RET Site: Research Experience in Cybersecurity for Nevada Teachers (RECNT)

Biometrics - Image Augmentation

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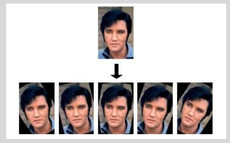
Ask

What is Biometrics?
What is Data Augmentation?
How does Data Augmentation work with a Machine learning Model?



Research/Imagine

Data Augmentation is a process of artificially increasing the amount of data/images by generating new data/images from existing data/images.

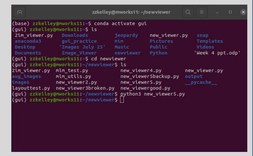
Augmenting existing data/images is needed to create the data/images for a Model Training Model.

Python is the language of choice for this project. The resources we will be using is Python based and our Machine Learning Model will use our Python Image Viewer.

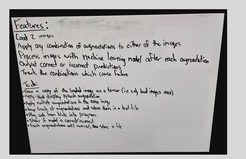
Plan

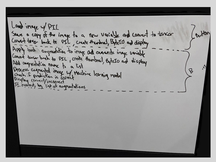
For our project we will build an Image Viewer that has elements that will load an original image and then have options to add augmentation to a second image.

The project will be created using Python. Before we start it we have to become very familiar with coding with Python, using Python Libraries, and using Linix Terminal.



Project Plan. Our group created a checklist of elements that is needed to create for our Image Viewer.



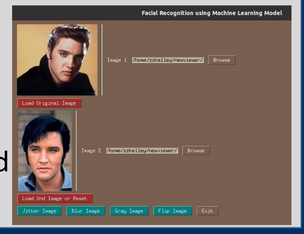


Create

Create a Prototype Image Viewer using Python.

- Create an Prototype Image Viewer using Python, PySimpleGUI and Open CV2.

- Upgrade Prototype Image Viewer using PyTorch and Torchvision libraries, so it would work with our Machine Learning Model.
- The last element we had to add was the ability to save the augmented images in a folder, so it can be reviewed for future use.



Improve

Added user friendly features:

- Added instructions on how to use the app.

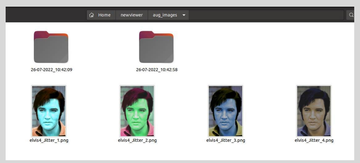
- Color coded the augmentation buttons.
- Added a reset button for 2nd image.
- Removed the baby yoda images and replace will human portrait photos.
- Add a results output box.

Test

Testing started with the 1st Prototype Image Viewer we created. It was good start, we had a working image viewer that that augmentation was added to an image by clicking a button.

The next step was to upgrade the Image Viewer Prototype for the Machine Learning Model.

After a successful test with the new upgraded Image Viewer. We tested the feature that would save of the augmented images to a folder. A new folder would be created each time the app is opened and the augmentation images would be add as the augmentation buttons are clicked.



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