

# 3DP: The 3D Panorama

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**Abstract** - The main objective of this document is to present the detailed description of the “3DP: The 3D Panorama”. The application lets you create 3D panorama videos on the go, using mobile devices or digital cameras. Thus making a dream come true for creating and viewing the 3D videos anywhere, anytime. Our project is salutary in a way that you get the actual 3D depth on regular android mobiles having an austere single 2D camera. Google has recently come up with Cardboard I/O making it easier for developers to create applications for 3D SBS (3D Side-By-Side) viewing and do the testing for same. Thus, thereby bringing the pleasure of immersive 3D environment to even common man.

**Keywords** – Android, Smart Phones, 3D, immersive, panorama.

## I. INTRODUCTION

The perspective of this application is to provide the common man the ability to create/generate 3D immersive panorama on the go, by using very less resources and still, dealing with very less or almost no complications. According to the survey it has been noticed that it is very cheap to prepare the virtual reality goggles/headset. The cost merely ranges from \$7~20(apart from mobile) to prepare one, while comparing it with real virtual reality headset, the cheapest available for \$300~1800+. Of course the immersion's and depth's have a great variance. This project is about creation of 3d videos that also can viewed as panorama, which uses the android smart phone/tablet having single 2d camera and also having a greater extent of availability, thus replaces the professional way of capturing 3d i.e., using two cameras.

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Literature Survey of the Project:

### 1. AirPano.com :

- High quality 3D Panorama.
- Use of more than one camera.
- Exhaustive image stitching techniques.
- Not available for common man.

### 2. Panorama Camera 360:TeliportMe

- 2D panoramas.
- Promises 3d effects like rainfall, lens flare.
- 3D view of image is just rendering the image on a cylindrical surface, producing no depth.
- Available for common man.

### 3. 3D panoramas has already started, then why 3DP?

The primary differences between the two disciplines are the distinction between availability of the tools required for generation of 3D. Where generating of 3d requires/required two adjacent cameras creating two distinct images, we use only one camera for generation of 3d.

## II. CREATING OF VIDEOS FOR INPUT OF APPLICATION

For creation of 3d image with depth one requires to have two different images, one for each eye. The traditional way is by capturing the images by using two cameras at a time or by a single camera by clicking two photos by keeping some distance horizontally between the camera positions. Thus, we created an innovative way for the capturing of 3d panoramas, by the help of a 2d video. The video capturing needs a still environment. The video for this purpose is captured the same way a normal panorama is captured. The capturing can be done by holding the camera in skillful hand for stable capturing or by using some rotating device/mechanism. For e.g.,

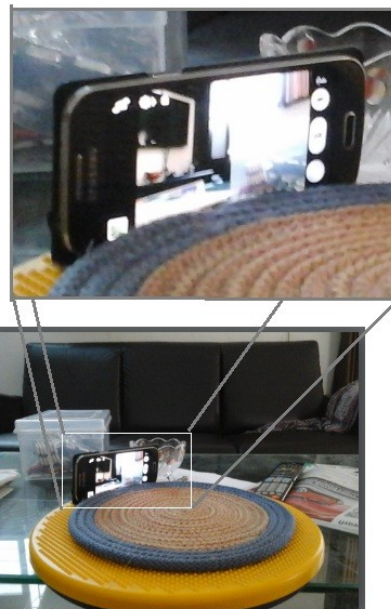


Fig. . Video capturing using rotating disc.

Not only does it require the videos captured by camera, but also we can take some clippings from movies like Matrix, etc., where a camera rotates around a still scene.

And still get the same 3D effect, by adjusting the speed of the playing video, as discussed further.

### III. PROPOSED SYSTEM

For creation of the 3d video, we need two different pictures on the screen at same time. Thus for this objective we proposed the application to be a 3D SBS player, wherein we will need to take into account the screen is divided into half, one half containing first image and other half containing the other image.

For this purpose we took two “video-views” in the application in correct proportions, but taking into account that it stays full-screen, so that notification bar gets omitted. And upon touching the options button only, the notification bar will appear.

e.g.

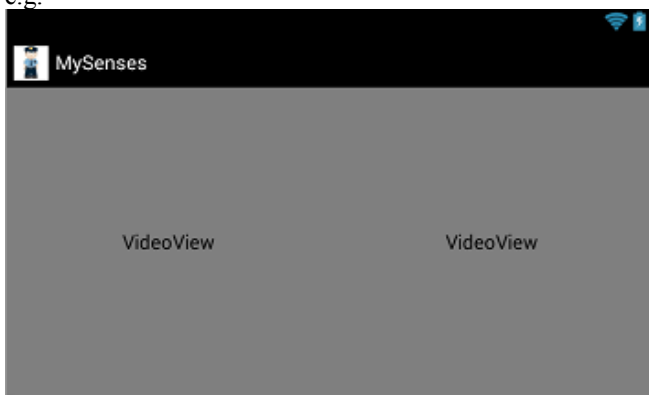


Fig. . SBS Video views upon clicking options key.

### IV. 3D GENERATION :

Now, the two images for generating 3D should be extracted from video. Thus as we've two video views, we will play the same video, which was previously captured in the same way as panorama, in both the video-views. But the only difference here is that, we will be playing the video to the right side with a minor difference in time of about 800 milliseconds in the starting.

