Human emotion detection using deep learning

Final Presentation

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Introduction

Emotion detection is the process of recognizing and classifying human emotions from inputs like facial expressions, voice, or text using AI and deep learning. It involves data collection, preprocessing, and training models to accurately predict emotions such as happiness, sadness, or anger. This technology is widely used in mental health, customer service, and human-computer interaction applications.

- Importance in various fields:

1. Human-Computer Interaction (HCI)
2. Mental health monitoring
3. Marketing and user experience
4. Education and e-learning

- Role of deep learning in advancing emotion detection

Literature Review

•Traditional Methods:

Early approaches used facial landmarks (e.g., eye and mouth distances) and texture analysis but struggled with lighting and pose variations (Pantic & Rothkrantz, 2003; Zeng et al., 2009).

•Deep Learning Advances:

CNNs transformed emotion detection by learning features directly from images. Models trained on datasets like FER2013 have achieved high accuracy in recognizing emotions such as happiness and anger (Goodfellow et al., 2013; Li et al., 2023).
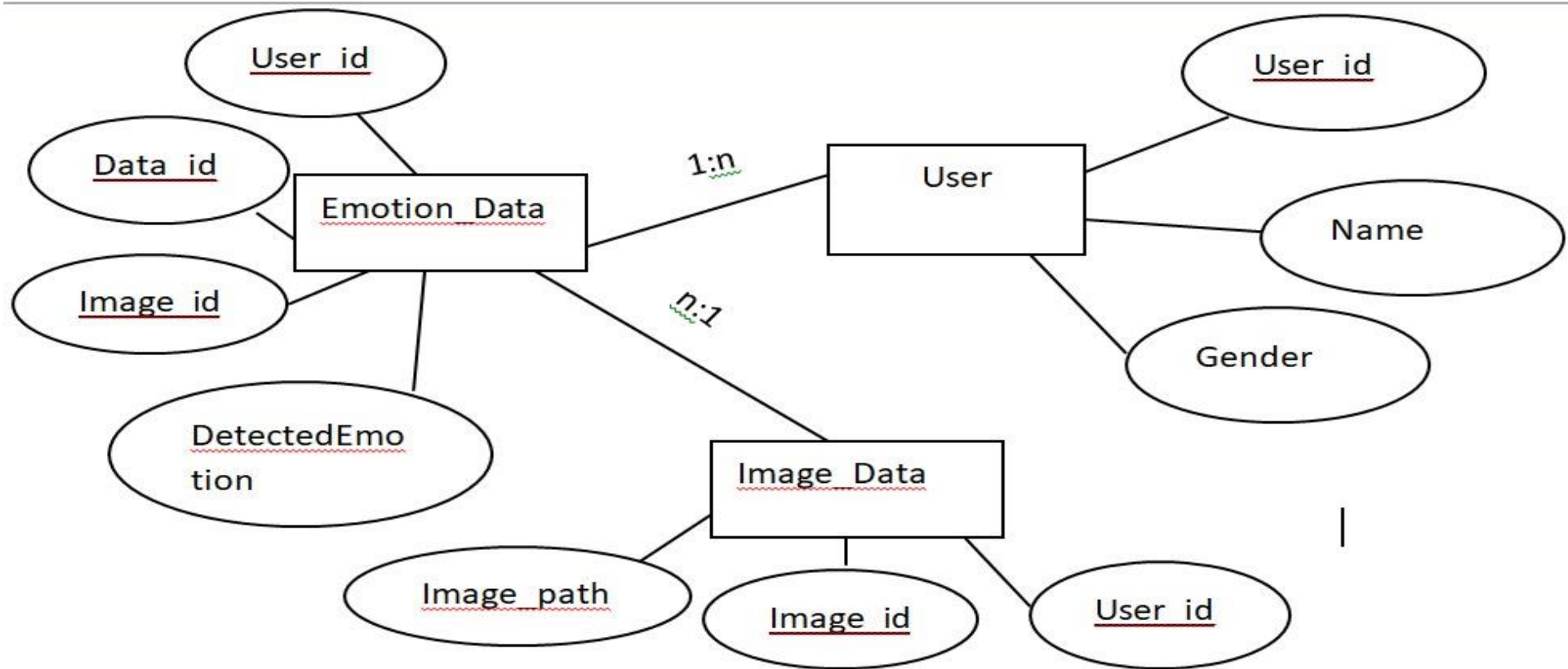
•Challenges:

