Emotion Detection System

YouTube is a major platform for sharing opinions and emotions. Harmful behavior like bullying is increasing. Arabic content lacks advanced emotional analysis tools. This project builds an automated system to detect bullying in Arabic videos and comments. It uses speech and text processing.

Project Objectives

The system extracts Arabic audio from YouTube videos. It then transcribes audio into text. It also collects and preprocesses user comments. Both sources are analyzed to classify content into bullying or non-bullying. Results are displayed via a GUI and exported to Excel.

Problem Statement: Addressing Online Bullying

Rising Online Bullying

Bullying is increasing on digital platforms. It impacts user well-being significantly.

Lack of Arabic Tools

Existing emotion detection tools often fail with Arabic. This creates a critical gap.

Need for Automation

Manual detection is impractical and slow. Automation is crucial for scaling efforts.

System Scope: Focused Detection

Arabic-Only Content

The system specifically targets Arabic language content.

Offline Processing

Analysis occurs after video link submission.

API Integration

Utilizes Whisper API for transcription and YouTube API for data.

Dataset Usage

Employs custom and AJGT datasets for training.

Binary Classification

Classifies content as either "Bullying" or "Non-Bullying."

User Interface & Output

Results are displayed via a GUI and exported to Excel for analysis.

Methodology Overview

Video/Comment Input

User provides YouTube video link. Comments are collected automatically.

Audio Extraction & Transcription

Arabic audio extracted from videos. Whisper API transcribes speech to text.

Text Preprocessing

Both transcribed speech and comments undergo cleaning. This includes normalization and tokenization.

Feature Extraction

Text features are extracted. These include sentiment and lexical patterns.

Classification

Machine learning models classify content. Outputs are bullying or non-bullying.

Results & Reporting

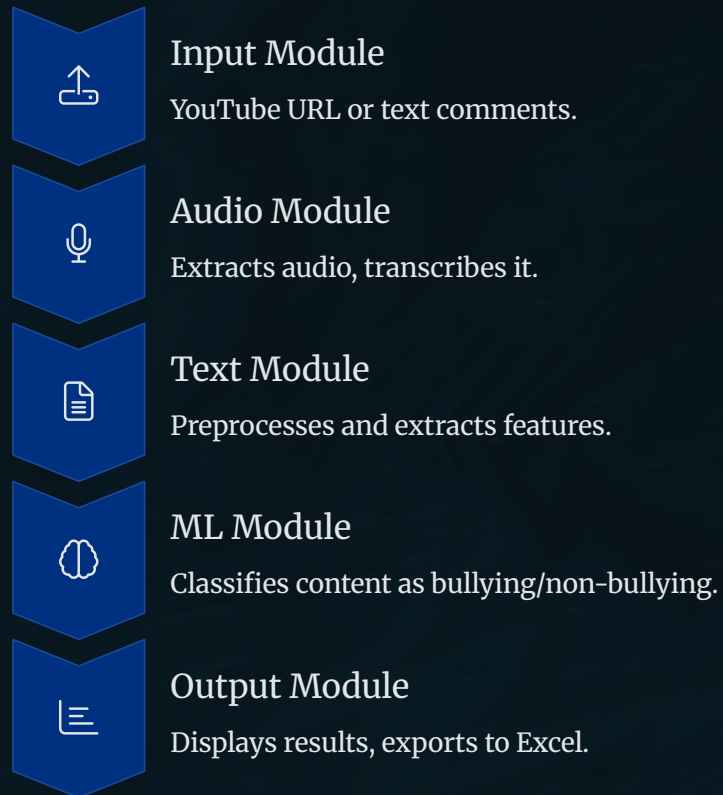Classification results are presented in a GUI. Data is exported to Excel.

