# Early Warning System for Customer Support

## Proactive Approach to Prevent Customer Churn

Presented by Elie Niringiyimana

# Business Problem

- Customer churn significantly threatens business profitability.
- Retaining a customer is far more cost-effective than acquiring a new one.
- Churn results in lost revenue, reduced loyalty, and increased marketing costs.
- Early detection and intervention are crucial to preventing customer departure.

# Solution

- Developed an AI-based model to predict when customers are at risk of churning.
- The system triggers alerts for the customer support team to engage with at-risk customers.
- This proactive engagement helps resolve potential issues before customers leave.
- Reducing churn preserves revenue and improves overall customer satisfaction.


# Data Understanding

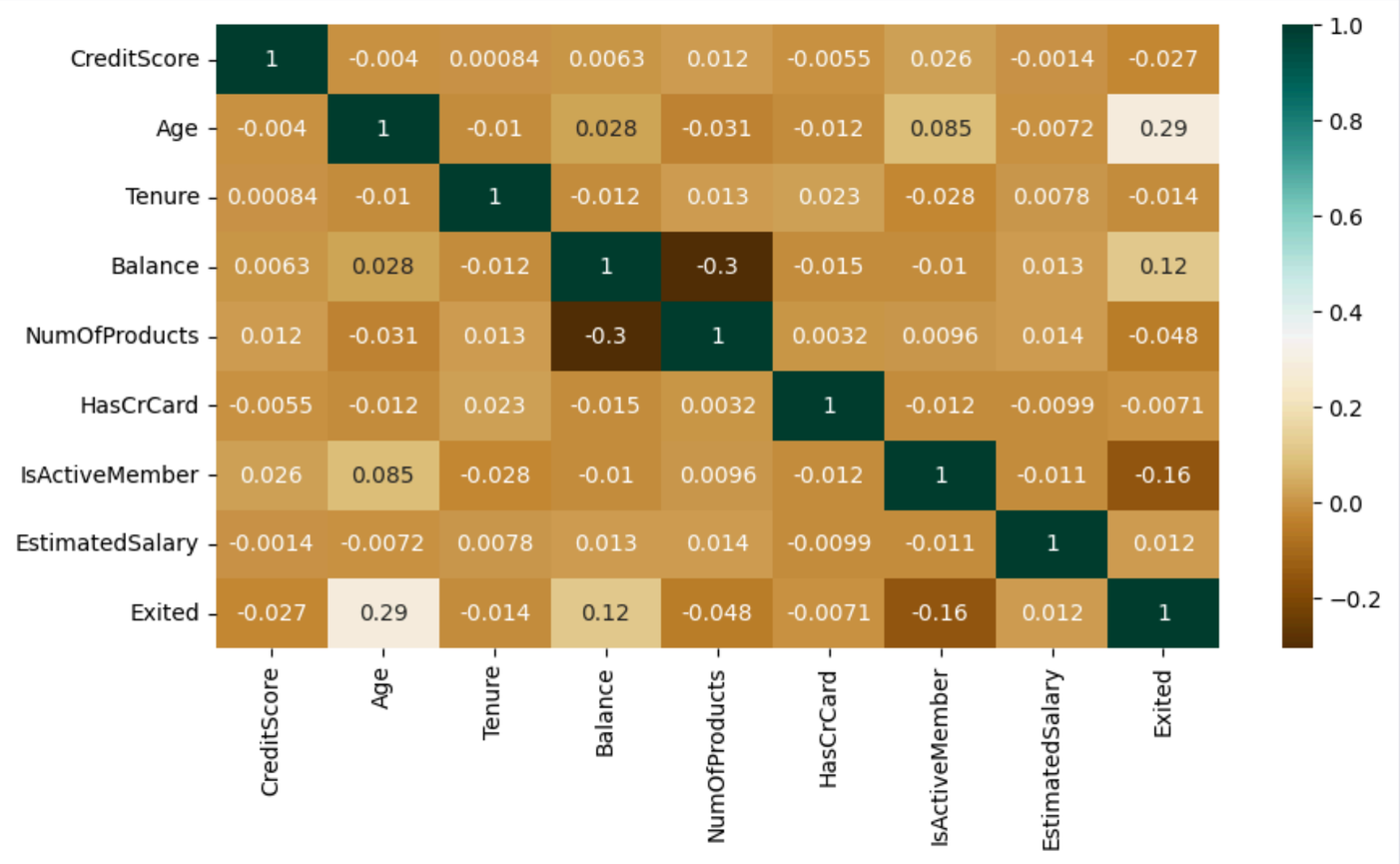
- The original dataset consist of 10000 rows and 14 columns.
- The dataset includes Age, Gender, Geography, along with Balance, Tenure, Products Held, and Estimated Salary to describe customer profiles.
- The target variable, Churn Indicator (y), is binary: 1 for churned customers and 0 for those who stayed.
- No null values.
- No duplicates.

