

## **PROJECT REPORT**

### **AUTOMATED EMOTION DETECTION USING DEEP LEARNING**

#### **1. Introduction**

This project focuses on automated detection of emotions from English text using transformer-based deep learning models. The system analyse user input and identifies emotions such as joy, sadness, anger, love, fear, and surprise.

#### **2. Architecture**

The system architecture consists of:

- User input via Streamlit frontend
- Text preprocessing and normalization
- BERT-based transformer model
- Emotion classification layer
- Output display with confidence score

#### **3. Approach**

- Collected and prepared an emotion-labeled dataset
- Applied text normalization for slang and abbreviations
- Fine-tuned a pre-trained BERT model using transfer learning
- Evaluated performance using accuracy, precision, recall, and F1-score
- Integrated the trained model with a Streamlit frontend

#### **4. Logic Flow**

1. User enters text
2. Text is normalized
3. Tokenizer converts text into tokens
4. BERT model processes tokens
5. Emotion and confidence score are predicted
6. Result is displayed on frontend

## 5. Tools & Technologies

- Python
- PyTorch
- Hugging Face Transformers
- Streamlit
- Google Collab

## 6. Evaluation Metrics

- Accuracy
- Precision
- Recall
- F1-score
- Confusion Matrix

## 7. Challenges & Solutions

Challenge	Solution
Slang & informal text	Text normalization
Context understanding	Transformer self-attention
Short sentence ambiguity	Documented as limitation
Deployment issues	Local Streamlit execution

## 8. Enhancements Suggested

- Multilingual emotion detection
- Emotion intensity prediction
- Explainable AI integration (LIME/SHAP)
- Real-time social media sentiment analysis