Real-world challenges include unclear emotions, diverse facial structures, and occlusions from masks or glasses, impacting accuracy and generalization (Miragaia et al., 2024; IEEE, 2024).
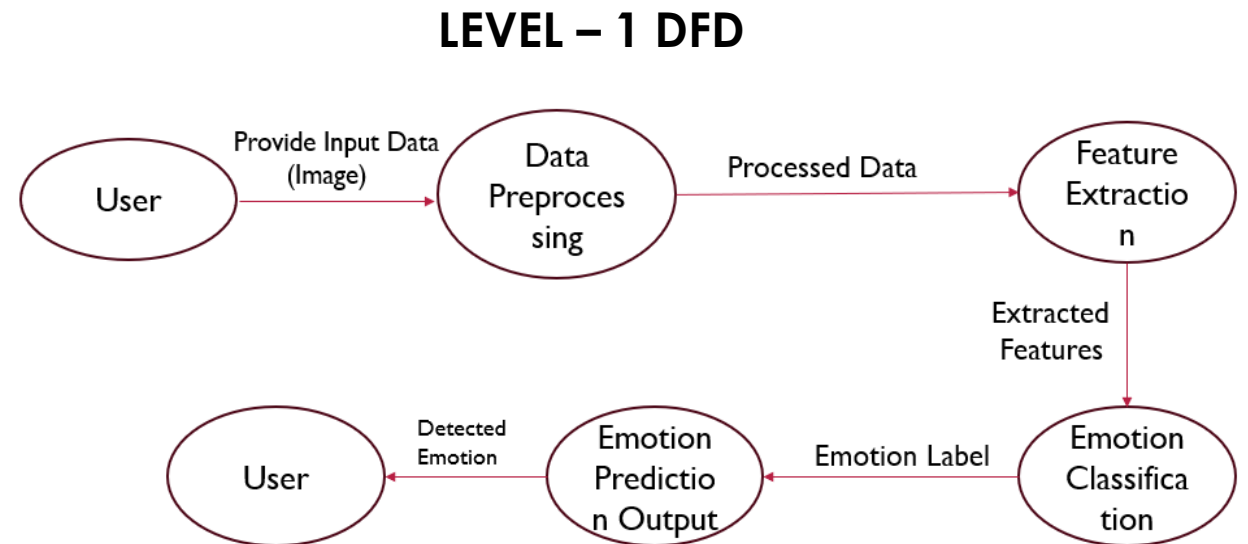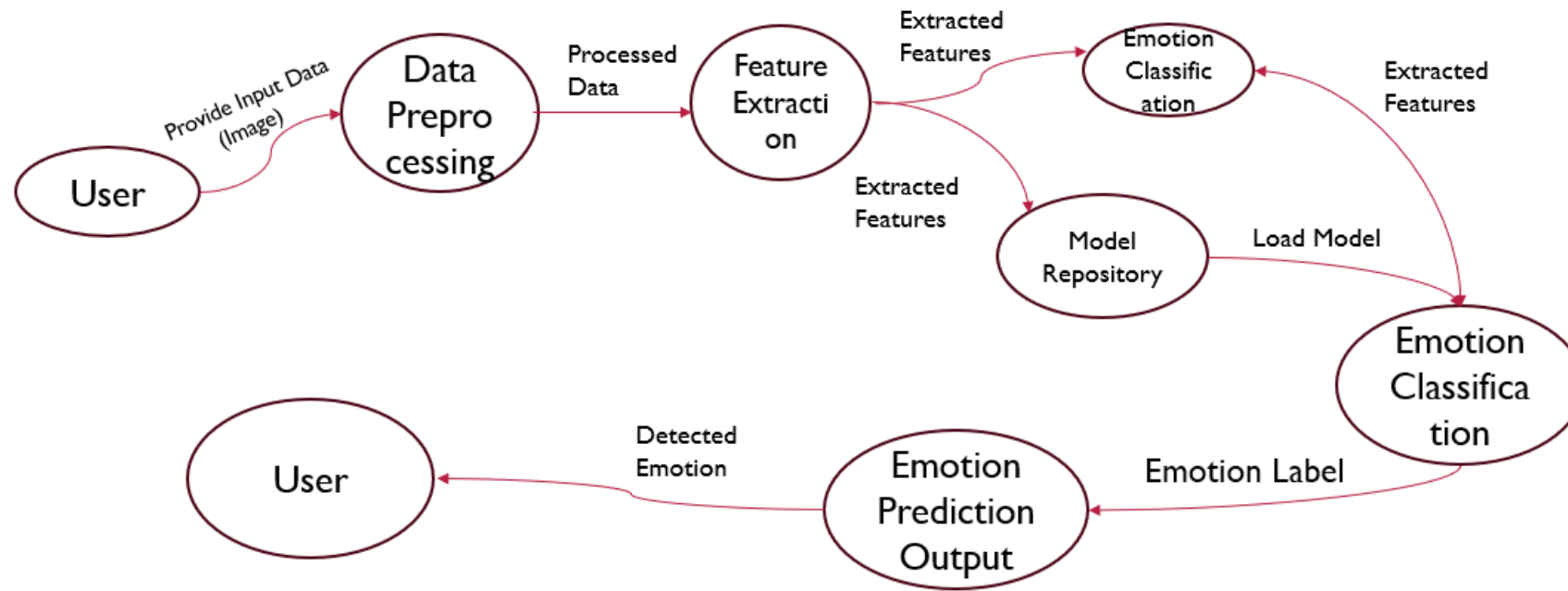
WATERFALL

