ARTIFICAL INTELLIGENCE AND MACHINELEARNING (AIML)– PROJECT

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Section: - 5

Problem Statement: Medication Recommendation System

The Medication Recommendation System is designed to predict diseases based on symptoms provided by the user and recommend appropriate medications, precautions, dietary plans, and workout routines. With the increasing complexity in healthcare, there is a growing need for AI-driven systems that can assist healthcare professionals and patients in diagnosing and treating medical conditions more efficiently.

This project leverages machine learning algorithms to predict diseases based on symptoms and provide real-time medication recommendations through an interactive web interface built with Flask.

2. Datasets

2.1 Dataset Description

The dataset includes symptoms and their associated diseases, medications, precautions, workout routines, and dietary suggestions. Data was gathered from multiple healthcare resources, ensuring comprehensive coverage of common diseases and conditions.

Key features:

Symptoms: A collection of common symptoms related to various diseases.

Diseases: Corresponding diseases for given symptoms.

Medications: Suggested treatments based on the predicted disease.

Precautions: Precautionary measures to help manage the disease.

Workouts & Diets: Suggested exercises and dietary plans for recover

Algorithm

3.1 Preprocessing

Data Cleaning: Symptoms and disease data were cleaned to remove noise and irrelevant information.

Feature Extraction: Symptoms were encoded as features to feed into the machine learning model.

Vectorization: Input symptoms were vectorized using one-hot encoding, transforming them into a machine-readable format.

3.2 Machine Learning Model

The system uses a Support Vector Machine (SVM) for disease prediction. The SVM was trained on a labeled dataset, where symptoms are features and the disease is the target label.

Steps involved:

Model Training: The SVM was trained on historical symptom-disease data.

Model Evaluation: Performance was evaluated using accuracy, precision, and recall.

Prediction: For new input symptoms, the model predicts the most likely disease.

3.3 Disease Prediction & Recommendation System

Once a disease is predicted, the system retrieves associated medications, precautions, workouts, and diets.

4. Expected Output
4.1 Real-time Disease Prediction

The system takes a set of symptoms as input and predicts the most likely disease in real-time. The prediction is displayed along with the following:

- **Description** of the disease.
- **Medications**: Recommended treatments with dosages.
- **Precautions**: Measures to avoid worsening the condition.
- **Workouts**: Suggested exercises for faster recovery.
- **Dietary Plans**: Foods to help boost recovery.

For example:

- **Predicted Disease**: Impetigo
- **Medications**: Antibiotics such as penicillin.
- **Precautions**: Avoid scratching, maintain hygiene.
- **Diet**: Hydration, fruits, and vegetables.

5. Flask Web Interface

5.1 Design

The web interface was built using Flask, HTML, and CSS, allowing users to input symptoms and receive real-time feedback. The system works as follows:

- Users input symptoms into a text field.
- The backend processes the input and predicts the disease.
- Medications, precautions, and other recommendations are displayed on the same page.

5.2 Implementation Steps

1. **Flask Framework**: The backend API, created using Flask, handles symptom input and returns disease predictions.
2. **HTML/CSS**: Provides the front-end design, making the system accessible and interactive.
3. **Real-Time Processing**: The system updates the predicted disease and recommendations without significant delays, ensuring a seamless user experience.

6. Expected Output For Flask

Real-time Prediction

The system predicts diseases and provides recommendations based on symptoms entered in real-time. Each output is divided into:

- **Disease Prediction**: The most likely disease based on symptoms.
- **Medications**: A list of recommended medicines, including dosages.
- **Precautions**: Important measures to avoid further complications.
- **Dietary Suggestions**: Foods that support recovery.
- **Workout Plans**: Suggested exercises to improve overall health.

7. Conclusion

The Medication Recommendation System leverages machine learning to predict diseases based on symptoms and provide personalized recommendations. The system's integration with Flask allows for real-time interaction and feedback, making it a useful tool in healthcare.

