Abstract

Face recognition is one of the most studied research problems in the pattern recognition problem family. It refers to the problem of detecting and recognizing human faces in arbitrary images. It has a wide range of applications from identity management, access control, and behaviour analytics along with more controversial applications such as automated public surveillance. This dissertation studies the field of face recognition in context of a specific real world application, namely, identity verification in access control systems for office buildings and other places of work. The dissertation starts off with a general overview of the problem and discusses the individual components of face recognition such as face detection, facial embeddings and face recognition. The pertaining theoretical ideas and the current research landscape is studied for each of these components. The second section of the dissertation is experimental and studies the effectiveness of popular algorithms used in face recognition such as viola jones, hog detectors and deep learning. Experiments are carried out on several face detection and recognition datasets to measure metrics such as speed, accuracy and overall performance on a raspberry pi. The goal is to pick the best algorithms in terms of accuracy and speed for the individual components that can be used to construct an end to end, near real time face recognition pipeline. The last part of the dissertation deals with the development of a plug and play face recognition platform that can be used by office buildings to add face recognition to their access control system . This platform consists of a web application that can be used to manage multiple face recognition nodes. The features of this platform include device registration, employee registration, attendance reports, employee access management and alerts for unauthorized access attempts. In addition to the web platform, a local application is developed for a raspberry pi in order to convert it into a face recognition node that works in conjunction with the web application to provide a seamless experience. The goal of the developed consumer system is to provide an easy to set up, batteries included solution to incorporate face recognition as an added layer of security