

EASYMONEY PROJECT

"End-to-End Machine Learning

"EasyMoney Business case: Make your dreams come true without complications "

- 03 INTRODUCTION**
- 06 CONTEXT**
- 08 TASK 1: ANALYSIS**
- 09 TASK 2: SEGMENTATION**
- 10 TASK 3: RECOMMENDATION**
- 13 TASK 4: MONITORING KPI'S**
- 16 TASK 5: COORDINATION, MLOPS PLAN**
- 17 CONCLUSIONS**

OBJECTIVE

Enhance customer engagement and optimize marketing strategies for EasyMoney by using detailed data analysis and machine learning models.

1.Data analytics 2. Customer segmentation 3. Predictive modeling

CONTEXT

Commercial_activity cvs file

Name	Table	Description
active_customer	commercial_activity	Client activity indicator in our application
entry_channel	commercial_activity	Customer acquisition channel
entry_date	commercial_activity	Date on which first easyMoney contract was signed
segment	commercial_activity	Customer business segment

Sociodemographic csv file

Name	Table	Description
age	sociodemographic	Customer age
country_id	sociodemographic	Country of residence of the client
deceased	sociodemographic	Deceased index. N/S
gender	sociodemographic	Gender
region_code	sociodemographic	Customer's province of residence (for ES)
salary	sociodemographic	Household gross income

Products csv file

Name	Table	Description
credit_card	products	Credit cards
debit_card	products	Debit card
em_account_p	products	easyMoney+ account
em_account_pp	products	easyMoney++ account
em_account	products	easyMoney account
emc_account	products	easyMoney Crypto account
funds	products	Investment funds
loans	products	Loans
long_term_deposit	products	Long term deposits
mortgage	products	Mortgage
payroll	products	payroll
payroll_account	products	Account awarded with a bonus due to payroll
pension_plan	products	Pension plan
securities	products	Securities
short_term_deposit	products	Short-term deposits

Customer ID & Date Ingestion common to 3 files

pk_cid	pk	Customer identifier
pk_partition	pk	Data ingestion date

DASHBOARD

ANALYSIS

Dataset Overview: Analysed nearly 6 million records, reduced to 456,373 unique customer profiles, addressing duplicated customers as each subscriber appears in every batch after the subscription date.

Behavioural Insights: Identified a small percentage of short-term deposit subscriptions and significant trends in customer engagement, with a notable peak in active subscriptions in mid-2018.

Customer Lifecycle Dynamics: Revealed critical patterns in new subscriber rates, indicating spikes in acquisitions and the importance of differentiating active from inactive subscribers for strategic engagement.

Channel & Retention Analysis: Assessed entry channels' effectiveness, showing a predominant acquisition via KHE, and highlighted the shift towards retaining subscribers as a key strategic focus.

SEGMENTATION (KMODES CLUSTERING)

Cluster 0: Entry-Level Engagers

Diversity and inclusivity of various age groups and financial backgrounds. suggesting their wide-ranging product interests.

Cluster 1: Steady Mid-Agers Savers

Key demographic for the bank, with a consistent financial approach. Emphasizes the stability and traditionalism.

Cluster 2: Financially Engaged

Mature and financially stable customer base. Long-standing relationship with the bank and are experienced in financial matters.

Cluster 3: Emerging Customers

This cluster comprises newer customers to the bank.

Cluster 4: Balanced Customers

Balance in customer demographics and financial engagement. Potential for growth and deeper engagement.

