Learn image transformations using AutoEncoders

Aman Verma, *1211170659, ASU,* Anchit Agarwal, *1211213390, ASU,*

Abstract—The idea is to develop a neural network model that learns transformation parameters of images from their transformations and extract the original, intended images. These transformation parameters to be learnt for this project are rotation, translation and skew (shear mapping).

1 Introduction

Over recent years, after the adoption of a fast, scalable, end-to-end learning framework, the Convolutional Neural Network (CNN) [2], in ImageNet classification by Krizhevsky et al. [1], the landscape of computer vision has seen drastic changes. By taking advantage of Convolution Neural Networks, we are trying to learn different affine transformation properties of an image and also produce original un-transformed image. Since affine transformation include several transformation, we are currently limiting the learning at rotation, translation and shearing of image. If time permits, we have future plans of extending the results for scaling too.

1.1 Examples

As seen from example images 1 and 2, we can see examples of affine transformation on images.

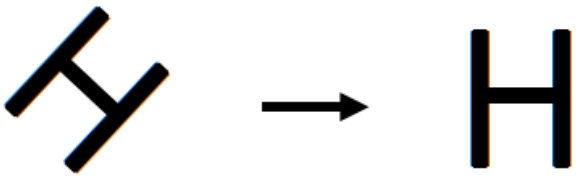

Fig. 1. Rotation example

Fig. 2. Skew example

2 Time line

We adhere to follow the following time line:

Week(s)	Activity
1-2	Project finalization and proposal.
3-4	Finalizing network architecture
5-8	Training and fine tuning on MNIST
9-10	Report work and future work attempt.

3 Future work

Since scaling is one of the major part of affine transformation, we would like to explore if our network can be altered to handle scaling too.

References

[1] Alex Krizhevsky and Sutskever, Ilya and Hinton, Geoffrey E, ImageNet Classification with Deep Convolutional Neural Networks. Advances in Neural Information Processing Systems 25, 2012

[2] Y. LeCun, L. Bottou, Y. Bengio, and P. Haffner. Gradient-based learning applied to document recognition. Proceedings of the IEEE, 86(11):22782324, 1998.