# Data Preparation

- Encoding Categorical Variables: Converted non-numerical data into usable numerical format.
- Normalization: Standardized numerical features to ensure uniformity and improve model performance.
- Outlier detection and removal
- Handling class imbalance.

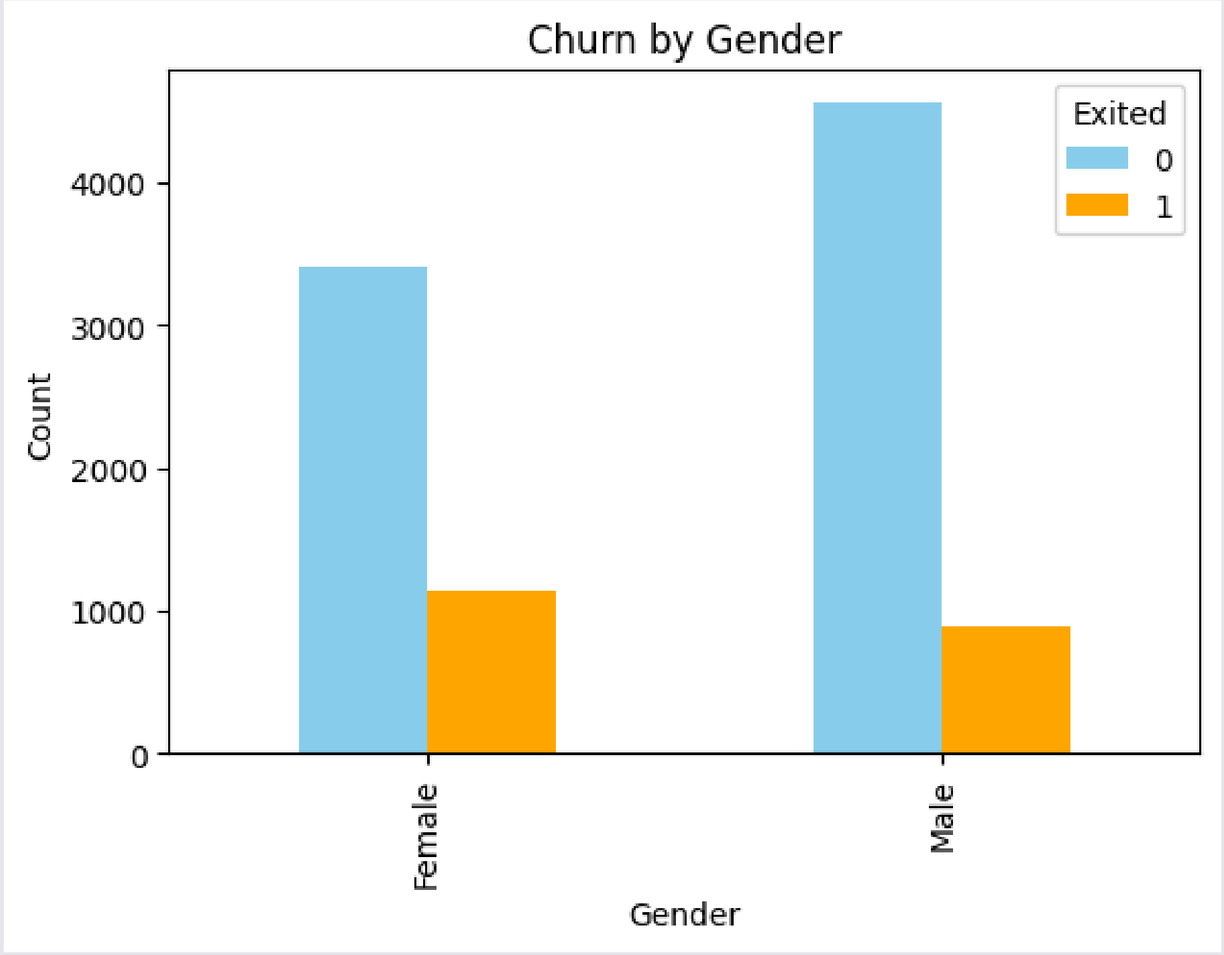
# Correlation

- Older customers are more likely to churn (Age shows strongest positive correlation).
- Active members are less likely to churn (negative correlation with churn).
- Balance and NumOfProducts have minimal impact on churn.
- CreditScore and Tenure show little relation to churn.