Cluster 5: Growth Seekers

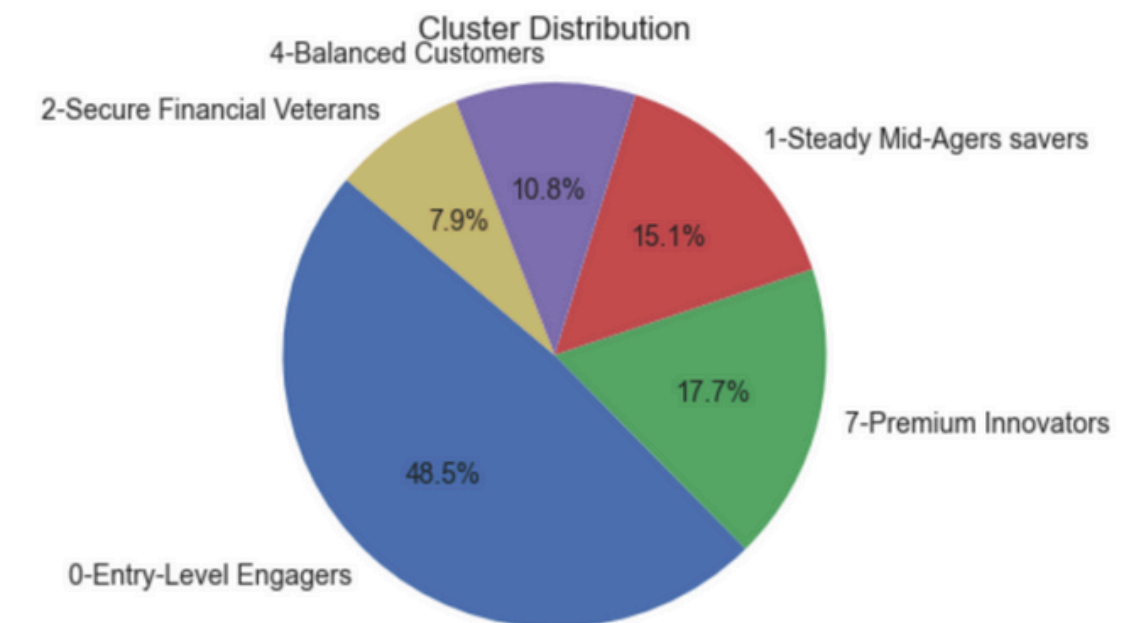
Younger demographic and potential for growth. May be open to trying new financial products and services.

Cluster 6: Aspiring Diversifiers

Customer group aiming to broaden their financial portfolio. Potential desire to improve their financial standing.

Cluster 7: Premium Innovators

Segment with significant financial resources and a propensity towards adopting new banking technologies or products.

