Architecture Design

FACE MASK DETECTION

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Planning the Process

DREAM

DESIGN

BUILD

What is Architecture Design Document?

- Any software needs the architectural design to represent the design of the software. IEEE defines architectural design as "the process of defining a collection of hardware and software components and their interfaces to establish the framework for the development of a computer system." The software that is built for computer-based systems can exhibit one of these many architectures.
- Each style will describe a system category that consists of:
- • A set of components (eg: a database, computational modules) that will perform a function required by the system.
- • The set of connectors will help in coordination, communication, and cooperation between the components.
- • Conditions that how components can be integrated to form the system.
- • Semantic models help the designer to understand the overall properties of the system.

Outline of the Architecture

1. Dataset Collection: Dataset of 1000 images containing 500 faces with and 500 without masks. Diverse and representative of the scenarios where the model will be used.
2. Data Preprocessing: Dataset has Images, converted images into Numpy array and Preprocess the images, normalization, and augmentation to increase the model's robustness and generalization.
3. Base Object Detection Model: A pre-trained object detection model that acts as a backbone for face mask detection system.
   - Single Shot Multibox Detector (SSD)
4. Transfer Learning: Take the pre-trained object detection model and fine-tune it on face mask dataset. During this process, the model learns to identify faces and distinguish between masked and unmasked faces.

Outline of the Architecture

5. Classification Head: Modified the last layer(s) of the object detection model to include a classification head that can predict two classes: "with mask" and "without mask."

6. Loss Function: binary cross-entropy, depending on the number of classes in classification head.

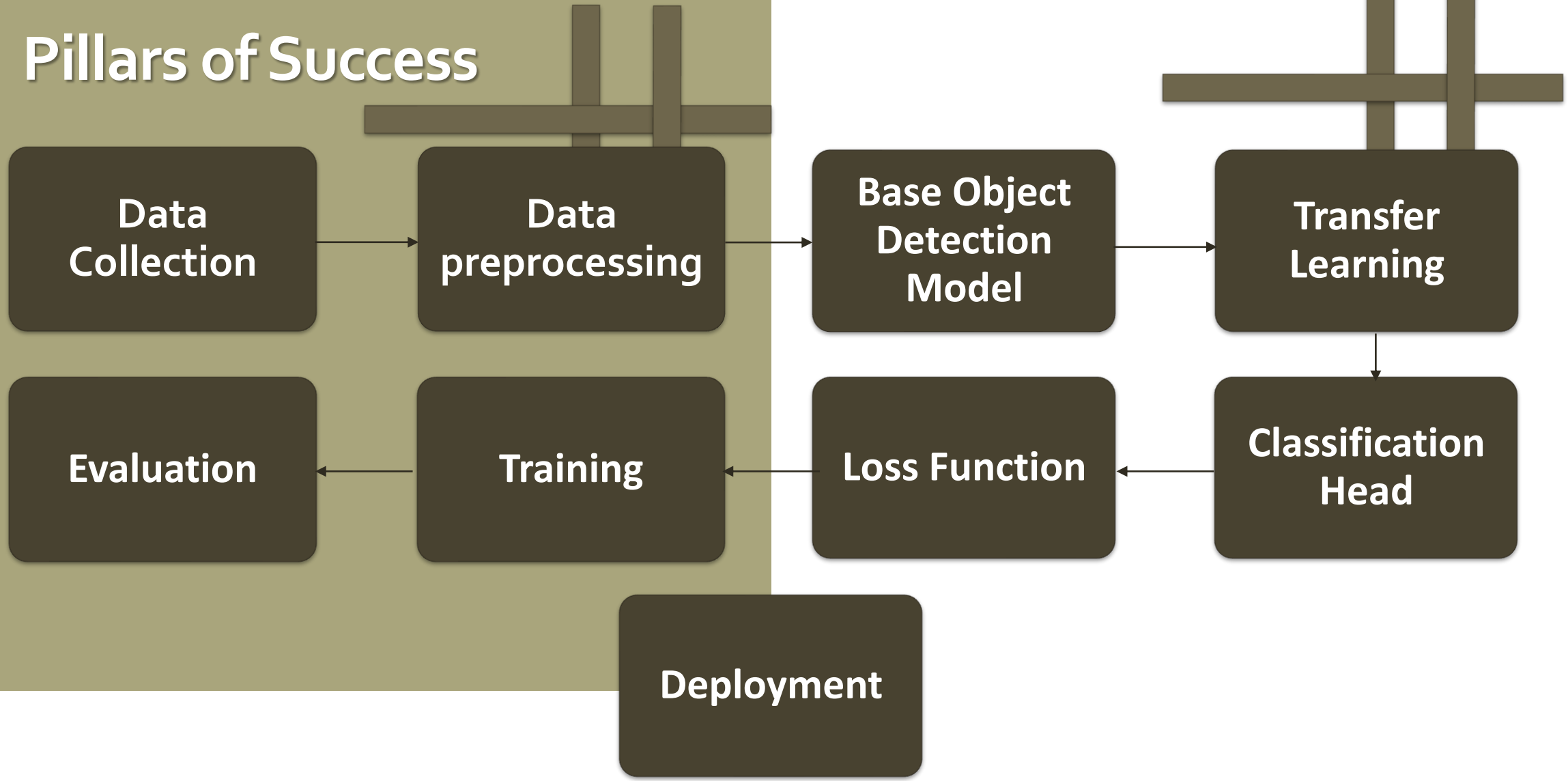
(Here we used Binary cross-entropy as loss function and ADAM as Optimizer)

7. Training: Trained the modified model on custom dataset. Depending on the dataset size and complexity of the task, fine-tuned the model for several epochs.

8. Evaluation: Evaluated the model on a separate test dataset to assess its performance in terms of accuracy.

9. Deployment: Deploy the trained model to a production environment, integrating it with application or system where it can perform real-time face mask detection.

Pillars of Success



Thank you

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