



# Applying Innovative AI Techniques for Automatic Emotion

## Recognition

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# Introduction

- Emotion recognition technology can identify human emotions from text and speech but faces challenges like ambiguous language and limited data.
- Advancements in language processing and machine learning are key to overcoming these obstacles.
- Subsequently, emotion recognition has the potential to improve many fields like healthcare, education, and customer service.

# Problem Statement

Current emotion recognition systems face challenges due to the:

- Complexity of human emotions.
- Lack of diverse training data.
- Limiting their accuracy and application in fields like healthcare and education.

# Motivation

This thesis aims to applying cutting-edge methodologies to improve emotion recognition problem by developing more accurate models based on diverse datasets for enhancing human-computer interaction.



# Literature Review

Model	Dataset-Type	Results	Language	Publication Year
SVM	Arabic Sentiment Analysis Dataset. (Text)	97.12%	Arabic	2024
ANN	Arabic and English (Text)	73.4%	Arabic, English	2024
GPT-4	English Text	86.7%	English	2024
Transformer-based LLM (Typecast)	English Speech	66.6%	English	2024
CNN	English Speech	99.89%	English	2023
LanSER	English Speech	58.7%	English	2023
Wav2vec2.0	Arabic Speech	89%	Arabic	2021
KNN	Arabic Text	84.02%	Arabic	2020

# Thesis Objectives

The aim of this proposed model is to enhance the accuracy of emotion recognition systems by:

- Exploring and evaluating various solutions.
- Developing robust models.
- Utilizing diverse datasets.
- Conducting comprehensive data analysis and integration.
- Providing more reliable and effective tools.