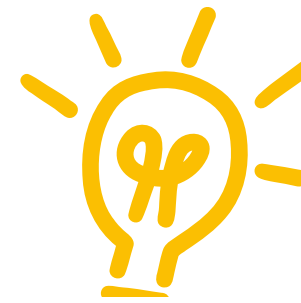




RECOMMENDATION

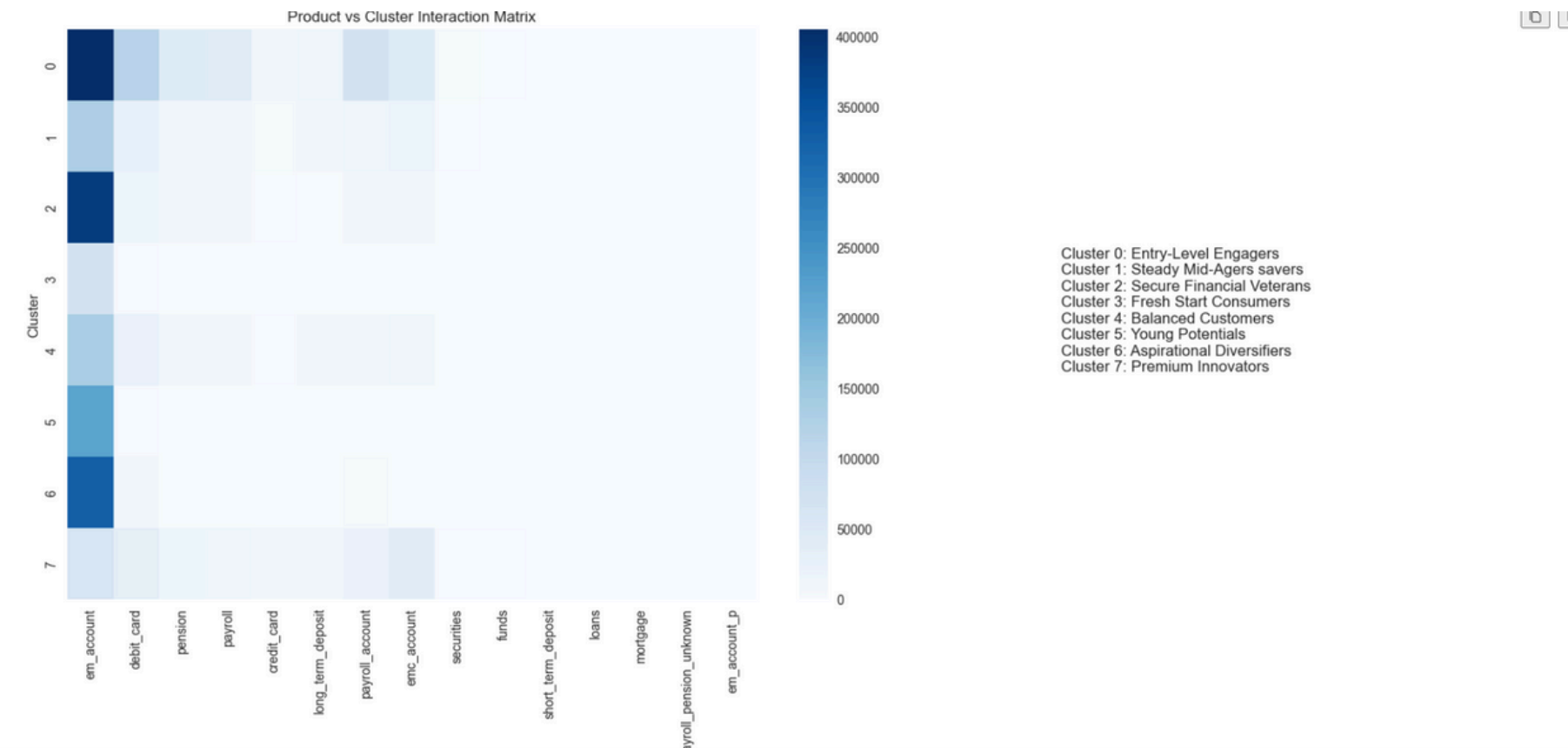
Overview and Objectives:

- **Campaign Goal:** Elevate EasyMoney's market presence and customer trust with "PiggyBank Bonanza," focusing on personalized Piggy Account product bundles.
- **Problem Addressed:** Predict campaign response rate and expected ROI for 10,000 targeted customers, enhancing product appeal and profitability based on product of interest of users.
- **Strategic Approach:**
 - Select customers based on the most engaged and profitable to target our 10,000 customers with high potential ROI.
 - Design the model and predict the probability that each user select a particular service.
 - Predict the ROI
 - Improve the model continuously
 - Integrate real-time data and feedback for continuous improvement.



RECOMMENDATION

- User/data Selection:



- Most ROI Potential

Cluster	engagement_Rank	potential_roi	engagement_rate	engagement_ROI	best_customer_to_target_Rank
7	4572.0	261.142857	0.921290	240.588424	1.0
0	4572.0	261.142857	0.921290	240.588424	1.0
7	4572.0	261.142857	0.921290	240.588424	1.0



RECOMMENDATION

Outcome and Adjustments:

- Achieved a nuanced recommendation system, ready to impact customer interactions positively.
- The model on average predicted 17% less or more than the actual likelihood of a user selecting a particular service
- The model prediction is around approx.600,000 Euros ROI for the next campaign.
- Pessimistic scenario prediction considering the model always predict 17% higher than the actual is approx.170,000 Euros
- Expected ROI : average of both : approx. 385,000 Euros

Next Steps:

- Explore advanced modelling techniques and hybrid models for improved accuracy.
- Implement continuous evaluation and data enrichment strategies for dynamic personalization.

MONITORING KPI'S

Typical Campaign KPIs:

- **Open Rate:**
 - The percentage of our target subscribers who open your email. This indicates how engaging our email contents are.
- **Click-Through Rate (CTR):** The percentage of recipients who click on a link in campaign emails.
 - This measures the effectiveness of the call-to-action and content.
- **Conversion Rate:**
 - The percentage of recipients who actually subscribed to our recommended products, such as making a purchase or signing up for a service, after clicking on a link in the email.
- **Bounce Rate**
 - : The percentage of emails that were not delivered successfully to recipients' inboxes. High bounce rates can indicate issues with your email list quality or email deliverability.

