Deep Learning project

Subject: Lightweight deepfake detection using MobileNet

References:

https://ejournal.nusamandiri.ac.id/index.php/jitk/article/view/5798/1308

file:///C:/Users/viann/Dropbox/Mon%20PC%20(LAPTOP-DRSLMGAL)/Downloads/mathematics-13-03088-v2.pdf

Type of project: Bring your own method

Summary:

Deepfake videos have become increasingly realistic and easy to produce, leading to growing concerns about misinformation and identity theft. This project aims to develop a lightweight neural network capable of efficiently detecting deepfake images or video frames, even on devices with limited computational resources such as smartphones. To achieve this, I will adapt and fine-tune a convolutional neural network based on MobileNetV3, and compare its performance with established baseline architectures like XceptionNet and EfficientNet-B0. The approach involves using the MobileNetV3-Small model pretrained on ImageNet, applying transfer learning on deepfake datasets such as FaceForensics++, Celeb-DF and optimizing the network through quantization and pruning to enable real-time detection. Finally, the project will evaluate the trade-off between detection accuracy and inference speed to ensure an optimal balance between performance and efficiency.

Dataset:

I want to use 2 different types of datasets:

- FaceForensics++: https://github.com/ondyari/FaceForensics
  Manipulated video dataset with various compression levels & approximately 1000 videos

- Celeb-DF (v2): https://github.com/yuezunli/celeb-deepfakeforensics
  High-quality deepfake videos & approximately 590 real and 5639 fake videos

Work breakdown:

Dataset Preparation	12h
Model Design	10h
Training & Fine-Tuning	15h
Optimization	10h
Application Development	8h
Presentation of the work	5h
Total	60h