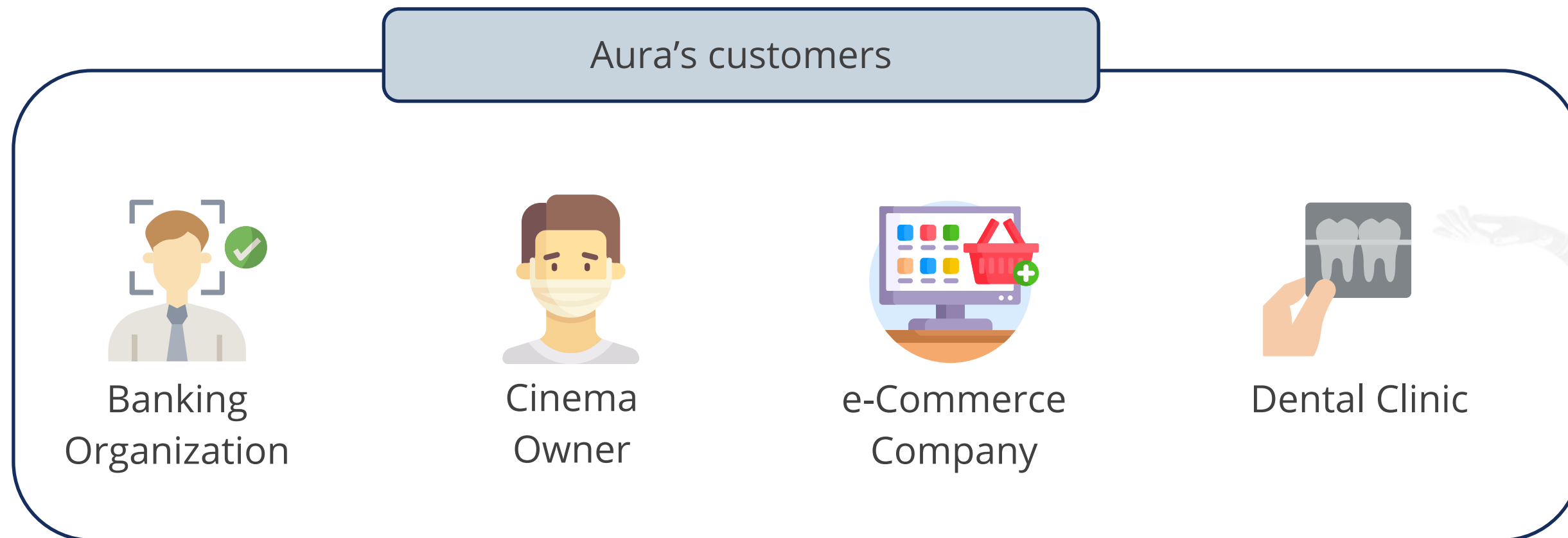**Capstone Session 9**

Deep Learning for Advanced Modeling

Deep Learning End Goal

The intuitive analyses of Aura must help customers make informed decisions to push relevant ads, services and products based on real-time user sentiments.

Aura's customers

Banking Organization

Cinema Owner

e-Commerce Company

Dental Clinic

Project Statement

Build necessary data aggregation, wrangling and visualization modules for Aura using the Healthcare dataset.

- Identify customers who churn the bank
- Detect humans wearing face masks
- Classify customer product reviews
- Denoise dirty documents

Week 9: Dataset Description

Churn_Modelling.csv

Variable	Description	Variable	Description
Row Numbers	Row numbers from 1 to 10000	Age	Age of the customer
CustomerId	Unique Ids for bank customer identification	Tenure	Number of years for which the customer has been with the bank
Surname	Customer's Last Name	Balance	Bank balance of the customer
CreditScore	Credit score of the customer	NumOfProducts	Number of bank products the customer is utilising
Geography	The country from which the customer belongs	-	-
Gender	Male or Female	-	-

Week 9

Task: Build an Artificial Neural Network to identify the customers who will be leaving the bank, based on the data of all customers over the past three months.

Task A:

- Load the dataset

- Drop the customers' personal data columns that will not be useful for analysis. (Hint: First three columns)

- Prepare independent variables X and dependent variable Y (Exited).

- LabelEncode the Gender column

- OneHotEncode the Geography column

- Perform a train test split in the ratio 80:20 and random_state 0

Week 9

- Build a Keras Sequential model with the following layers

- Dense layer with 6 neurons and activation relu

- Dense layer with 6 neurons and activation relu

- Dense layer with 1 neuron and activation sigmoid

- Compile the model with Adam optimizer, binary_crossentropy loss and metric accuracy

- Train the model for 10 epochs and batch size 10

- Evaluate the model on the test set; print the accuracy and confusion matrix
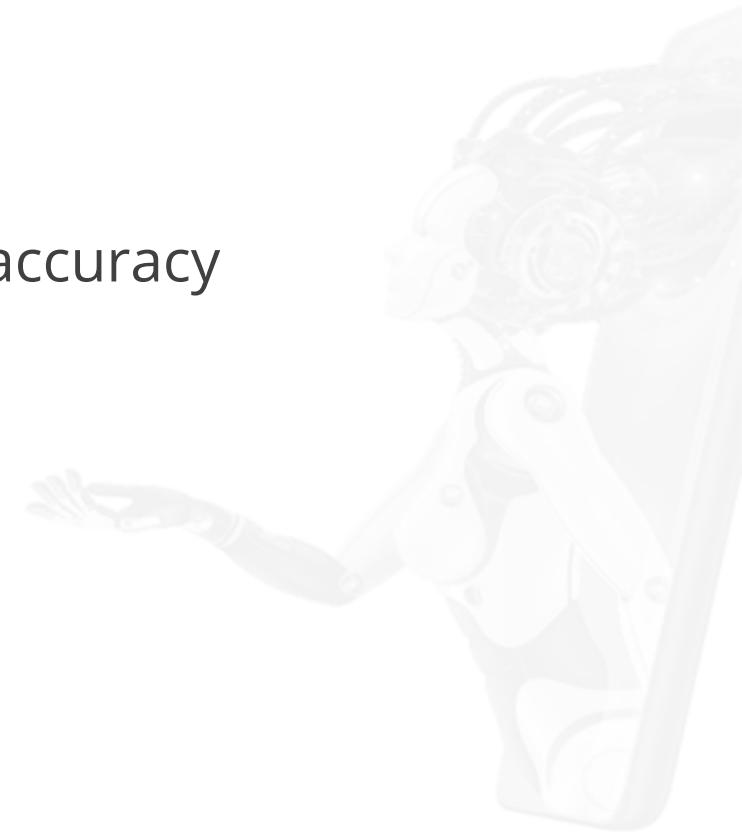
Week 9

Task B:

- Use the built ANN model to predict if the customer with the following information will leave the bank:
  - Geography: France
  - Credit Score: 600
  - Gender: Male
  - Age: 40 years
  - Tenure: 3 years
  - Balance: $60000
  - Number of Products: 2
  - Does this customer have a credit card? Yes
  - Is this customer an Active Member: Yes
  - Estimated Salary: $50000

So, should we let the customer go?