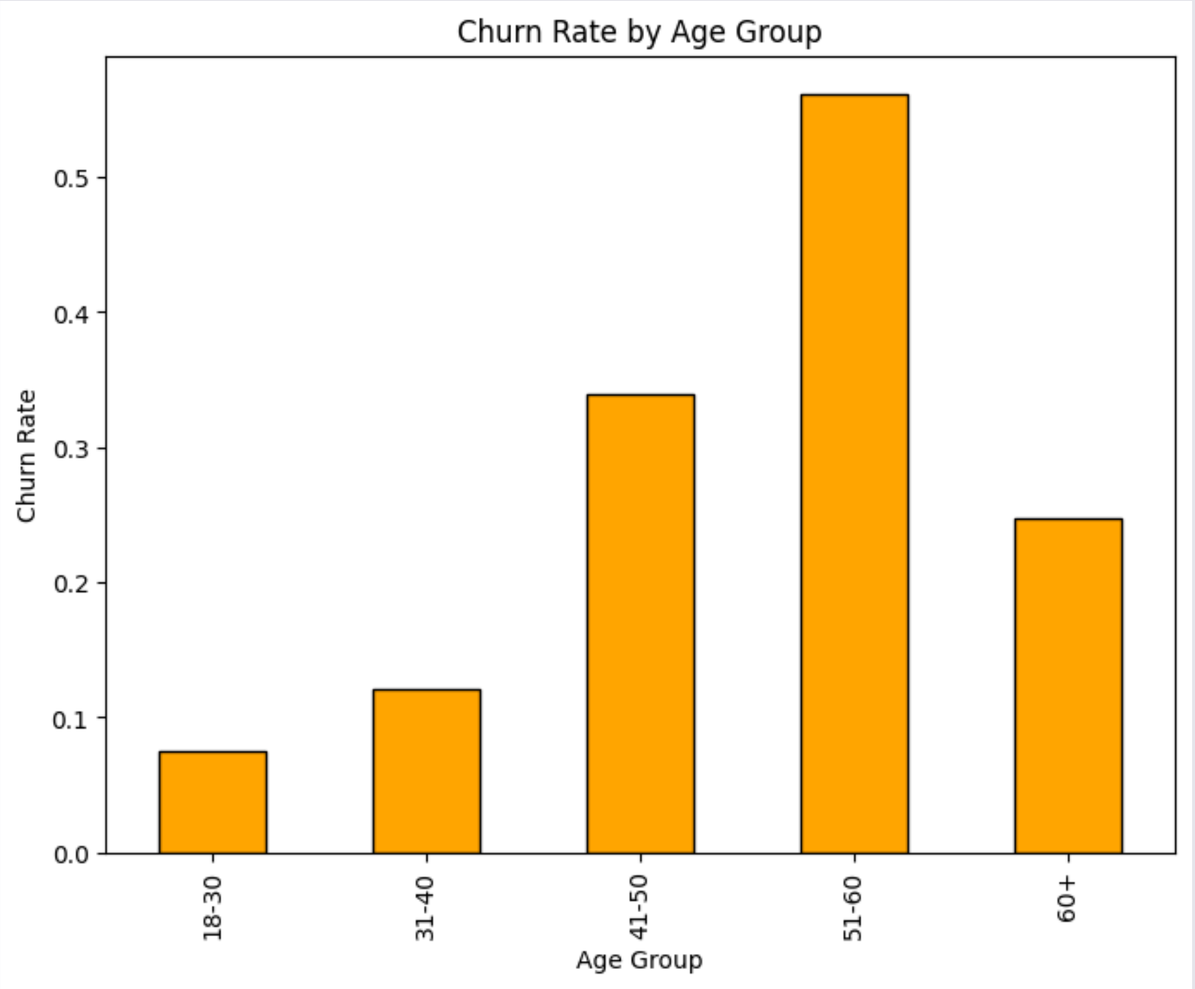
# Churn by Gender

- Females have a higher churn rate compared to males, indicating higher exit risk.
- Males have a larger customer base with a lower churn proportion.
- Gender-based strategies may be needed, with more focus on retaining female customers.



