A lightweight facial detection and recognition system using a Raspberry Pi

Emmanuel Olayemi, Galamo Monkam, Ruth Agada

Bowie State University, Department of Computer Science, 14000 Jericho Park Rd, Bowie, MD U.S.A 20715

ABSTRACT

With mobile devices running pseudo compute-heavy AI models for face recognition, most of the actual detection and recognition are done on edge systems. The raspberry pi is a low-cost wallet-size computer which can serve as an edge resource to run the compute-heavy AI models for detection and recognition. In this work, we present an extremely lightweight and accurate facial detection and recognition solution. The detection and recognition system on the raspberry pi is based on the OpenCV's Haar cascades feature set. The model was trained and tested on a combination of different Generative Adversarial Networks (GAN)-based image generator models, FFHQ, CelebA, frames from FaceFroensics++ dataset, and images of real people. To that end, we conducted a case study for lightweight facial detection and recognition on a raspberry pi computer. As videos are made up of frames, which are still images, the system can detect and recognize faces.

Keywords: Computer vision, raspberry pi 3+, Haar cascades, OpenCV, Generative Adversarial Networks.