DL Project -1

Fire image Classification

Project summary:

- The goal of this project was to develop a deep learning-based fire image classification system that can accurately and efficiently predict fire images.
- For this project I collected so many Fire and non fire images from the various resourses.
- First imported the needed library for the project and import the Dataset where model to be trained.
- And then used an image generator function to obtain training and testing data from the custom dataset given.
- We then used three different models to train our system: DenseNet121, MobileNetV3, and InceptionResnetV2.
- These models were selected because they are well-established and have proven to be effective in image classification tasks.
- For modelling the layers, I used transfer learning methods i.e just by giving only required input Dense and output dense layer with number of classes and activation fuction as arguments, leaving rest of the layers as in Pre-trained models, Large amount of computational time were reduced and will get good accuracy.
- The training process involved feeding the models with the training data, and adjusting the parameters such as epoch, batch size, Learning rate, loss type, Optimizers, through backpropagation to minimize the loss function.
- We also utilized data augmentation techniques such as rotation, flipping, and reshaping to improve the robustness of our models.
- After the training was complete, we tested the models using a set of new data.
- We evaluated the performance of the models using accuracy metrics.
- Based on the results, we selected the model with the highest accuracy to be used in our final system and saved in h5 format (Used to store numerical data such tensors and arrays)
- To make our classification system user-friendly, we deployed it using Streamlit, a web application framework that allows for easy creation of interactive user interfaces.
- The deployed system allows users to upload images and receive a prediction of the fire images or not.
- The successful completion of this project has the potential to contribute to public safety by providing a more accurate and efficient way to predict fires in residential and commercial places to activate fire alarm, authorities can take necessary actions to prevent further damage and ensure the safety of the community.