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

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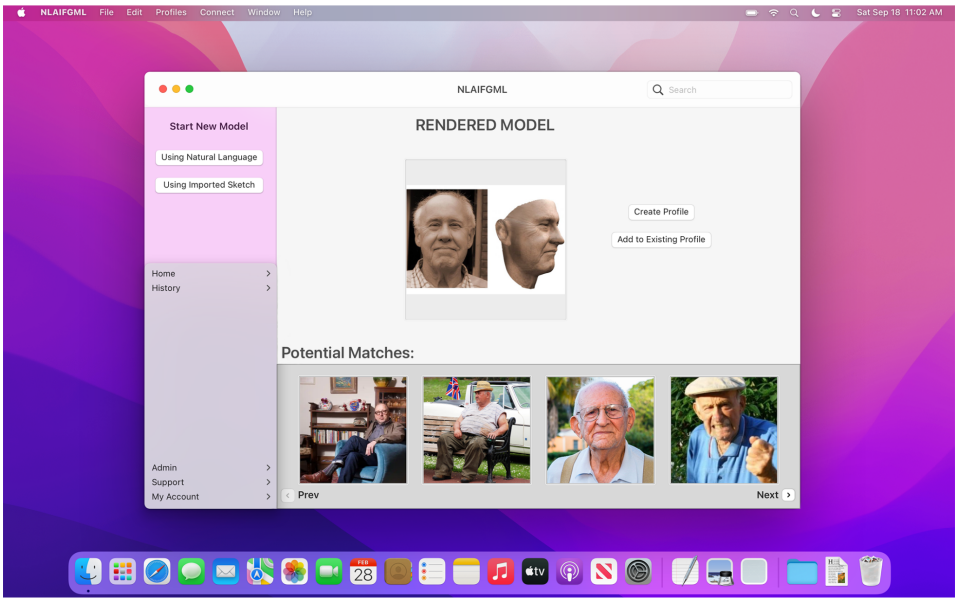
Project Description

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.

Project Requirements

The user can expect that the application will have a login screen where they must enter their credentials to gain access. When the user chooses to input a sketch, the file should be of JPEG or PNG file formats for maximum compatibility. When the user chooses to type in natural language descriptors, the application must only accept and parse words from the English lexicon. Front end and user login is expected to be very fast (within 5 seconds) while the 3-D model relying algorithms take a significant amount of time (5+ minutes). The system is also expected to not lose any data upon a system failure and have a very low failure rate to begin with (less than once a month). Along with these things, the application will require an intuitive set of video instructions available for the user to view at any time, along with an owner’s manual. The final product is required to have an enticing theme and color scheme. NLAIFGML’s logo will also appear on every screen of the application (see logo at end of document). The product will require internet access to run as it depends on multiple external databases to fulfill its capabilities. Ethical and legal concerns will be at the forefront of the development of the product, including precautions against racial biases in the program and having a full legal team to consider the products compliance with FRT, biometrics and general privacy regulations. Security requirements are also needed for a plethora of reasons in documentation, and a few examples are listed as such: user accounts and passwords, possible hardware security, different levels of secure authorization for specific data items or tools, and requirements for federally defined standards.

Project Design



High Fidelity UI Mockup

Design Considerations

Some design considerations, and especially those related to the hardware and software mapping, have been described as NLAIFGML and the hardware devices running it (desktops, mobile devices, etc.) interacting with real-time data sensors such as public access cameras. NLAIFGML's subsystems are composed of the User Subsystem, the Authentication Subsystem, the 3-D Model Subsystem, and the Finding Similar Suspects Subsystem, while the device subsystems refer to internal and external databases, and server and admin control.

Open Issues

Since we plan to make interacting with the AI as easy as possible we hope to allow users to directly speak their descriptions, however voice recognition software as it currently exists isn't sufficiently advanced enough to be used seamlessly. Another issue is that while 2D image generation via AI is rapidly progressing, 3D data generation is not nearly as advanced, and our hope is that our program can generate a 3D model of a face as well as 2D.

Waiting Room

In the future, we plan to develop in direct collaboration with Neuralink. We're big fans of Elon Musk. A user will be able to control their product entirely with their mind. AI Face-Generation will need to be swift. Image-rendering will need to take place quicker than a sketch artist can sketch. The most ideal tool for this sort of speed may be a custom rendering machine developed in C++. A demo of the product could be done using a pre-existing Graphics Library, such as OpenGL. Machine Learning on footage and image data could be done utilizing pre-existing machine learning libraries, such as PyTorch.