Natural Language to AI Face Generation Using Machine Learning Project Description Summary

Group 31 - Abel Abraham, Beyza Soylu, Edward Plesa, Ryan Jasiak

Overview

This software is designed as a way to improve and modernize criminal identification systems that are in use today. After a criminal commits crime, the moments after, used to gather information from bystanders, are the most crucial for creating an accurate representation of the human face. Even if the information is perfect, forensics sketch artists can only get so far with the composite sketches that come out of this. Our software will simplify this process by accepting natural language descriptions and even already done sketches to create a more accurate 3-D model of a suspect's face, using the camera and video surveillance infrastructure to build a database of images for the AI to utilize.

Purpose

Our purpose is to help modernize the outdated methods that currently exist in law enforcement agencies. To make sure our software accomplishes this, we start by asking the agencies on their internal reports and metric to establish a baseline. Then, after delivering our software, we will return in one year to assess where it's effectiveness stands. We expect that as our real time database expands, the efficacy of our AI will improve as well. With this in mind, within the first year a 20% increase in criminal identification is a very reachable goal.

Work

The work for our project has been identified as the utilization of AI technology in combination with natural language processing to identify criminals. To have our project accomplish this goal, we will include implementing redesigned methods using current technologies and infrastructure in order to meet the demands of our modern needs and capabilities. We have determined that the current methodology used to collect information for creation of an investigation sketch is somewhat flawed, and this is due to the possible discrepancies with what the details that a crime witness remembers. After extensive research, we have decided to design our project to rethink and improve the way the work is carried out.

Product

The product for our project has been discussed to be composed of a software application packaged with the ability to input common facial descriptors, receiving an image, or strengthening of a sketch, and outputting a 3-D human facial model. The product will also have the capability to connect with the databases of currently existing infrastructure that gather real-time information via cloud (such as street cameras) databases of publicly accessible social network profiles, as well as other solution software which will help aid in the process. The product will have a few different scenarios to follow, including giving an input description or an input sketch, then updating the internal database, moving on to generating an image, and finally outputting the results of the 3D facial printing process.

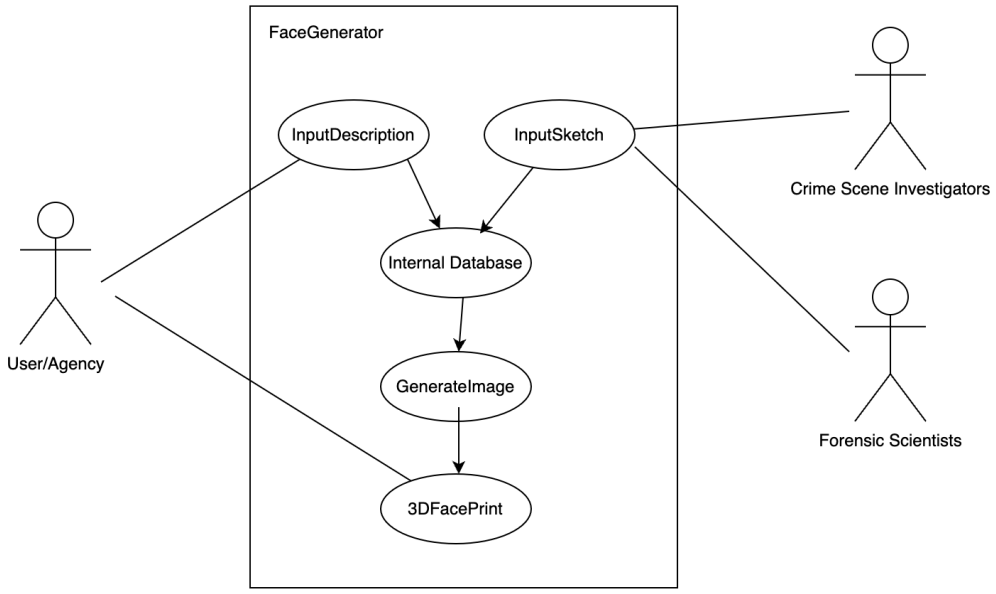

Figure 2 - Scenario Diagram

Solution Constraints/Assumptions

Development of such a product certainly requires some constraints to be set, and the Natural Language to Artificially Intelligent Face Generation using Machine Learning software is no exception. First and foremost, the product *must* include a natural language processor. One of the main benefits of the application is to provide the ability for the user to describe a face using human language for the computer to understand. Secondly, the product absolutely requires access to public security camera image and footage databases. Without, our product would have no data for the machine learning aspect to learn and better itself for the face generation. Third, the application must produce original, human-like faces. The faces must not be cartoon-like or a copy of another face.

The product will have the ability to function on Mac, Linux, and Windows. It will require collaboration with Public Security database Infrastructure teams in order to gain access to their data. Additionally, the software will *not* be sold online to the general public, but rather sold privately to crime investigation agencies. Equally important to the development constraints are the expected workplace and the estimated budget. It is expected that the users will be in an office setting and must have access to the internet in order to connect to the databases. Additionally, it will be assumed that the user will speak one of the languages supported by the natural language processing portion.

The product is expected to take 5 years to develop and will require at least 20 software engineers. Given that most software engineers are greedy and will probably want ~$150,000/yr, this product will cost about $15 million to develop.