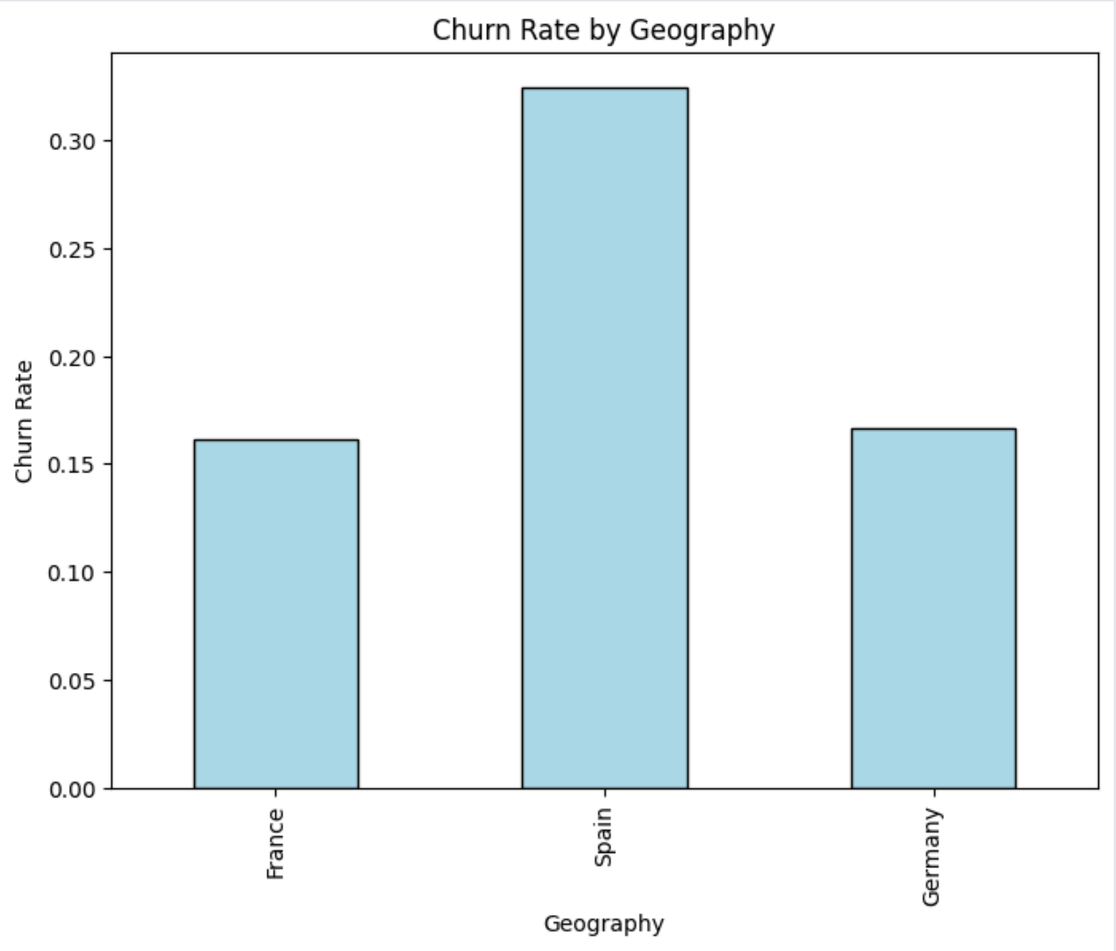
# Churn Rate by Age Group

- 51-60 age group has the highest churn rate, over 50%.
- 41-50 age group also shows a significant churn risk.
- Younger customers (18-30) have the lowest churn rate.
- Retention strategies should focus on customers aged 41-60, who are at greater risk of leaving.



# Churn Rate by Geography

- Spain has the highest churn rate compared to France and Germany.
- France and Germany have lower, similar churn rates.
- Focus on retention strategies for customers in Spain to address the higher churn rate.



