Overall, its great improvement compared to previous written work that I’ve read. Your ideas are more organized which has been a major issue but there are minor parts that can get moved. I just added suggestion in the comments to extend/improve your points.

Keyless Entry Door(KED) identifies people’s faces in a video stream, compares them to images in a database, and recognizes known faces. If an individual’s face is recognized, the door unlocks itself automatically. Additional features include a key generator which allows entry through a keypad, and an accelerometer to detect a break in. KED will offer convenience as the user does not have to pull out his or her key in order to open the door. Another benefit of KED is the increase of security. Between 2003 to 2007, 3.7 million household burglaries occurred each year on average. If a break in is detected, KED will alert the user via an email. More than one-third have been a victim of package theft. We wish for KED to integrated with courier services by allowing the courier to open the door and place the package inside.

Facial Recognition has been implemented in a variety of products and services. One example is the service FacePRO from Panasonic. FacePRO’s matches a person’s face using live video to a database of registered faces and alerts the user of matching faces. It includes up to 20 cameras on a server and up to 30,000 known faces. A similar product is FaceVACS from Cognitec. FaceVACS also identifies peoples’ faces from video streams and recognize known faces. FaceVACs also provides services like frequent visitors, generate demographic statistics, and more depending on the version of the product bought. Other products that closely resemble our project are smart doorbell products. Standard features of these products are two-way communication, video recording, and motion sensors. Google Nest has the features mentioned above, along with a facial recognition system. The facial recognition is only used to alert the user if a face is recognized.

Our project is different from the above-mentioned products. Products like FacePRO and FaceVACS recognize people and alert the user, they are not products the general consumer will buy. They are more focused on business and public use. Recently, states have been coming together to ban facial recognition in public settings, so these products might not be available for businesses in most states.

The products above do not mention how they perform facial recognition, but we assume they use deep learning, like our project, in order to the accuracy they mention. Deep learning is a class of machine learning in which neural networks are used to extract information from input. A convolutional neural network (CNN) consists of an input layer and an output layer, along with multiple hidden layers. For our project, an image of a face is sent into a CNN, and its features are extracted as it goes through each of layer of the CNN. It returns a probability that the face in the image is a certain person. There are also different CNN models, and each are designed for a specific input. We chose the FaceNet model, since it specializes in facial recognition. When an image is passed in, FaceNet calculates how close that the image is to an anchor image. We use the probability calculated to determine whether to unlock the door. The user can also use the keypad to unlock the door. The passcodes are randomly generated and expire in order to increase the security.