Thus, for viewing of 3D video as panorama, now we will place the mobile in the home- made/Samsung-gear VR headset, e.g.,

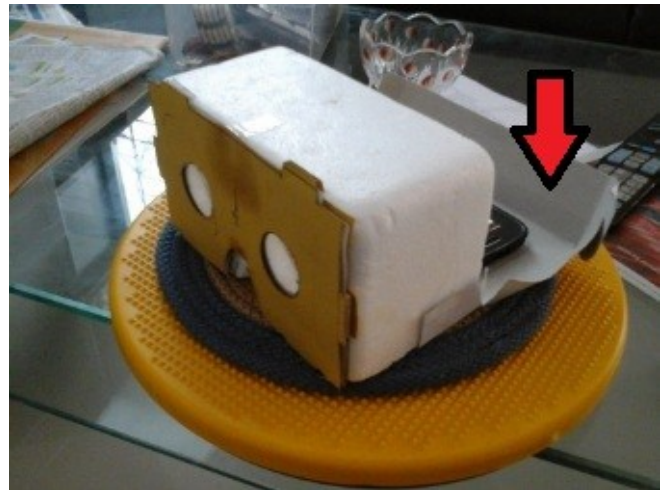


Fig. . Mobile placed in our home-made VR headset.

Here, we are just taking a couple of two images by making the 1st and the Nth or Xth frame and (X+N)th frame appear on the screen simultaneously. And through VR headset, we will get only one image, as brain processes it to appear in 3D. So, how the 3D is generated can be understood by the following figure:

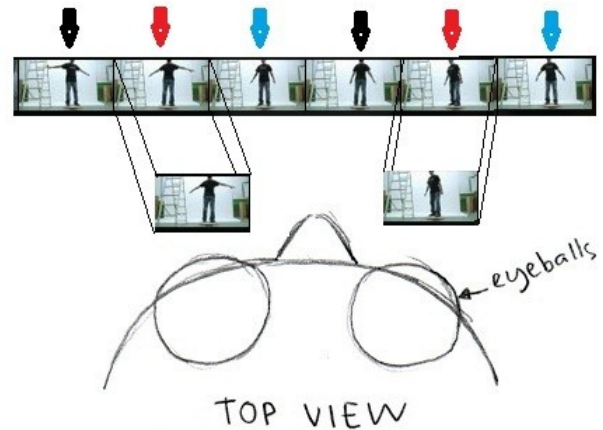


Fig. . How each eye gets to see different image.

In the figure above, the frames of same video are being used for 3D generation. The pairs here are tagged by different colored arrows. These pairs are rendered in front of our eyes, which later-on forms one 3D image. And also the current sample video shown in the diagram is not panoramic, as you can see the images are not in synchronous.

To show how the synchronous images from panorama video appears, here is the screen-shot taken from mobile of the panoramic video captured from mobile:



Fig. . Screen-shot of actual SBS 3D formation of two images/frames from the same video.

#### V. TECHNICAL PROBLEMS:

To implement our project we require to know the speed of captured video to be played, where the speed means the rotation speed of capturing device. After which the delay between the videos can be decided, else it causes /may cause, dizziness and headache, sometimes to a greater extent. This causes because, the brain is continuously merging both images to generate 3D effect, but images are not in synchronous enough, to make it happen. And even if the images are in between of being in synchronous/non-synchronous, the eyes start to strain to make them synchronous.

But this will require a lot of image processing to detect the exact speed and determine some delay which may often lead to wrong determination.

Another problem is, when the video is taken in non-traditional way, i.e., from right to left. Meaning, as a standard, the panoramas are always captured from left to right. But sometimes the fed video may be taken in opposite direction. At such times the orientation too needs to be determined, as it will generate an effect giving opposite images to both eyes.

#### VI. SOLUTION TO THE TECHNICAL PROBLEMS:

Thus as the image processing will be a tedious job to do, we came up with a simple approach. In android we can set the “onTouchListener” to video-views, means, we can assign some function upon touching the video-view. Thus, we can have two different functions executing on touching the correct video-view.

Therefore we used this feature, to determine the actual as well as comfortable delay according to user. The default delay will be 800 milliseconds. So, in order to decrease the delay between the two video-views, the user has to touch the left video-view. And similarly to increase the delay for slow rotation speed captured videos, user will have to touch on right-side video-view. The code for the same:

```
vw1=(VideoView)findViewById(R.id.vidView1);

vw1.setOnTouchListener(new
OnTouchListener() {
```

```
@Override
public boolean onTouch(View arg0,
MotionEvent arg1) {
    decreaseDelay();
    return false;
}
});
```

Now, the second issue of the fed video, being recorded in opposite direction. For this, using the same technique, as touching the left image will continuously decrease the delay and after reaching Zero, will turn into negative. Which in-turn will make the right-side video playing first and the left with negatively increasing delay on each further tap/touch on left video-view.

#### VII. FEATURES OF THE PROJECT:

There is no such limitation that the user will require only VR headset to see 3D, user can change the view to red/cyan 3d and similarly set speed/delay by tapping on left/right of processed video.



Fig. . Enjoying 3D on 3DTV, via HDMI cable.

Also the user can view the same SBS video on any 3D TV, and set the TV mode to 2D to 3D, thereby making the video available to see on big screen.

#### VIII. FUTURE ENHANCEMENT

The application will be enhanced for head-tracking, wherein the video will be still at the center of the time span of video. And for the video there will be forwarding/rewinding and the setting of the delay will be taken from the parameters of the mobile during head tracking.

Similarly, for un-availability of VR head-set, still by using HDMI cable one can see this 3D panorama on 3D TV, by moving the mobile in head-tracking motion.

#### IX. AIMS AND OBJECTIVES

The aim of our project is to provide the common man the ability to generate 3D videos/panoramas by using a single camera, of their android. Because android mobiles have become very cheap nowadays, and easily afforded by common man.

#### IX. CONCLUSION

The 3DP will give many android users the ability to capture the 3D videos/panorama, by using very less resource, without causing the dizziness/headaches due to imperfect 3D.

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