

Generating Stereo-pair of an image for 2D to 3D Conversion

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Abstract—We propose a Deep Learning mechanism using GAN to generate the stereo-pair of a 2D image which together can be used by a 3D-hardware to produce a 3D image.

Index Terms—2D, 3D, Stereo-pairs, Deep Learning, GAN

1 INTRODUCTION

IN the past few years, we have witnessed an explosive growth of 3D hardware but this has still not matched the amount of 3D content production. We propose a method of generating a stereo-pair of a given 2D image, let's say left image and generating its corresponding right image. These 2 images can then be used in a VR or other 3D hardware to generate a 3D image of it.

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2 RESEARCH QUESTION

Despite a significant growth in the last few years, the availability of 3D content is still dwarfed by that of its 2D counterpart. To close this gap, many 2D-to-3D image and video conversion methods have been proposed. Methods involving human operators have been most successful but also time-consuming and costly. Automatic methods, which typically make use of a deterministic 3D scene model, have not yet achieved the same level of quality for they rely on assumptions that are often violated in practice. Hence there is need for a automated algorithm that learns the depth of an image by itself. We propose to develop a neural network based on Generative Adversarial Networks to find the stereo pair of a given image.

3 EXPECTED EXPERIMENTS

Each eye receives a slightly different view of the world and stereo vision combines the two views to perceive 3-d depth. Our aim is to generate the stereo pair of a given image using Generative Adversarial Networks. We have tried to find image datasets which contain stereo pairs and came up with Hollywood dataset and Middlebury Stereo Datasets. We are also planning to use YouTube's 3D video dataset and choose selected frames for our dataset. We then plan to train our model to learn the correlation parameters (stereo cues, depth cues) from an image and compare to its stereo pair and then use the parameters to predict stereo pair of any given image.

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4 DIRECTION OF ANALYSIS

GANs consist of a constant push between two networks (thus adversarial): a generator (G) and discriminator (D). Given a set of training examples (such as images), we can imagine that there is an underlying distribution (x) that governs them. With GANs, G will generate outputs and D will decide if they come from the same distribution of the training set or not.

We will use GAN to generate the stereo-pair of a given image. In our case we can feed the left image of a particular image and the generator will generate its right image. In past, there has been work on depth calculation of image which helped in 2D to 3D conversion, so we may too calculate image depth in this project of ours to attain better understanding and accuracy.

5 TIME LINE

- Explore, Collect and analyze dataset - 2 days
- Understand stereo pair of an image - 2 days
- Reduce the image sizes - 2 days
- Build and improve Generative Adversarial Network - 30 days
- Use the image and generated image pair to form 3D image - 10 days

6 CONCLUSION

We will build a system that can successfully generate a stereo-pair of a given image which can be used to convert a given 2D image into its 3D image.

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