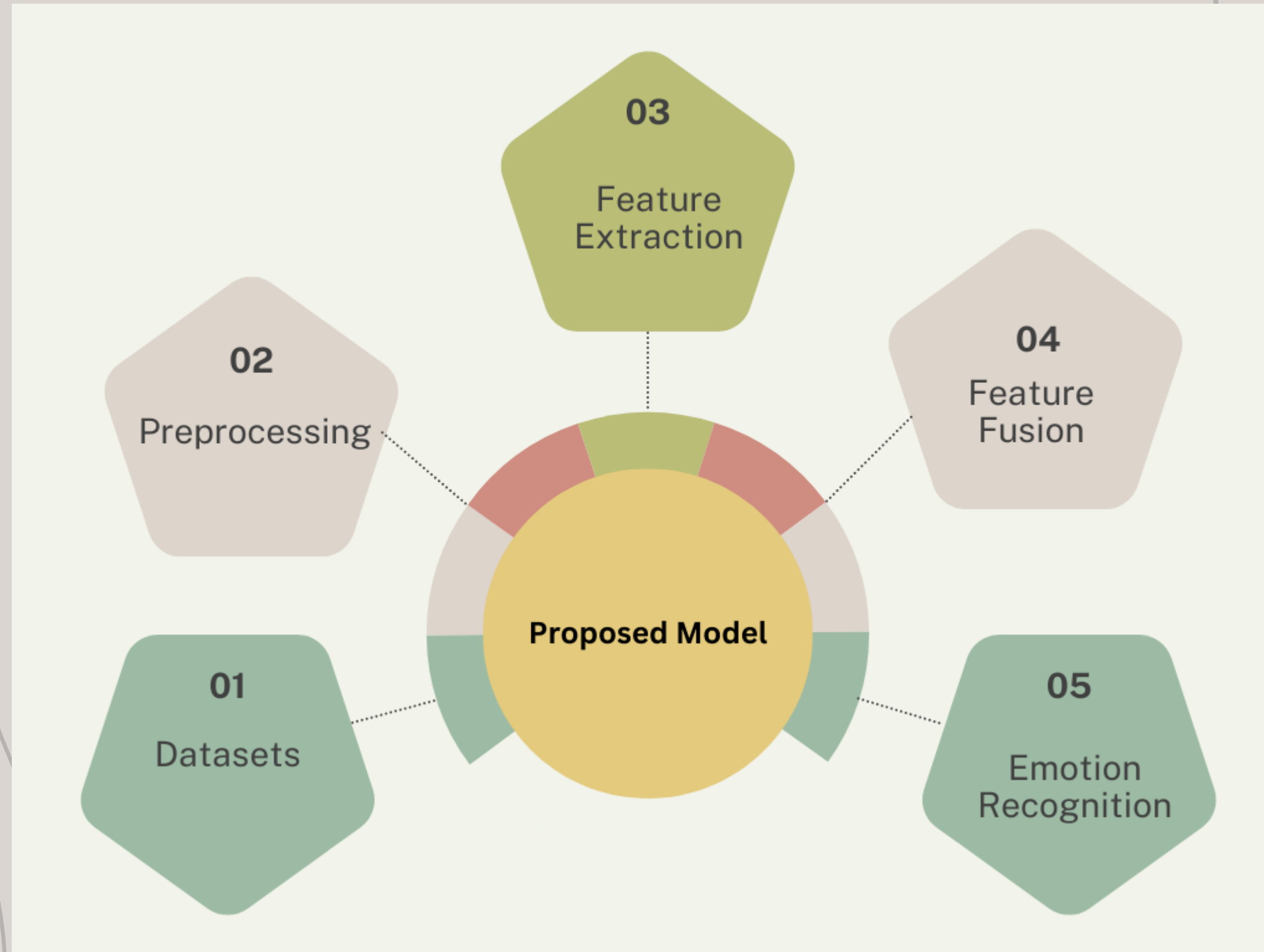


# Contributions

The thesis contribution will be:

- Using heterogenous datasets such as: Text and Speech.
- Using different languages.
- Building robust model based on new technologies like Generative-AI, LLMs, and deep learning.

# Proposed Model



# 1. Dataset

Name	Type	Language	Classes	No. of records
IEMOCAP	Speech	English	4	5,531
CREMA-D	Speech	English	6	7,442
RAVDESS	Speech	English	8	1,440
EYASE	Speech	Arabic	5	162
BAVED	Speech	Arabic	5	1,935
AraSenti Tweet	Text	Arabic	4	17,573
Semantic Evaluation	Text	English Arabic	3	63,817 3,497
EmoReact	Text	English	17	1,102
GoEmotions	Text	English	27	58,000

# 2. Preprocessing

According to text:

1. Tokenization
2. Stop word removal
3. Stemming/ Lemmatization
4. Normalization

# 2. Preprocessing

According to speech:

1. Noise Reduction
2. Voice Activity Detection (VAD)
3. Normalization

# 3. Feature Extraction

- **According to text:**

- Use pre-trained models for word embedding.

- **According to speech:**

- MFCCs.
- Prosodic Features.
- Spectral Features.



# 4. Feature Fusion

1. Concatenation.
2. Attention Mechanisms.

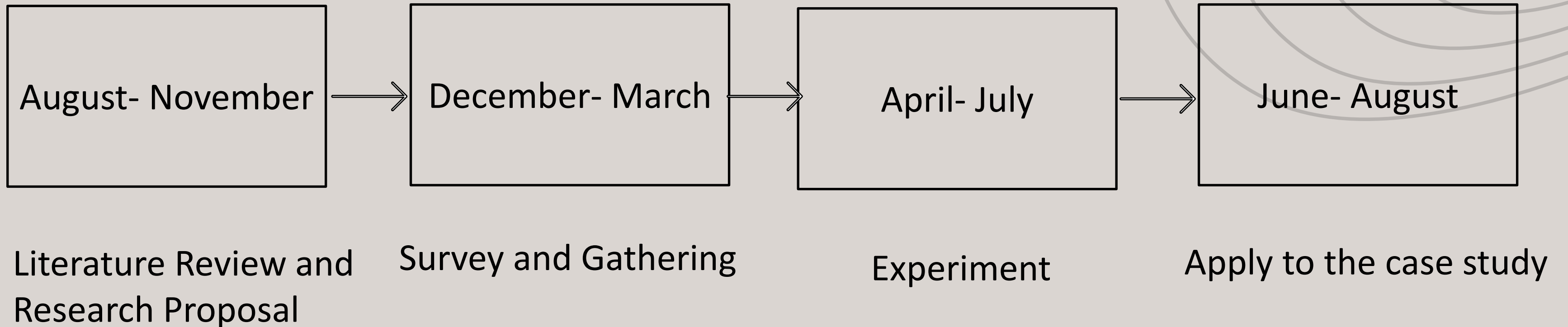
# 5. Emotion Recognition

- Train a model to recognize emotions using combined features by experimenting different AI techniques like: Transformers, LLMs, and deep learning.

# Evaluation

1. For obtaining robust model we will evaluate the proposed model by different measurements like accuracy, precision, F1-score, and ROC-Curve.
2. Fine-tune the model for improving results.

# Research Plan





**Thank  
You**