SFFA

Saudi Focused Financial Advisor

Khaled Alqahtani

Team Leader

Anas Alshehri

Feild Expert

Abdulaziz Binyabis

Programmer

SFFA

Agenda

SFFA

Project Overview

- SFFA is an intelligent system to help you meet your financial goals.

- Objective: Predict the most suitable budgeting rule (50/30/20,70/20/10, and 60/20/20) for users based on financial profiles.

SFFA

Data Collection

- Data Source:
  - A comprehensive survey conducted to gather financial data.
  - Data points included salary, age, expenses, debt, employment status, goals, and budgeting preferences.
- Purpose: Understand the relationship between budgeting rules, financial comfort, and goal achievement.

SFFA

Data Collection

- Initial Survey: The domain was rather limited, resulting in data that did not accurately represent Saudi Arabian society.
- Updated Survey: Contained a refined version with updated questions to reflect more factors. This survey was sent to a wider audince

SFFA

Survey

Financial Statues Survey

This is a survey to study the situation of each Saudi individual in terms of Financial expenses and goals.

Your name *

Short answer text

Net-income (In SAR) *

Short answer text

Age *

Short answer text

State *

- Single
- Married

What is your sex? *

- Male
- Female

How much do you spend in your debts? (Monthly) *

Short answer text

How much do you spend on your elementary needs monthly? *

Short answer text

What is your primary goal in your financial planning? *

- Saving
- Investment

How many children do you have? *

Short answer text

SFFA

Survey

What category describe your statues best? *

- Employed
- Unemployed
- Student

What is your nationality? *

- Saudi
- Other...

What budgeting rule do you use in your financial planning? (Expenses/ Savings / Investment) *

- 50/30/20
- 70/20/10
- 60/20/20

Are you comfortable with you Financial statues? *

- Yes
- No

Are you approaching the goal you specified? *

- Yes
- No

SFFA

Data Summary

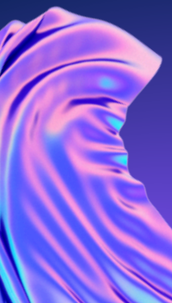
- 1176 responses
- 488 post cleaning responses
- The data structure looks like this

Name	Salary (SAR)	Age	State	Sex	nthly Debt (	tary Expens	Goal	nber of Chil	loyment_St	Nationality	dgeting_Ru	ial_Comfort	oal_Progress
Ibrahim	3341	30	Single	Female	824.26	2607.09	Investment	0	Student	Saudi	50/30/20	['no']	yes
abdulmajic	2595	27	Married	Male	362.05	4919.38	Savings	5	Student	Saudi	50/30/20	['yes']	no
Bander	2472	26	Married	Male	204.87	4152.5	Savings	3	Student	Saudi	50/30/20	['yes']	yes
sami	2841	57	Married	Male	464.94	5733.83	Savings	0	Unemploye	Saudi	50/30/20	['yes']	yes
salem	2337	54	Single	Male	507.02	4012.42	Investment	0	Unemploye	Saudi	50/30/20	['yes']	yes
Naif	1833	53	Married	Male	481.5	9286.48	Investment	1	Unemploye	Saudi	50/30/20	['yes']	yes

SFFA

Programing and Simulation Tools

- **Programming Language:** Python.
- **Libraries:**
  1. **Pandas** and **NumPy** for data processing.
  2. **Scikit-learn** for model building and evaluation.
  3. **Flask** for app development.
  4. **Joblib** for model serialization.
- **Deployment Platform:** Render.



SFFA

Data Preparing

- **Steps:**
  1. Ensure numeric columns are properly formatted
  2. Filter irrelevant records
  3. Drop irrlivant column
  4. Removing outliers
  5. Encoding categorical variables
  6. Feature engineering

```
# Filter out rows where the conditions are met
filtered_data = data[
    (data['nationality'].str.lower() == 'saudi') ]  # Keep only rows w
filtered_data = filtered_data[
    (filtered_data['financial_comfortability'].str.lower() != 'no') ]
filtered_data = filtered_data[
    (data['goal_progress'].str.lower() != 'no')  # Exclude rows where
```

```
numeric_columns = ['salary_(sar)', 'age', 'monthly_debt_(sar)',
for col in numeric_columns:
    data = remove_outliers_iqr(data, col)
```

```
# Create new features
data['debt_to_income_ratio'] = data['monthly_debt_(sar)'] / data['salary_(sar)']
data['savings_ratio'] = data['elementary_expenses_(sar)'] / data['salary_(sar)']
```

