

Report Questions

Q1 Dataset Selection: What dataset did you choose? Describe its purpose and target.

Ans -It was Binary Classification of Bank Churn Synthetic Data. The purpose is to predict Customer Churn. The target value was Exited or not.

Q2 EDA Findings: What key insights did you gain during EDA?

Ans – We find these Properties by performing EDA

Clean Data: The dataset is complete with no missing information.

Class Imbalance: Significantly more customers have stayed with the bank than have left (churned).

Feature Skew: The distribution of customer age and account balance is not even.

Outliers Present: Some numerical features contain outlier values that may need attention.

Q3 Feature Engineering: What transformations did you apply? Why?

Ans – we apply StandardScalar to Standardization rescales the data to have a mean of 0 and a standard deviation of 1.

Standardization was done to put all features on the same scale, ensuring they contribute equally to the model's predictions.

Q4 ANN Architecture: List number of layers, neurons, activation functions.

Ans – Total Layers: The model consists of 4 layers in total (1 input layer, 2 hidden layers, and 1 output layer).

```
model = Sequential([  
    Dense(128,activation='relu', input_shape=(X_train.shape[1],)),  
    Dense(32,activation='relu'),  
    Dense(1,activation='sigmoid')])
```

Q5 Performance Summary: What were the final accuracy and loss?

Ans - loss: 0.3121

accuracy: 0.8686

Q6 Confusion Matrix Analysis: What did it reveal about model behavior?

Ans – we use metrix like MSE, MAE, and R2.

Mse-- 0.10393407940864563

Mae -- 0.1914944052696228

R2 -- 0.376541137695312

Q7 Hyperparameter Tuning: What parameters did you change and what was the result?

Ans - Epochs: 50 to 30

Result: Improved convergence and slightly lower loss compare to earlier

Q8 Improvement Ideas: Suggest one way to improve performance.

Ans – Increase epochs and validation_split to the model which will help to increase performance.

Q9 Overfitting/Underfitting: Did you face it? How did you address it?

Ans – There is overfitting when we increase the epochs (when we use 100 epochs to the model) so we use only 30 epochs then the model does not get overfitting in the model

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**Project Title: End-to-End ANN Model
Implementation and Analysis**

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