Tools & Technologies Utilized

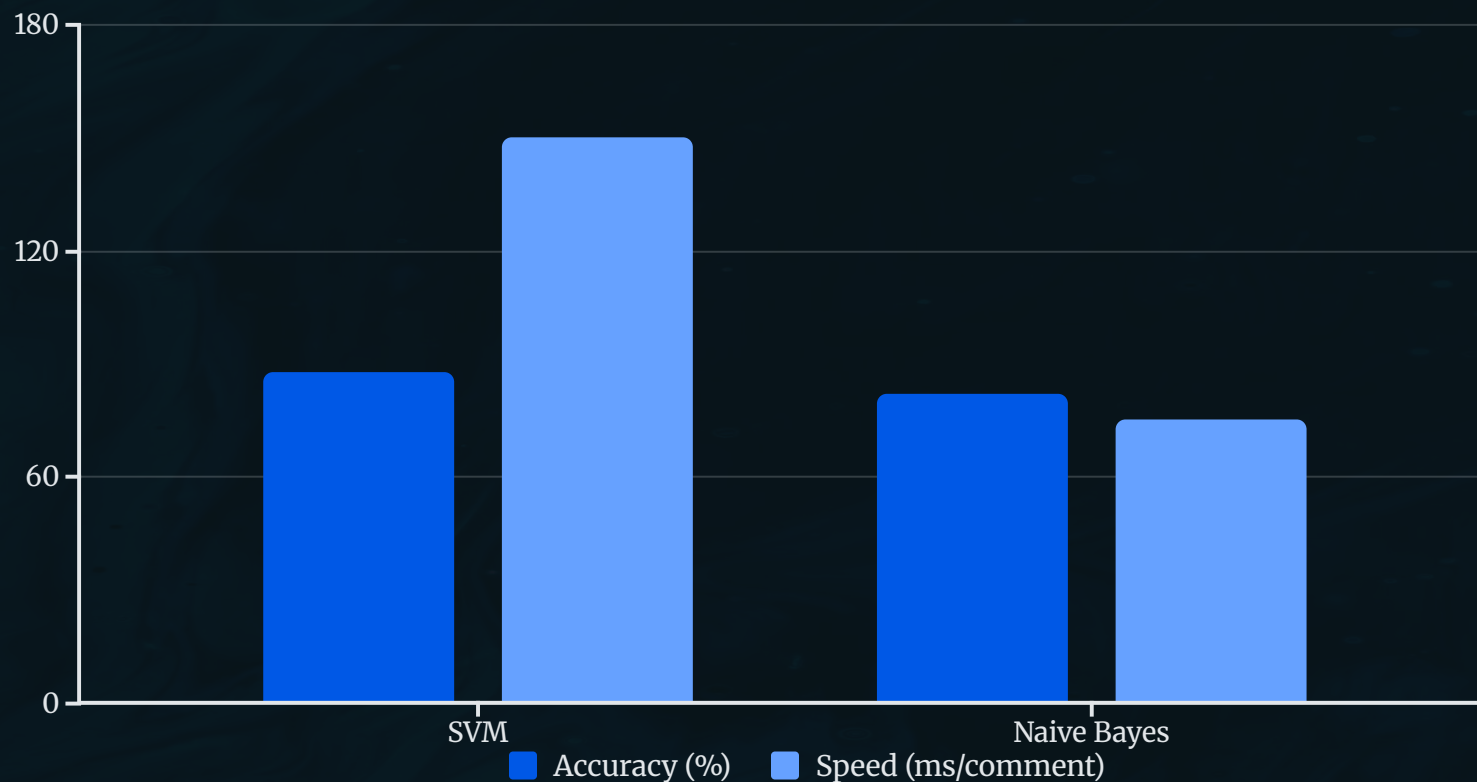|	
Whisper API + FFmpeg	Audio Processing
AraNLP, Camel Tools	Text Processing
SVM, Naive Bayes	Machine Learning Models
Tkinter	Graphical User Interface
Excel (Pandas)	Output Reporting

These tools form the technical backbone. They enable robust Arabic content analysis. Each plays a crucial role in the system's pipeline.

System Architecture: Modular Pipeline

The system follows a modular pipeline. It processes from video input to final classification output. It uses both speech and text analysis techniques. This design ensures scalability and maintainability for future enhancements.

Input Module

YouTube URL or text comments.

Audio Module

Extracts audio, transcribes it.

Text Module

Preprocesses and extracts features.

ML Module

Classifies content as bullying/non-bullying.

Output Module

Displays results, exports to Excel.

Model Performance Metrics

Legend: ■ Accuracy (%) ■ Speed (ms/comment)

Chart shows two model groups on the x-axis: SVM and Naive Bayes. Y-axis ranges from 0 to 180.

SVM generally outperforms Naive Bayes in accuracy. Naive Bayes is faster on shorter comments. Accuracy varies with dialect and audio clarity. Overall, both models show promising results in bullying detection.

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Challenges and Limitations

Dialectal Complexity

Limited support for diverse Arabic dialects. This can affect detection accuracy.

- Regional linguistic variations
- Slang and colloquialisms

Whisper API Errors

Transcription errors occur in noisy videos. Background noise reduces accuracy.

- Poor audio quality
- Multiple speakers

YouTube API Limits

Maximum 100 comments retrieved per video. This restricts data volume.

- Data incompleteness
- Scalability issues for popular videos

Real-time Processing

Current system is offline. Real-time analysis presents challenges. Latency and resource demands are concerns.

Future Work & Closing Remarks

Future plans include expanding dialect support. We also aim for real-time analysis and facial emotion detection. Cloud deployment will enhance accessibility. This project shows strong potential for enhancing digital safety for Arabic-speaking users.

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