SFFA

Model Training

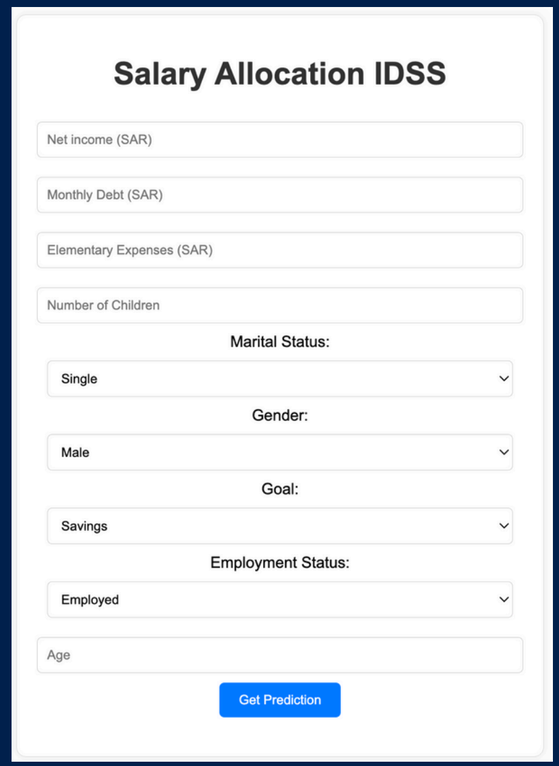
```
# Define features (X) and target (y)
X = data.drop(['budgeting_rule'], axis=1)  # Features
y = data['budgeting_rule']  # Target

# Train a Random Forest model using OOB evaluation
rf_model = RandomForestClassifier(
    n_estimators=100,
    max_depth=5,
    min_samples_split=10,
    min_samples_leaf=5,
    oob_score=True,
)
rf_model.fit(X, y)
```

SFFA

App Implementation

- **Steps:**
  1. Creating a simple HTML page for user input
  2. Creating a Flask app to handle the backend
  3. Loading the random forest model to process user input
  4. Deploying the app using Render

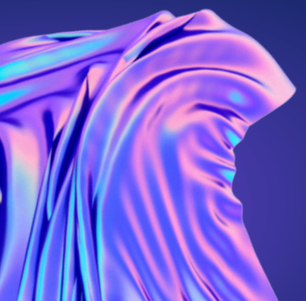
```python
# Initialize Flask app
app = Flask(__name__)
# Load the saved model
model = joblib.load('salary_allocation_model.pkl')
# Define the home route
@app.route('/')
def home():
    return render_template('index.html')  # Render the HTML form
```



SFFA

Try the IDSS!

SCAN ME



SFFA

Model Evaluation

- **Cross-Validation:**

```
cv_scores = cross_val_score(rf_model, X, y, cv=5)
print(f"Cross-Validation Accuracy: {cv_scores.mean():.2f}")
```

✓ 1.3s

```
Cross-Validation Accuracy: 0.89
```

- **OOB Score and Accuracy:**

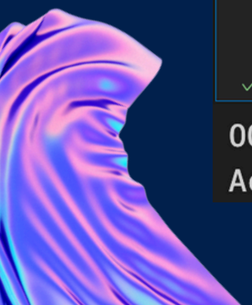
```
# Get the OOB score
oob_score = rf_model.oob_score_
print(f"OOB Score: {oob_score:.4f}")
# Evaluate the model on training data
y_pred = rf_model.predict(X)
# Accuracy
accuracy = accuracy_score(y, y_pred)
print(f"Accuracy on Training Data: {accuracy:.4f}")
```

✓ 0.3s

```
OOB Score: 0.8934
Accuracy on Training Data: 0.9631
```

- **Classification Report:**

```
Classification Report:
              precision    recall  f1-score   support

           0       0.98      0.98      0.98       390
           1       0.84      0.88      0.86        42
           2       0.91      0.89      0.90        56

    accuracy                           0.96       488
   macro avg       0.91      0.92      0.91       488
weighted avg       0.96      0.96      0.96       488
```



SFFA

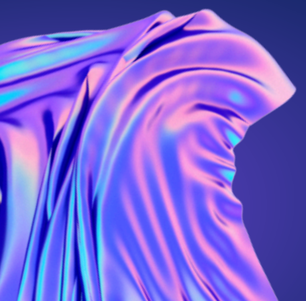
Areas of Improvment

1. Limitations

- Potential for bias due to self-reported survey responses.
- Time

2. Future Enhancements:

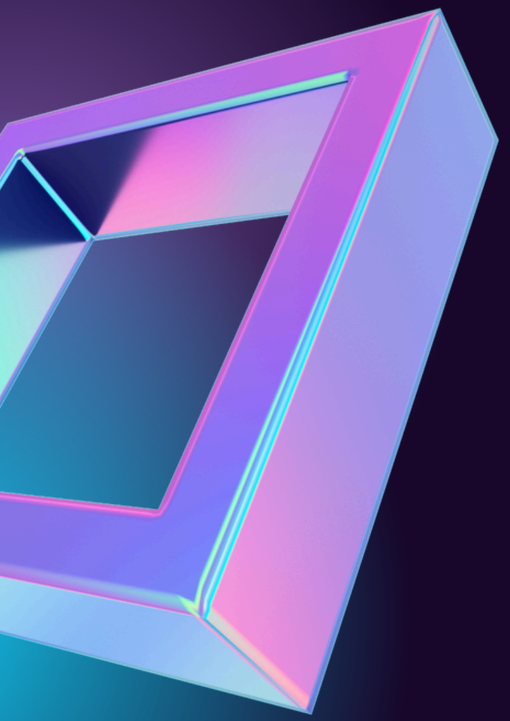
- Provide more budgeting rules
- Expand the survey to include a broader demographic.



SFFA

Conclusion

- Successfully built a data-driven application to analyze financial habits and predict budgeting rules. Empowered users with actionable insights for better financial management.
- Many areas to improve is there, yet the idea is very promising and the project proved its feasibility



Thank You