A Deep Learning Approach for Hateful Meme Recognition on Social Media

Objective:

A meme is typically formed by an image and a short piece of text on top of it, embedded as part of the image. Memes are nowadays a common thing in social media. With time, people are using memes to spread hate among the social community. For this, the detection of hate speech in memes or detecting harmful memes has become an important task. As memes have a multimodal nature, it is necessary to detect both to correctly identify if this is a hate meme or not. We will use deep learning models like CNN or transfer learning and Bert or text models for the text.

Methodology:

The proposed multimodal framework integrates both visual and textual analysis for automated hateful meme detection. The system follows a late fusion architecture, with separate deep learning pipelines for image and text which are joined through an integration layer.

For the visual modality, meme images are passed through convolutional neural network (CNN) models pre-trained on large-scale image datasets and fine-tuned for hateful meme classification. This aims to capture discriminative visual features indicative of harmful meme content.

For the textual modality, the text content is first extracted from meme images using optical character recognition (OCR). The resulting text goes through multiple natural language processing steps including tokenization, lemmatization, and embedding generation. Contextual word embeddings are obtained from state-of-the-art pre-trained language models. The text embeddings are then passed through recurrent neural networks (RNNs) or other deep learning architectures suited for text classification.

Finally, the probabilities or feature vectors from the visual and textual pipelines are concatenated and fed into fully connected layers to produce a fused prediction indicating whether the multimodal meme is considered hateful or not. The entire framework is trained end-to-end, allowing the image and text models to complement each other.

Digital Agriculture: IoT-Driven Plant Disease Detection from Leaf Images

Objective:

Nowadays, with the assistance of computer vision, Internet of Things (IoT) and machine learning, leaf diseases in plants are detectable via various devices, e.g., mobile phone applications, websites, and IoT applications. This digital approach to detecting plant diseases negates the need of manual methods which require expert knowledge and might be difficult to detect timely, and the diagnosis may be based on subjective judgment. By integrating digital methods in agriculture the difficulty of the production operation can be greatly reduced, and diseases in plants can be detected with accuracy and efficiency.

Proposed Methodology:

We are proposing a mobile application through which any user can identify whether the plant has a disease or not. The image of the leaf of a plant will be taken by the user. Then the image will be sent to the prediction model which will predict whether the plant is healthy or not.

Automated Identification of Abusive Language Through Deep Learning Approaches

Objective:

Social media provides a platform for all users to freely express themselves but nowadays offensive and harmful content become normal. One type of such harmful content is hate speech, which is speech that directly attacks or promotes hate towards a group or an individual member based on their actual or perceived aspects of identity, such as ethnicity, religion, and sexual orientation. A key challenge for automatic hate-speech detection is the separation of hate speech from other instances of offensive language.
In this work, we will Identify linguistics as well as some quantitative features for five classes- religious hatred, political comments, racism, misogyny, and ethnicity.

Methodology:

The proposed methodology for our task involves collecting labeled datasets from social media and discussion forums containing both hateful and non-hateful text. The text data is preprocessed by tokenizing, removing stopwords, lemmatizing, etc. Various feature representations are extracted including word/character n-grams, TF-IDF vectors, and word embeddings from pre-trained models. These textual features are used to train machine learning classifiers like SVMs, random forests, and neural networks such as CNNs and LSTMs to identify patterns predictive of hate speech. The models are trained and optimized on the prepared datasets and evaluated on unseen test data using metrics like accuracy, precision and recall.

Detection of Brain Tumors in MRI Images using CNN-based Classification

Objective:

The most complex organ in the human body, the brain is vulnerable to the deadliest tumors. Any growth of a tumor within the skull, which protects the brain, has the potential to cause death or pain. For a treatment plan to minimize potentially fatal outcomes, accurate brain tumor diagnosis is essential. Accurately identifying brain tumors is essential, and computer-aided diagnostic (CAD) technologies can contribute to increased reliability.

Proposed Methodology:

We are suggesting computer software through which any user can detect whether there is a tumor or not in the MRI image. The MRI image of the patient will be sent to the prediction model and that prediction model will provide the probability of having a brain tumor.