Future Work

- Improve the prediction model by incorporating more comprehensive datasets.
- Add support for more diseases and symptoms.
- Expand the system to support multiple languages for a wider audience.
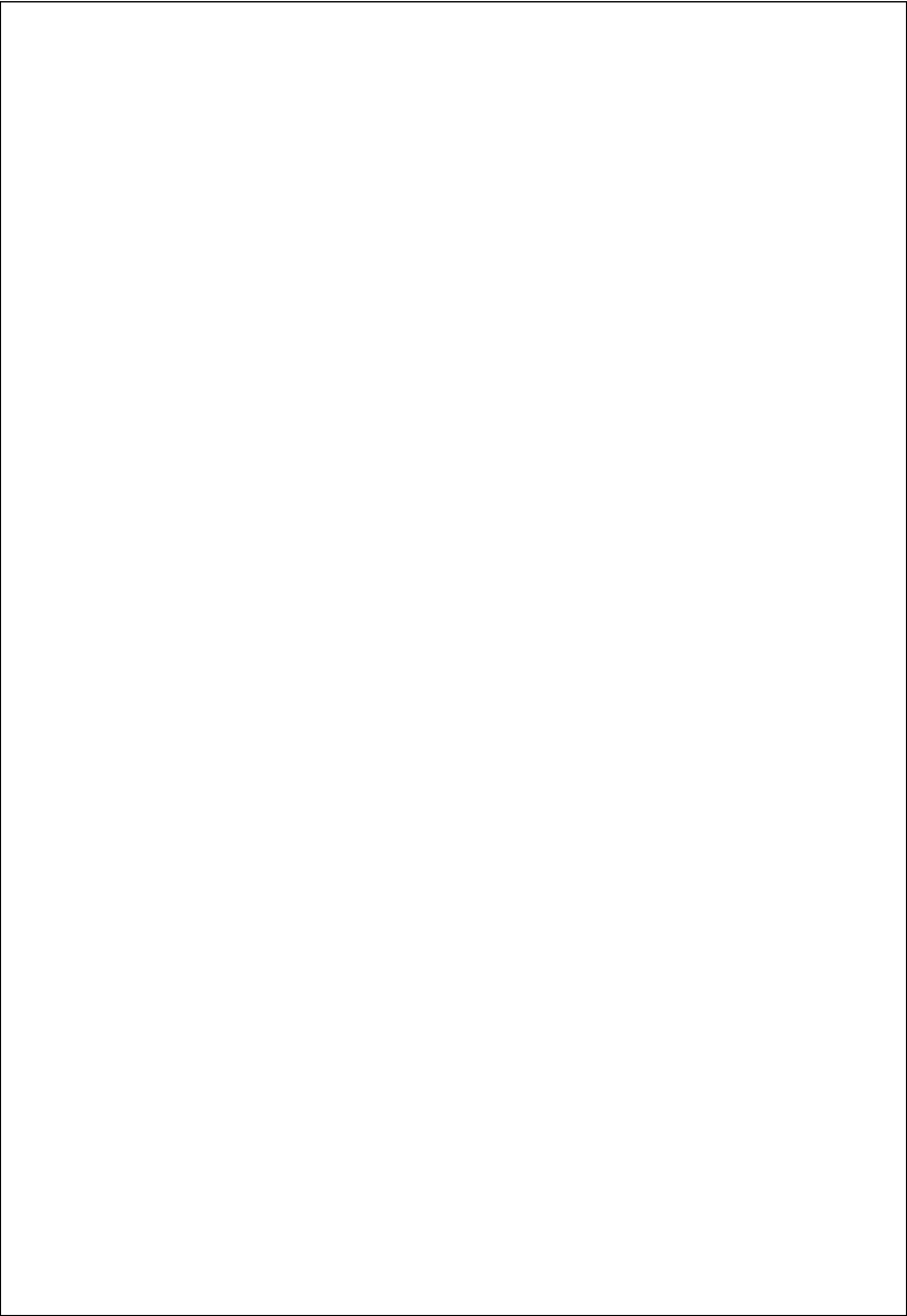
EXPECTED OUTPUT:

The real-time emotion detection system will capture live video from a webcam and detect faces by drawing rectangles around them in real-time. For each detected face, it will classify and display the corresponding emotion (such as happiness, sadness, anger, fear, or surprise) near the face on the video feed. The system is designed to provide smooth, continuous feedback with minimal delay, allowing emotions to be recognized and updated dynamically as they change. It will also be robust enough to handle variations in lighting, facial orientations, and expressions, ensuring consistent and accurate emotion detection throughout the video stream.