# Modelling and evaluation

- For modelling I tried Binary Logistic Regression, Two-Layer Feed Forward Perceptron, and Artificial Neural Net with Back Propagation

| Model | Accuracy |
| --- | --- |
| Binary Logistic Regression | 72.5% |
| Two-Layer Feed Forward Perceptron | 73% |
| Artificial Neural Net with Back Propagation | 79% |

# Business Value & Benefits

- Increase retention by proactively engaging high-risk customers before they churn.
- Preserve revenue by reducing churn-related losses.
- Enhance efficiency for customer support through better prioritization of resources.

# Conclusion

- The Early Warning System enables proactive engagement, reducing customer churn.
- AI-driven predictions allow targeted interventions, improving customer satisfaction.
- Preserves revenue by retaining high-value customers before they decide to leave.

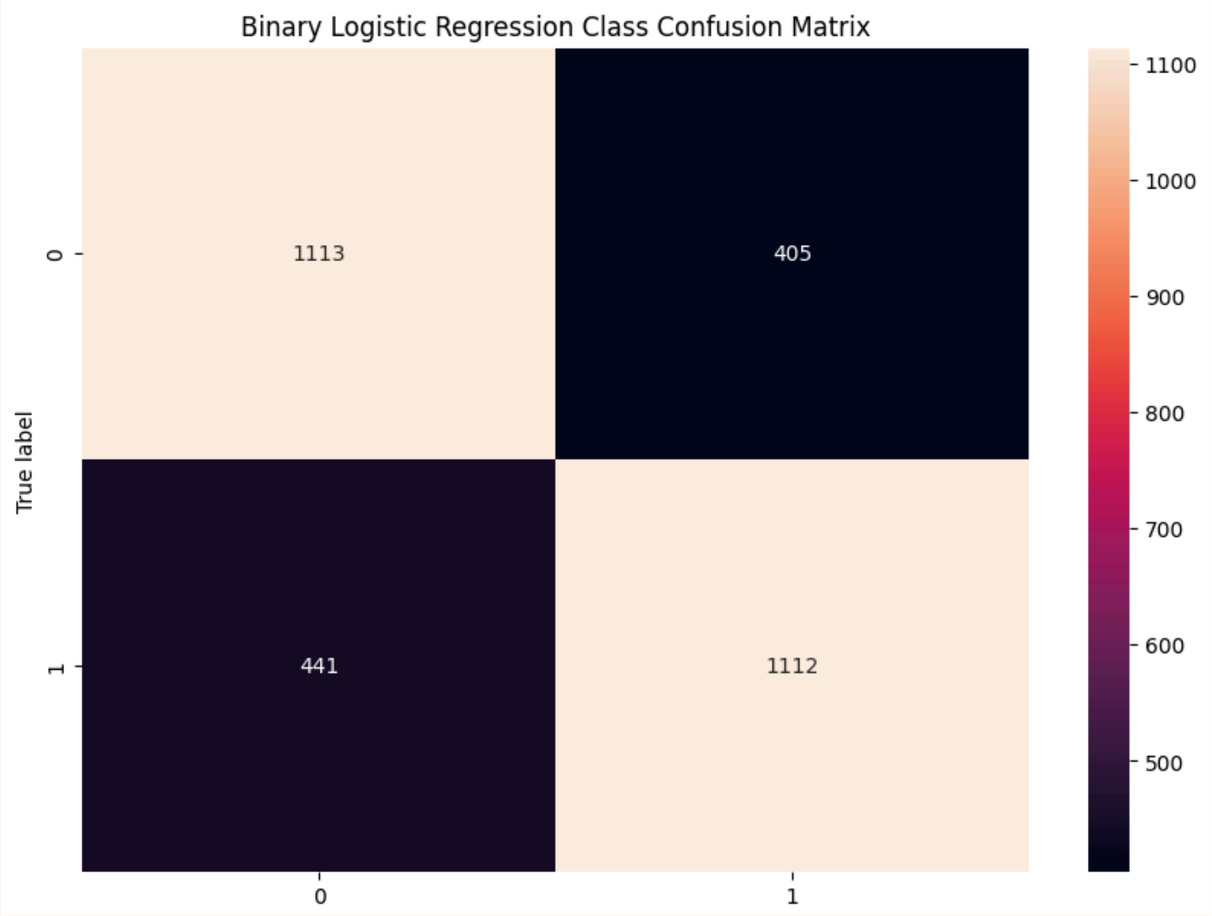
# Summary

- Problem: Customer churn results in revenue loss and higher acquisition costs.
- Solution: Implement an AI-based early warning system to predict customer churn and trigger proactive customer support engagement.
- Recommendation: Use the developed neural network model to identify high-risk customers, integrate it into CRM systems, and continuously refine based on customer feedback and data.

