Face Recognition Smart Home Door Lock System using AI

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Abstract*: Security is at most concern for anyone nowadays, whether it's data security or security of their own home. With the advancement of technology and the increasing use of IoT and AI, digital door locks have become very common these days. Face recognition system is broadly used for human identification because of its capacity to measure the facial points and recognize the identity in an unobtrusive way. The application of face recognition systems can be applied to surveillance at home, workplaces, and campuses, accordingly. The problem with existing face recognition systems is that they either rely on the facial key points and landmarks or the face embeddings from FaceNet for the recognition process. Deep convolutional neural networks have been successfully applied to face detection recently. Despite making remarkable progress, most of the existing detection methods only localize each face using a bounding box, which cannot segment each face from the background image simultaneously. To overcome this drawback, this project present a face detection and identification method based on improved Mask R-CNN, named G-Mask, which incorporates face detection and recognition into one framework aiming to obtain more fine-grained information of face. This paper also investigates the robustness of the face recognition system when an unknown person is being detected, wherein the system will send an SMS Web link to the owner of the house through edge computing. The door lock can also be accessed remotely from any part of the world by using a door lock integrated server account.*

Keywords: IOT, AI, Deep Convolutional Neural Networks, Mask R-CNN