Autostereogram Classification

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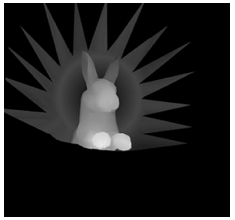
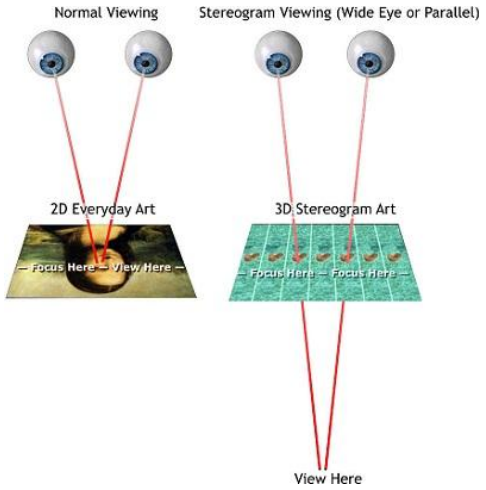
Preface



- An autostereogram is a single-image stereogram, designed to create the visual illusion of a 3D scene/image
- As technology progresses, we need to find innovative ways for that technology to experience the sensations of the universe, one sense is through sight
- For me, an important step was the ability for technology to distinguish depth, recognize something that may be hidden in plain sight, the beginning of understanding and context to the world around us.

Data

- Images were web scraped, manual retrieval and created using Stereogram Explorer
- Images underwent Augmentation to exacerbate features to help train
- Both classes consist of 1,000 images:
  - Autostereogram's hidden image accompanying opposing class
  - Opposing class filled with similar and related images/imagery



Results

- Multi-Layer Perceptron: Baseline, not efficient for dimensional analysis
- Convolutional Neural Network: Best performing model, benefits from image augmentation
- Pretrain DenseNet201, ImageNet database performed well on transfer learning

Metrics	Loss	Accuracy	Precision	Recall
MLP Original	92.07%	73.33%	68.84%	89.70%
MLP Finetune	48.15%	79.68%	74.88%	92.12%
CNN Original	21.19%	94.60%	95.12%	94.55%
CNN Finetune	15.78%	95.24%	94.12%	96.97%
Pretrain Original	16.11%	95.56%	98.09%	93.33%
Pretrain Finetune	17.14%	93.97%	90.56%	98.79%

However....

Recommendations

- These models work well in a general classification of what ***is*** and is ***not*** an autostereogram
- The model itself is not learning about the specific hidden image within each autostereogram, but rather is only understanding the difference between what makes an autostereogram and what doesn't.
- Implement progress here into Segmentation & Object Detection

Future Work

- Multi-class Object Detection & Segmentation to train a model how to pick out the image in an autostereogram
- Compile work from all models to work toward building a technology that can ‘see’ the world and distinguish between what is and is not there.
- Follow up each type of model with .3ds inputs, as these are the format for creating the hidden image

Thank You!!

Any Questions??