Requirement analysis

Design

Implementation

Testing

Deployment

Maintenance
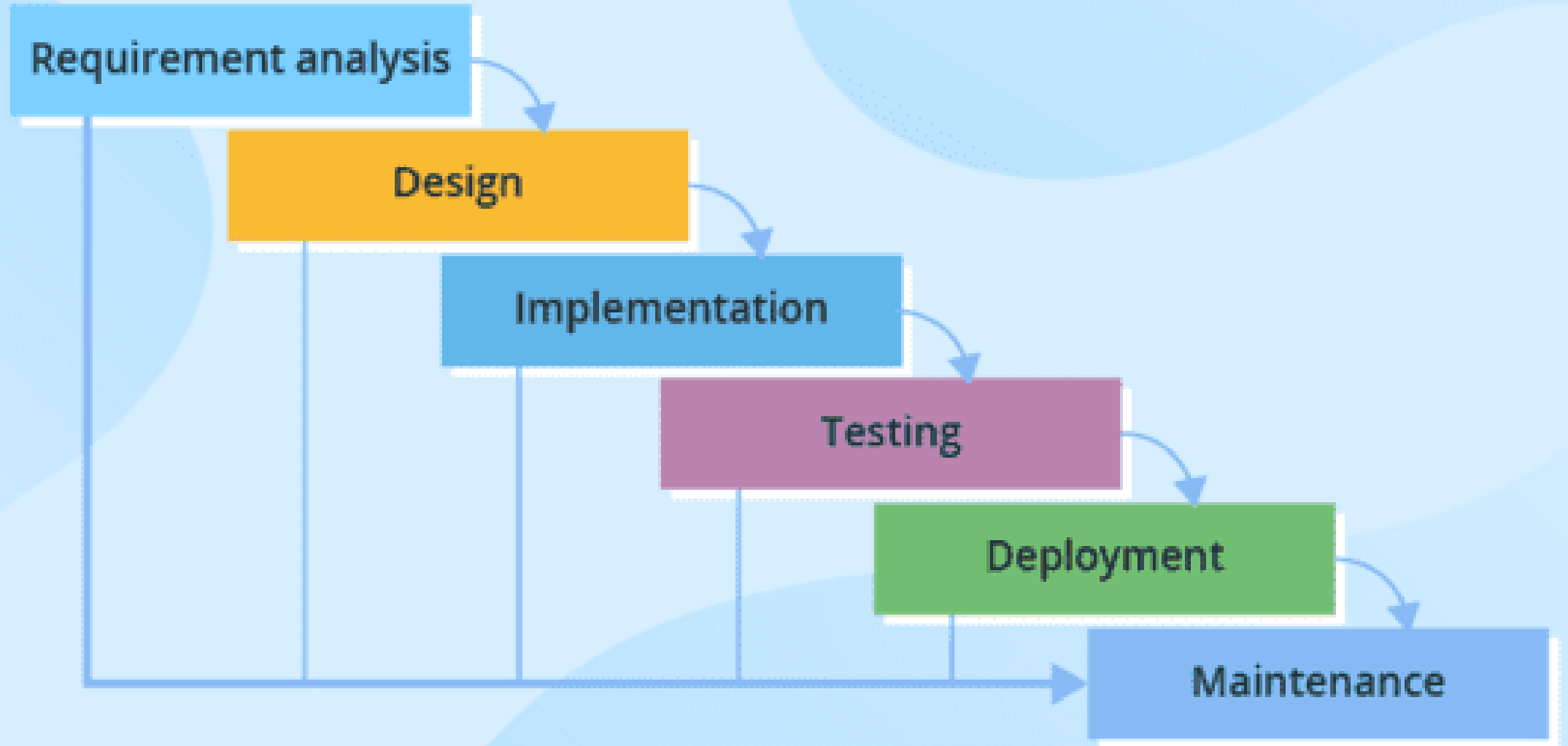
Entity – Relationship Diagram (ERD)

