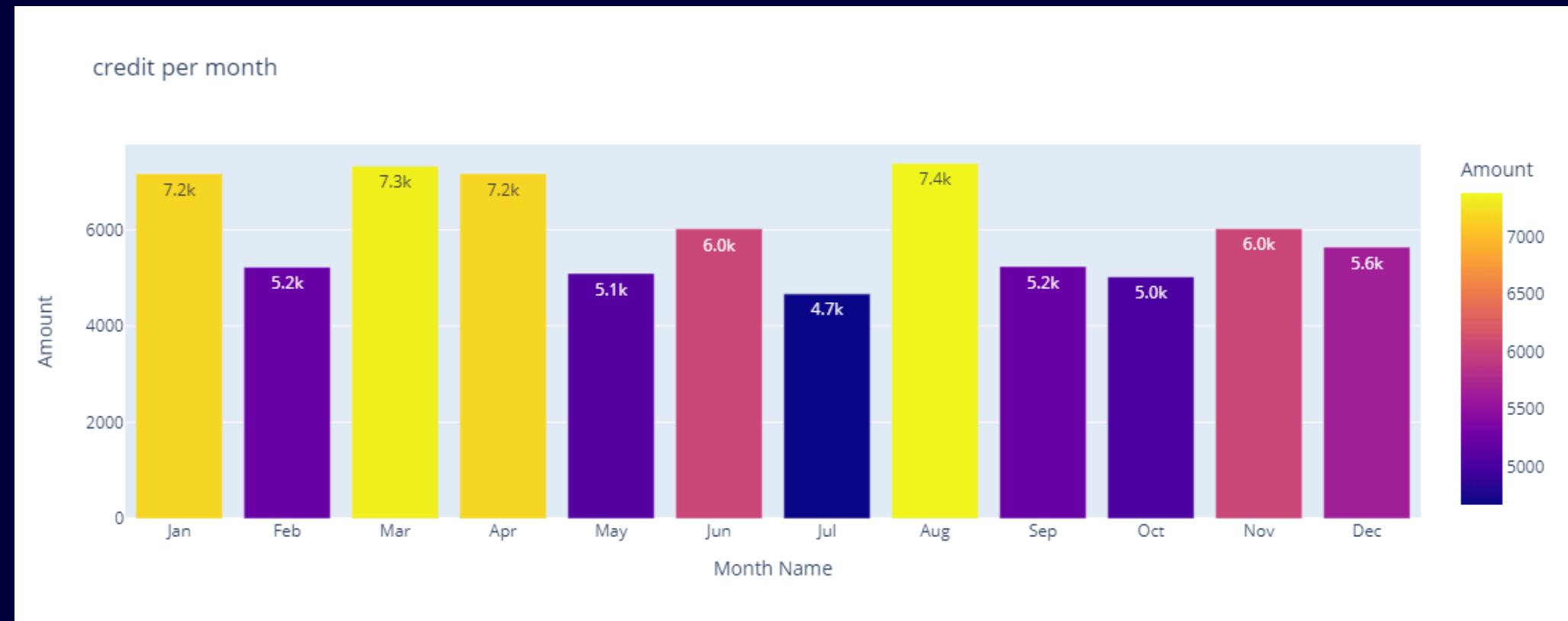
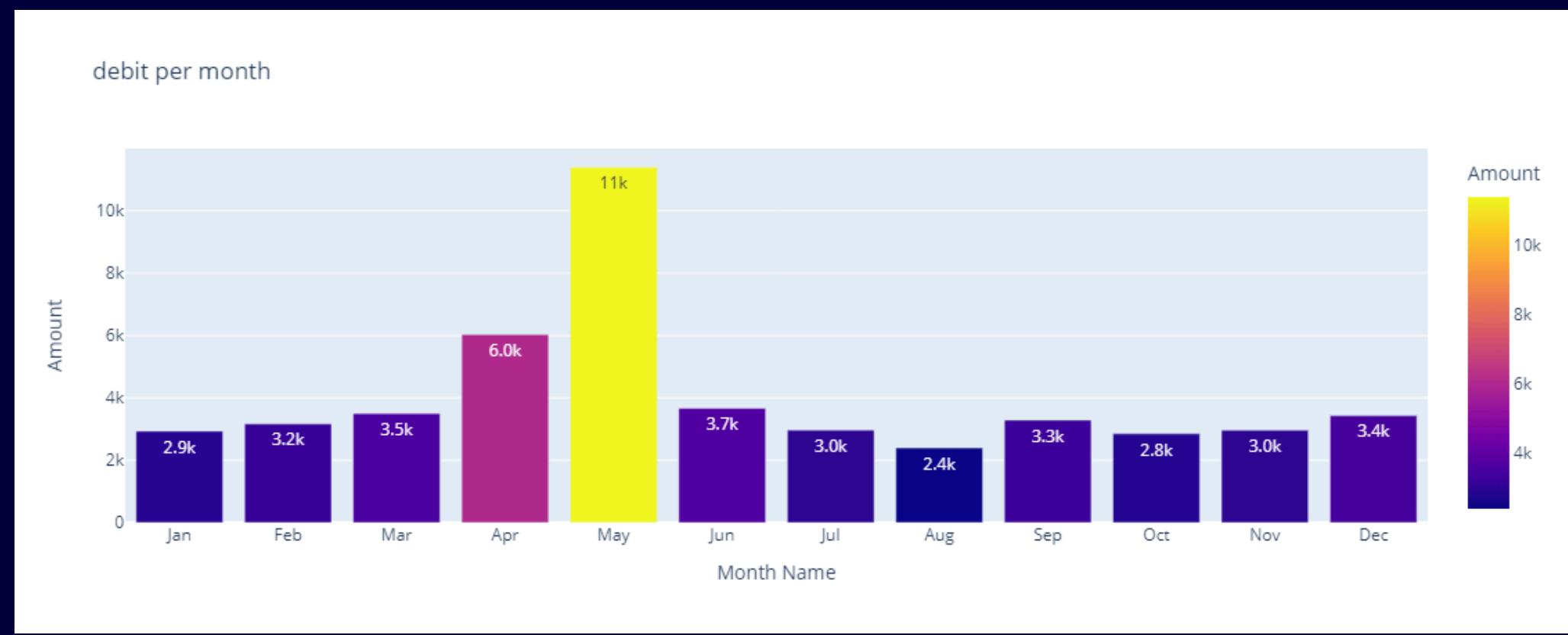
# แสดง DataFrame
print(df_unique_results)
```

```
{"sequence": "Amazon", "labels": ["online Shopping", "Entainment", "Food & Dining"], "scores": [0.9544157385826111, 0.036866966634988785, 0.008717305958271027]}
```

Categorize Transaction obtain by Text-Classification

	Date	Description	Amount	Transaction Type	Account Name	Text	Category	Year	Month	Month Name
0	01/01/18	Amazon	11.11	debit	Platinum Card	Amazon	Online Shopping	2018	1	Jan
1	01/02/18	Mortgage Payment	1247.44	debit	Checking	Mortgage Payment	Finance	2018	1	Jan
2	01/02/18	Thai Restaurant	24.22	debit	Silver Card	Thai Restaurant	Food & Dining	2018	1	Jan
4	01/04/18	Netflix	11.76	debit	Platinum Card	Netflix	Entertainment	2018	1	Jan
5	01/05/18	American Tavern	25.85	debit	Silver Card	American Tavern	Food & Drink	2018	1	Jan
...
800	09/23/2019	Amazon	24.63	debit	Platinum Card	Amazon	Online Shopping	2019	9	Sep
802	09/28/2019	BP	33.46	debit	Platinum Card	BP	Energy	2019	9	Sep
803	09/28/2019	Sheetz	4.27	debit	Platinum Card	Sheetz	Personal Care	2019	9	Sep
804	09/30/2019	Starbucks	1.75	debit	Platinum Card	Starbucks	Retail	2019	9	Sep
805	09/30/2019	Internet Service Provider	75.00	debit	Checking	Internet Service Provider	Technology	2019	9	Sep

Income- Expense each months Overview



Expansion and Application



- Personal Finance Assistant
- Expense Tracking and Analysis
- Investment Portfolio Management
- Financial Goal Setting and Tracking
- Budget Optimization Solutions