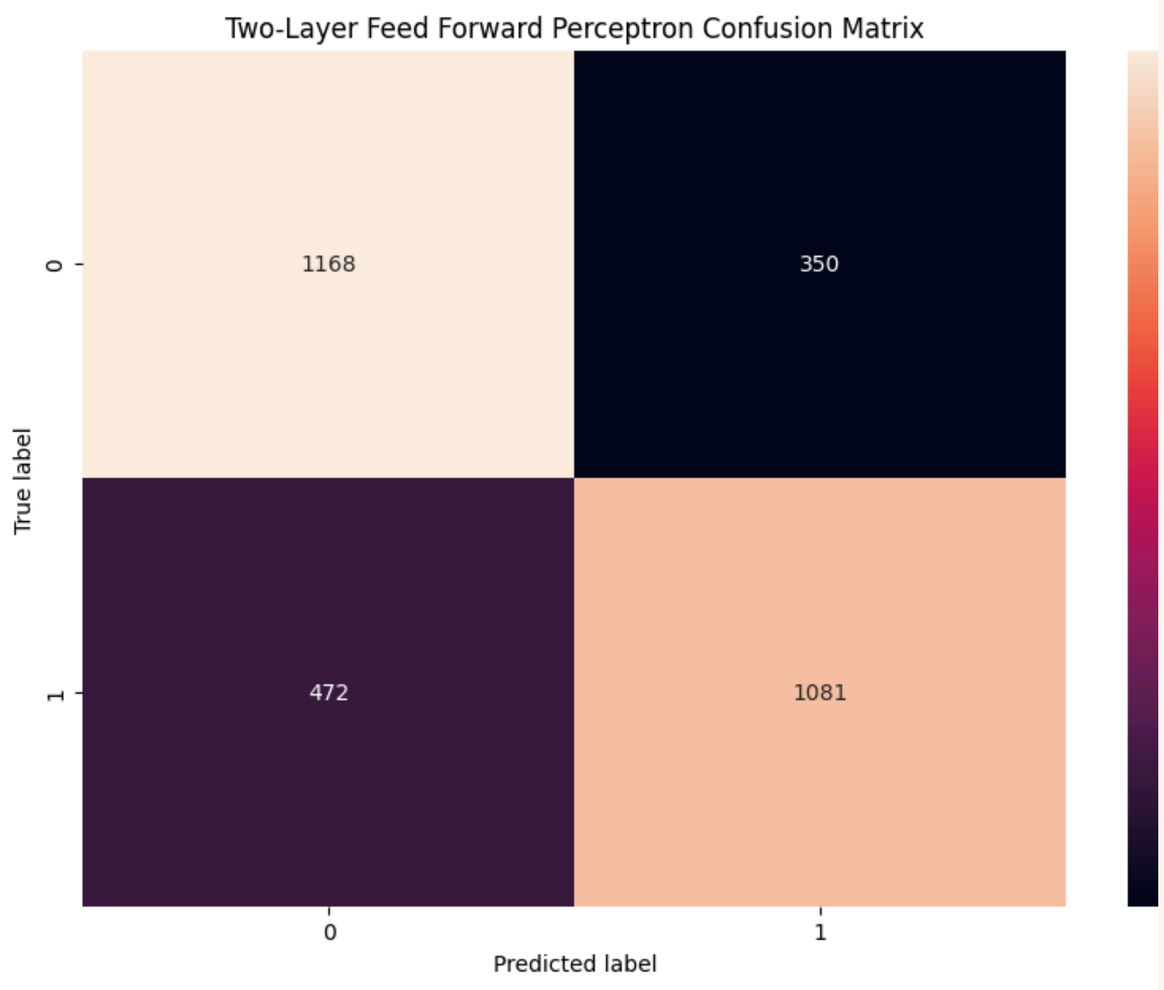
# Thank you very much!

