Project Report:

Q1: Disaster Prediction Model using Hugging Face Transformers

Objective

This project aimed to leverage the Hugging Face Transformers library to build and fine-tune a model for predicting disaster types mentioned in tweets. It aligns with **Sustainable Development Goal (SDG) 13: Climate Action** by improving disaster response through automated social media analysis.

Project Explanation

Project Idea: The goal was to develop a model that classifies tweets into one of six disaster categories: Drought, Earthquake, Wildfire, Floods, Hurricanes, and Tornadoes. This tool supports quicker and more effective disaster response efforts.

Project Goals:

- Fine-tune a pre-trained BERT model for disaster classification.

- Evaluate the model's performance and utility in real-world applications.

Part 1: Research and Setup

Research: The Hugging Face Transformers library was explored for its capabilities in NLP tasks. It provides pre-trained models like BERT, which can be fine-tuned for specific tasks such as text classification.

Model Selection: The **bert-base-uncased** model was selected due to its effectiveness in text classification tasks.

Part 2: Model Implementation

Loading the Model: The **bert-base-uncased** model and its tokenizer were used to prepare the model for fine-tuning.

Data Preparation: The dataset consists of tweets with disaster labels. The data was tokenized and split into training and testing sets.

Fine-Tuning: The model was fine-tuned on the dataset to improve its accuracy in predicting disaster types.

Part 3: Evaluation

Model Evaluation: The model was evaluated on the test set using metrics such as accuracy, precision, recall, and F1-score. The fine-tuned model achieved high performance with :

- **Accuracy**: 97.5%

- **Precision**: 97.52%

- **Recall**: 97.5%

- **F1-Score**: 97.49%

Conclusion: The project successfully demonstrated the use of Hugging Face Transformers for disaster tweet classification. The model showed strong performance, highlighting its potential for enhancing disaster response efforts in alignment with SDG 13.