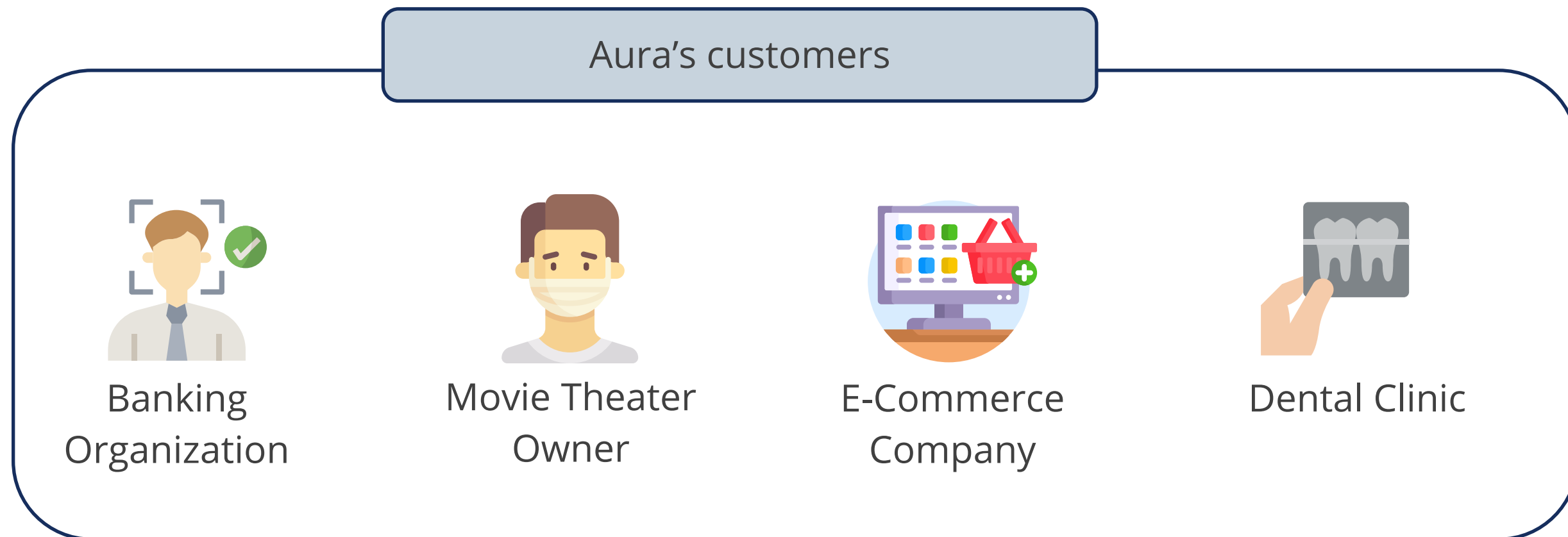# Capstone Session 10

Deep Learning for Advanced Modeling

Deep Learning for Customer Insights

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

Aura's customers

Banking Organization

Movie Theater 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

Session 10: Dataset Description

Variable	Description
Image File Name	Name of the image file name
Class	The allowed values are: • "with_mask" • "without_mask" • "mask_worn_incorrect"

Session 10: Detecting Face Masks with Transfer Learning

Task: Build a Transfer Learning model to detect face masks on humans.

Task A:

- Load the Image Training and Test Datasets from the train and test folders respectively. The size of each image is 128 x 128 x 3
- Load training dataset using Keras ImageDataGenerator with validation_split=0.2
- Load test dataset using Keras ImageDataGenerator

Build a Transfer Learning network using Keras with the following layers:

- Load EfficientNetB0 as first layers using Keras API
- GLobalAveragePooling2D layer
- Dropout (0.2)
- Dense layer with 3 neurons and activation SoftMax

Session 10: Detecting Face Masks with Transfer Learning

- Compile the model with Adam optimizer, categorical_crossentropy loss and with metrics accuracy

- Train the model for 25 epochs with callbacks Reduce Learning Rate on Plateau and early stopping while monitoring validation loss

- Plot training and validation accuracy and loss against epochs

Task B

- Load the Image Training and Test Datasets from the train and test folder respectively. The size of each image is 128 x 128 x 3

- Load training dataset using Keras ImageDataGenerator with validation_split=0.2

- Load test dataset using Keras ImageDataGenerator

Build a Transfer Learning network using Keras with the following layers:

- Load ResNet50 as first layers using Keras API

- GLobalAveragePooling2D layer

- Dropout(0.5)

- Dense layer with 3 neurons and activation SoftMax

Session 10: Detecting Face Masks with Transfer Learning

Task B

- Compile the model with Adam optimizer, categorical_crossentropy loss and with metrics accuracy.

- Train the model for 25 epochs with callbacks Reduce Learning Rate on Plateau and early stopping while monitoring validation loss

- Plot training and validation accuracy and loss against epochs

- Using the best model predict on the test dataset and plot 10 images from the test set along with its True Label and Predicted Label

Task C

- Compare EfficientNetB0 and ResNet50 model performance and find the best model

- Using the best model, predict the test dataset and plot 10 images from the test set along with its True Label and Predicted Label

Thank You