Presented by Elie Niringiyimana

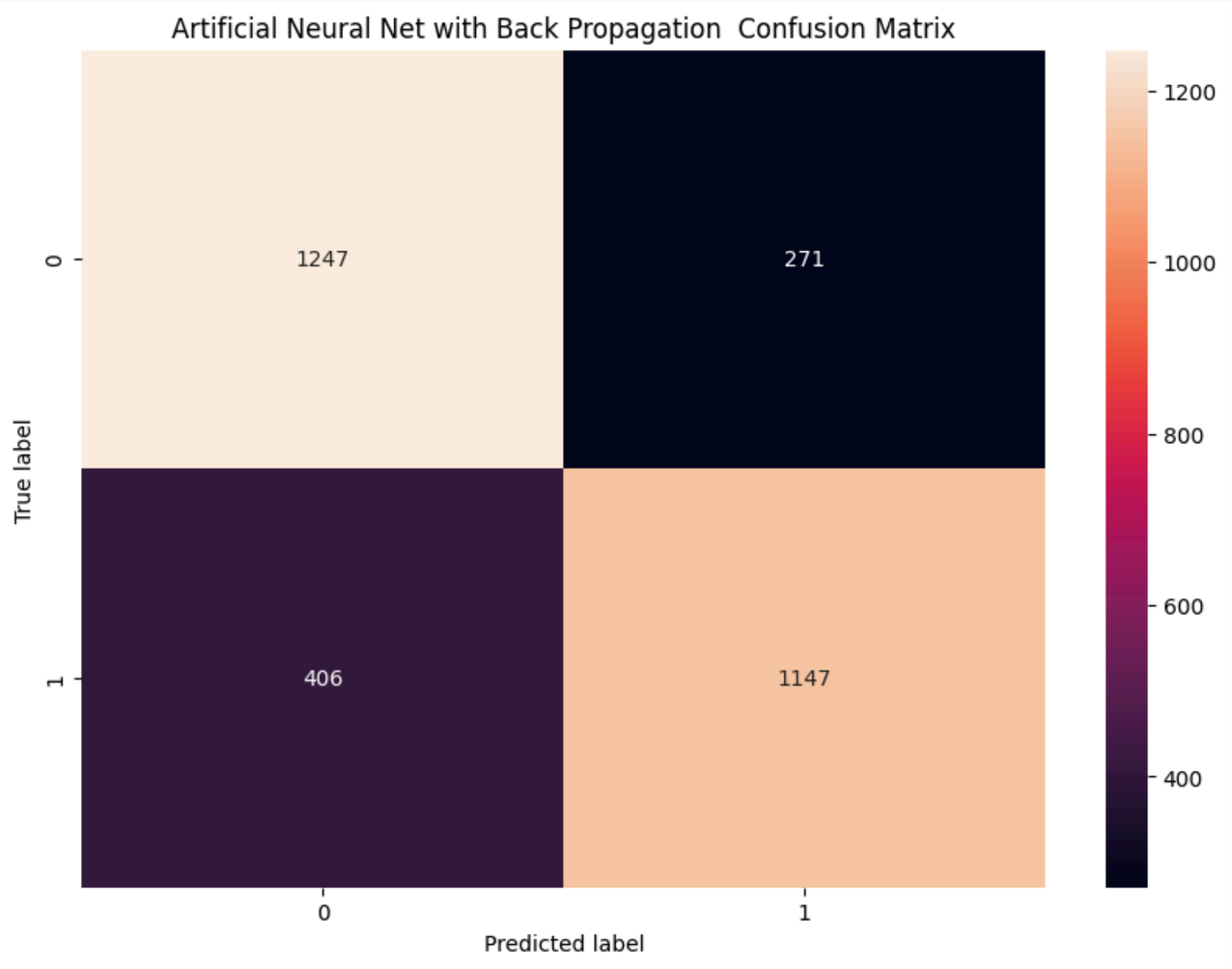
# Appendix


Binary Logistic Regression Class Confusion Matrix
True label
0
1
1113
405
441
1112
0
1
1100
1000
900
800
700
600
500

# Appendix


Two-Layer Feed Forward Perceptron Confusion Matrix
1168
350
472
1081
0
1
True label
0
1
Predicted label

# Appendix


Artificial Neural Net with Back Propagation  Confusion Matrix
True label
0
1
1247
271
406
1147
0
1
Predicted label
1200
1000
800
600
400