Data Flow Diagrams (DFDs)

LEVEL – 0 DFD

LEVEL – 1 DFD

# Data Flow Diagrams (DFDs)

LEVEL – 2 DFD

Working of Human Emotion Detection

1. **Input (Image)**: The model takes an image of a human face as input, focusing on key facial regions like eyes, mouth, and eyebrows.

2. **Preprocessing**:

   - Converts the image to grayscale or resizes it to a fixed dimension for uniformity.

   - Normalizes pixel values to enhance model efficiency.

3. **Feature Extraction (CNN)**:

   - Convolutional Neural Networks (CNNs) extract essential features from facial expressions, such as edge detection and texture patterns.

   - Feature maps are generated to highlight emotional cues.

4. **Classification**:

   - Extracted features are passed through fully connected layers or a softmax function.

   - The model predicts the emotion (e.g., happy, sad, angry)

5. **Output:** The predicted emotion is displayed along with its confidence level, enabling applications in healthcare, human-computer interaction, and safety systems.
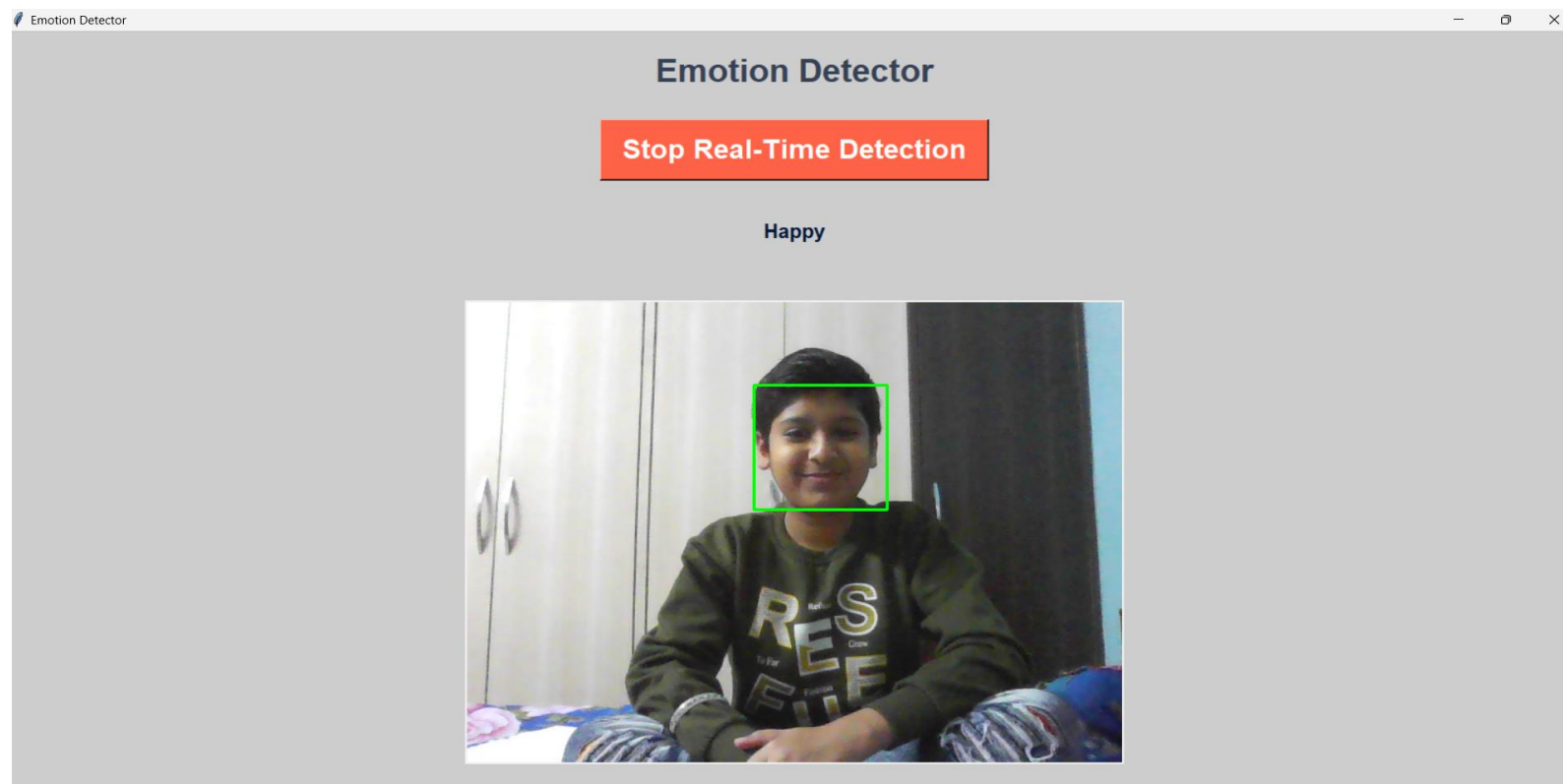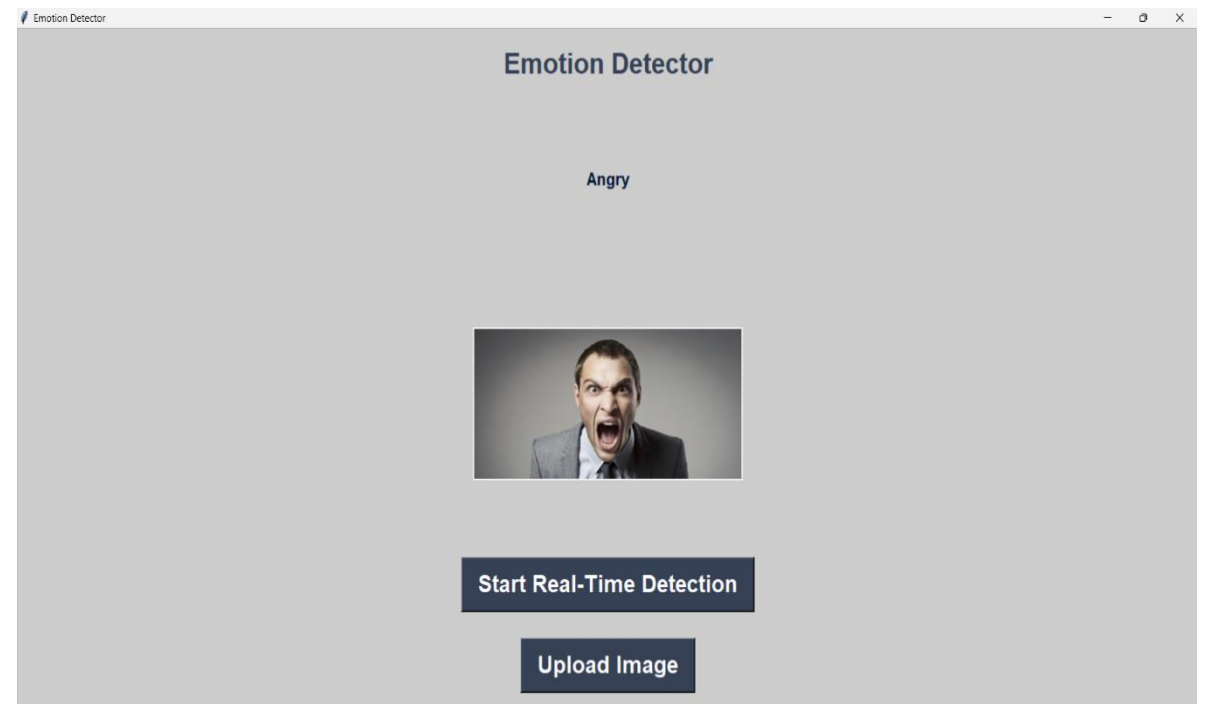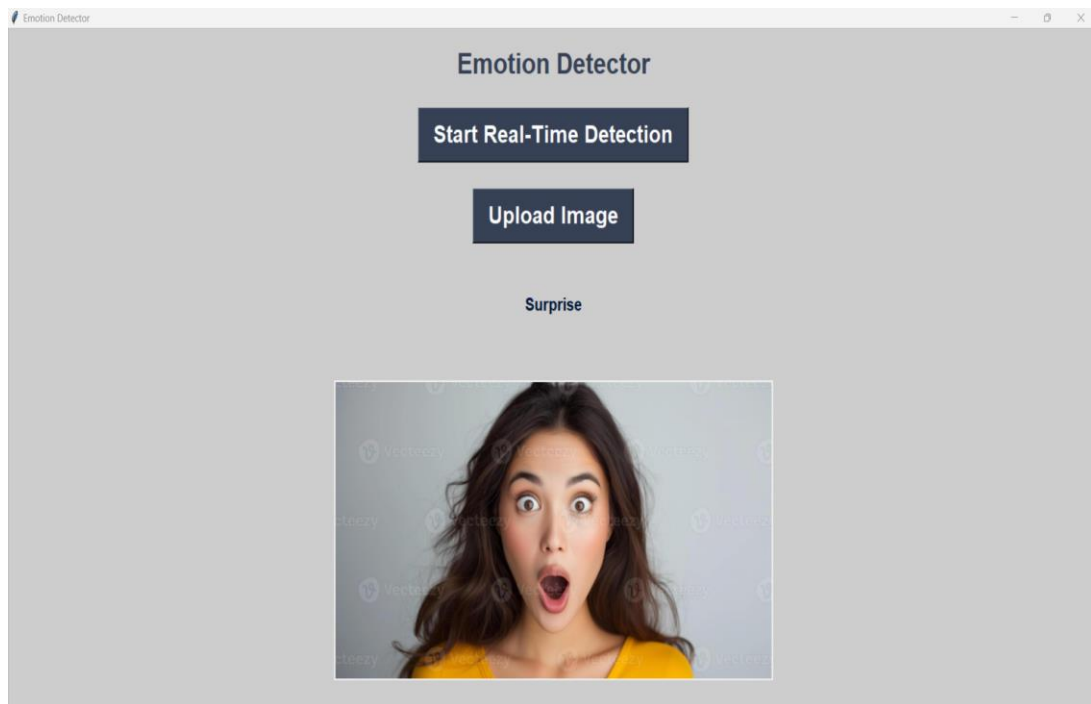
Flowchart
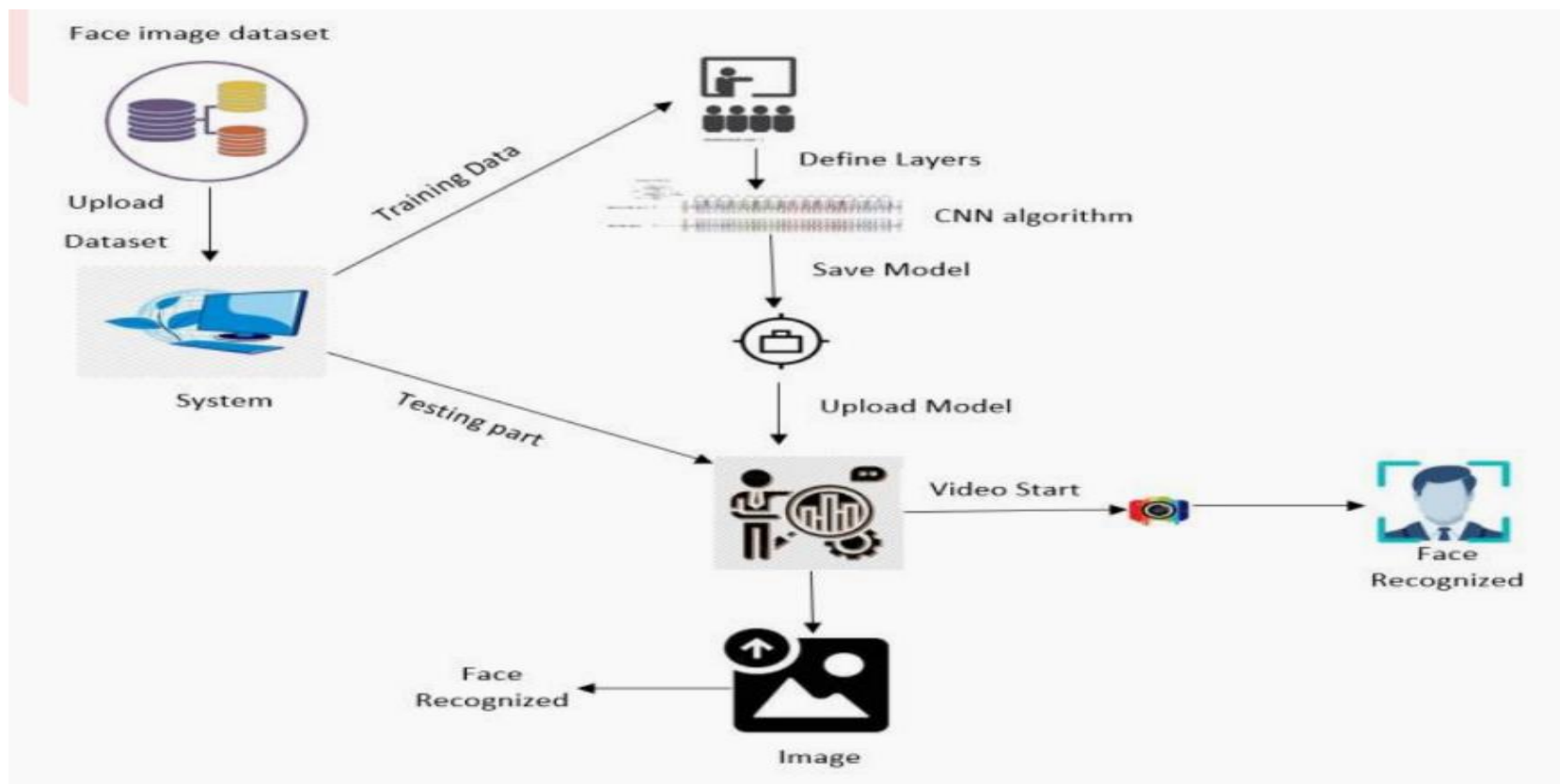
User Interface
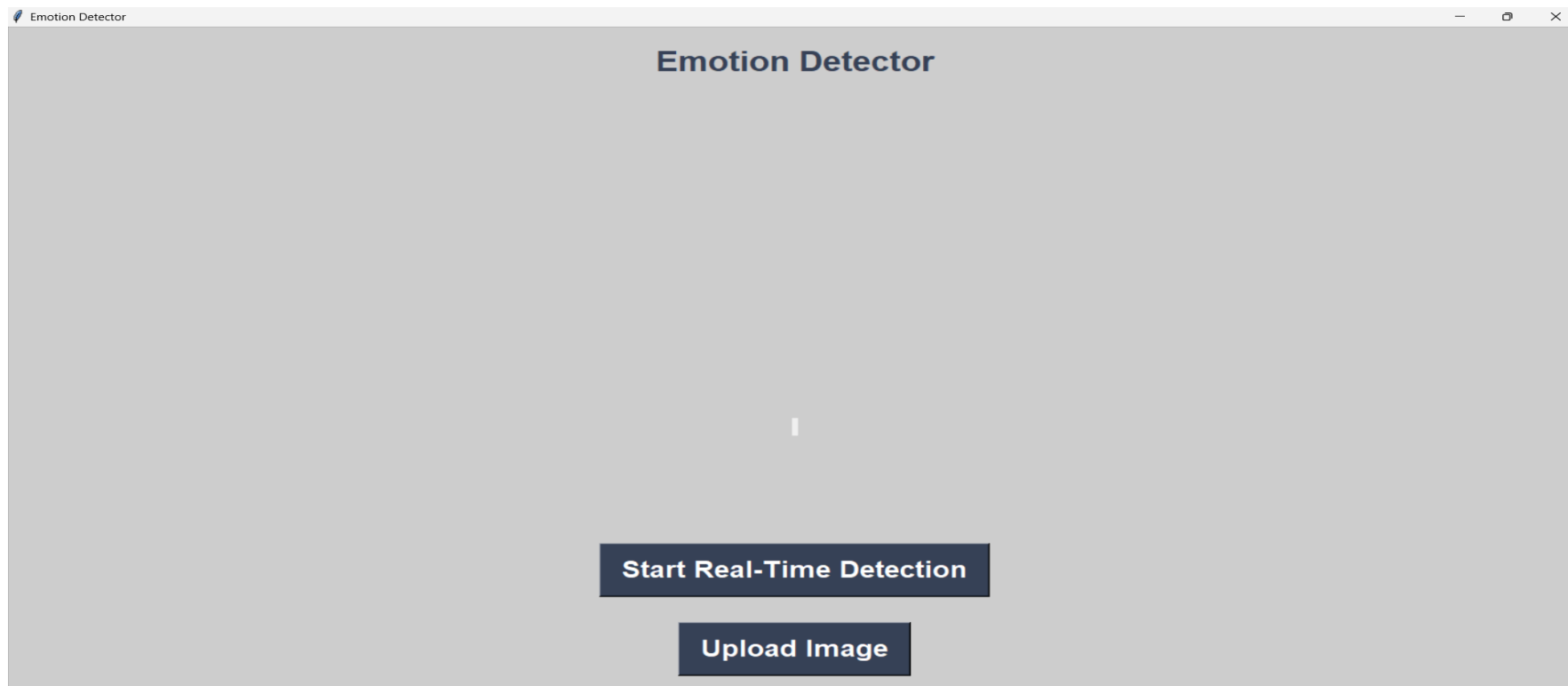
Real Time Accessing

Uploading Image

Future Enhancements

1. **Multi-Modal Emotion Detection**

   Combine **facial expression, speech, and text analysis** for more accurate emotion recognition.

2. **Real-Time Emotion Monitoring in Videos**

   Implement emotion detection from **live video feeds** for applications like customer support and security.

3. **Emotion-Aware Adaptive Systems**

   Develop **adaptive learning platforms** and **emotion-aware virtual assistants** that adjust based on user emotions.

4. **IoT Integration for Enhanced Interaction**

   Integrate with **IoT devices** (wearables, smart homes) to create responsive environments based on emotional states.

5. **Emotion Detection for Specific Demographics**

   Tailor emotion detection models for **children**, **elderly**, or **medical conditions** for specialized applications.

6. **Cloud-Based Scalable System**

   Use **cloud services** for scalable real-time emotion analysis across large datasets and devices.

THANK YOU