Title: Highly accurate deep compressed facial recognition

Abstract

As the focus shifts from analog to digital, we need measures to protect the data. Biometric authentication systems have recently gained popularity due to their simplicity and uniqueness. However, many devices still lack the measures. One solution is to use a simple phone camera to capture a facial image that can be authenticated over the cloud and add a layer of security for all applications.

This thesis investigates the performance of FaceNet, an AI facial recognition system when subjected to different compression algorithms. The study evaluates the effectiveness of four analytical algorithms (JPEG, JPEG-2000, WEBP, and PNG) and a deep learning-based technique called VAE (Variational AutoEncoder) on four distinct datasets LFW, CPLFW, CALFW, and CFP-FP

The research findings reveal that the algorithms like JPEG2000, and WEBP, even with very high compression, preserve most of the information required for face recognition. The implications of this research are significant for biometric authentication and recognition systems, as it suggests that using compression algorithms can significantly reduce the amount of data traffic generated by such systems without compromising their performance. This could help alleviate bandwidth limitations and improve the efficiency of biometric recognition systems. By minimizing the quantity of data that has to be communicated, saved, and processed, compression algorithms help create a more sustainable and environmentally friendly digital ecology. This may result in reduced carbon emissions, less energy utilization, and more environmentally friendly computing.

Overall, this thesis provides valuable insights into the efficacy of compression algorithms in face recognition systems and highlights the potential of using compression algorithms to help alleviate bandwidth limitations on edge devices.

Presentation outline

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  - Challenges in Biometric Authentication
  - Classification of biometric traits

- Background
  - Need for Efficient Image Compression Techniques
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- Experimental setup
  - Dataset - LFW, CALFW, CPLFW, CFP-FP
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- Conclusion and future direction