MONITORING KPI'S

Proposed KPIs

- **ROI Efficiency Ratio:(per cluster and overall))**

- The sum of potential return on investment of the subscribers totally and in each cluster vs the actual ROI they are generating after the campaign. Our goal is to maximize that

$$\text{ROI Efficiency Ratio} = \frac{\text{Actual ROI}}{\text{Potential ROI}} \times 100$$

- **Product Efficacy Ratio:**

- The actual ROI generated by a product divided by the potential ROI of that product

$$\text{Product Efficacy Ratio} = \frac{\text{Actual ROI of Product}}{\text{Potential ROI of Product}} \times 100$$

- **Engagement Index:**

- A composite KPI that measures the overall engagement of customers with the personalized recommendations, taking into account factors such as open rates, click-through rates, subscription, frequency of use for each product and average time spent on EasyMoney platforms.

$$\frac{(\text{Open Rates} + \text{Click-through Rates} + \text{Subscription} + \text{Frequency of Use} + \text{Average Time Spent})}{\text{Number of Factors Considered}}$$

MONITORING KPI'S

Proposed KPIs

- **Conversion Quality Score:**

- metric that evaluates the quality of conversions generated by the campaign, considering factors such as the frequency of use of the product, time spent, money spent, money spent.

$$\text{Conversion Quality Score} = \frac{(\text{Frequency of Use} \times \text{Time Spent} \times \text{Money Spent})}{\text{Total Number of Conversions}}$$

- **Recommendation Relevance Rate:**

- The percentage of customers who find the recommended products relevant to their needs and preferences, as indicated by feedback surveys and percentage subscribed.

$$\frac{\text{Number of Customers who Purchased after Receiving a Bundle}}{\text{Total Number of Customers who received the Bundle}} \times 100$$

- **Bundle Response Rate:**

- Number of customers who purchased after receiving a bundle / Total number of customers who received the bundle * 100.

$$\frac{\text{Number of Customers who Subscribed to Two or More Services in a Bundle}}{\text{Total Number of Customers who received the Bundle}} \times 100$$

COORDINATION - MONITORING PLAN

Step 1: Data Preparation

Deploy initial data preparation tasks on a basic server setup adequate for the data volume and complexity.

Regularly revisit and update the data schema.

GC Cloud Storage



Data Source

Identify, access data sources
Connect to a database and API to collect data. Ensure data quality

Feature Engineering

Transform, select and derive new relevant features that will be used to develop and to improve the model

Model Development

Create and fine- tune models
Revise the model Collaborative filtering using SVD modelling

Optimal Model

Revise & refine clustering and recommendation algorithms based on perf feedback and new insights



Step 2: Model Development

Use an enhanced server capable of handling more intensive computational tasks for complex model development

GC Compute Engine

Step 3: Model Training

Conduct thorough training of the chosen model, tuning hyperparameters for best results

GC Vertex AI/ AI Platform



Trained Model

Prepare trained model with finalised parameters for deployment

Server

Utilize high- performance servers to expedite the model training process, ensuring scalability and reliability

Model Deployment

Launch the trained model in a production environment to start making real predictions and recommendations

Cloud Monitoring and Logging
Kubernetes Engine
Compute Engine



Step 4: Model Serving and Monitoring

Putting the trained ML model into a production environment where it can provide predictions on new data.

Enable the model to actually perform the tasks it was designed for, such as product recommendations, monitor continuously performance and accuracy.

Step 5: Post-Deployment

Continually evaluate and maintain the ML model is crucial. This involves a cycle of monitoring, retraining with new data, and adjusting the model based on feedback. Maintaining version control is essential for managing updates and facilitating rollbacks. Compliance with regulations and seamless integration with CI/CD pipelines for automatic deployment are also key for sustained operational efficiency .



CONCLUSIONS

Data-Driven Strategies for Customer Engagement and Growth

Emphasized the need for ongoing customer behaviour monitoring to maintain model relevance and effectiveness in light of changing preferences.

The data-centric approach paves the way for enhanced customer retention and business growth, positioning EasyMoney for long-term market success and customer trust reinforcement.



THANK YOU!