WARPING ALGORITHM A BOON TO BASIC MOBILE DEVICES

Dr. R. Deepalakshmi
Assistant professor
Department of Computer Applications
Tamilnadu Dr. Ambedkar Law University,
Chennai -113, India

Abstract—**Inparallel to private systems, hand held systems have less handling power, lower money use, and very low resolution power. The previous two aspects are of great drawback for 3D graphics software running on handheld devices. The output is mainly on less space of display as the outcome is totally dependent on rendering of polygons. In this paper the concentration is mainly on how the 3D graphics are processed using Image Based Rendering, and why the Warping Algorithm is best suited for this type of rendering.**

Keywords—3D graphics, Warping algorithm, Mobile devices, Rendering technique

Introduction

Finding good examples for the given view for all images can solve these problems. The third problem, missing samples, is a peculiar error and will produce more or less visible artifacts. But of course, there can never be so many reference images that there would be always being 100% correct information from every angle of view. 3D Warping algorithm is implemented using Interactive warper. Extension to Image Based Rendering is an application of 3D graphics which is used in construction of 3D map is also discussed. Various optimization techniques involved and the technique of Binary Space Partioning is discussed in detail.Recent 3D cameras are capable of scanning large areas with adequate refresh rates.

This work also represents the first step to build a client server 3D rendering framework for mobile devices in networked environment.

So when attempting to model the real world, shortcuts need to be taken and if it is looked close enough at any digitized picture, you will see flaws that are not visible in the real world.

APPLICATION OF 3D GRAPHICS

Graphics find their wide application in computer games. Mobile phones play a vital role in graphic rendering using varying viewpoints. The outcome and visuals attract the customers more than the addiction towards the particular game. Visualization of maps, animated messages and screen savers are the areas which are hugely benefitted by 3D graphics.

PRACTICALITYISSUES IN 3D GRAPHICS

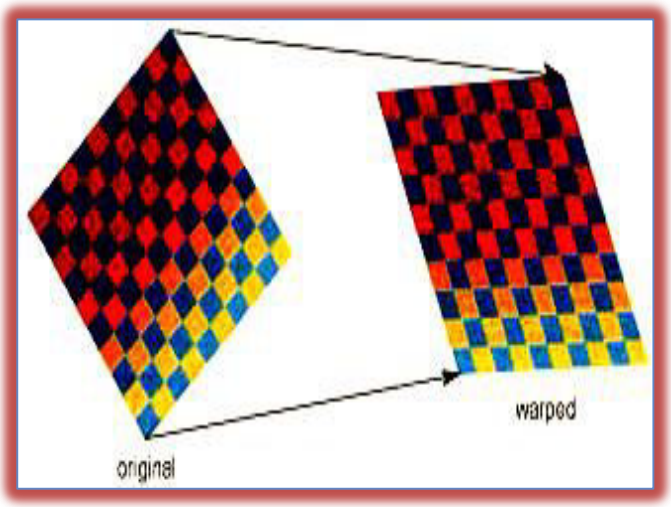
Most of the graphics applications use three dimensional objects and views. Both two dimensions and three dimensions not only differ in extra dimension but also in practical view of displaying 3D objects.The only practical problem arises is how the third dimension is displayed and what are the practical issues faced. These problems are discussed in detail below.

3D GRAPHICS RENDERING ON HANDHELD DEVICES

Mobile devices are a popular computing platform with the current inclinement in processing power. IN recent days mobile devices support video, audio and graphical user interface. Dedicated hardware is prescribed for desktop, and this is absent for mobile devices.

Fig 1: Rendering from original to warped

IMAGE BASED RENDERING IN THIRD DIMENSIONAL



VIEW

People have an elevated interest in smartphone, videogames and all electronic gadgets. Basic mobile devices have the

limitation in performing in only 2Drasterization that runs on CPU. Interest to have complex 3D images rendering on basis devises have a problem of remote rendering. This problem could be solved by Classical remote rendering solution. This type of rendering in basic model could be solved by 3D Warping algorithm.

The system framework can be designed by stand-alone version of our system. This framework is divided into two parts namely model constructor and interactive warper.

A. Model Constructor

The model to be represented are basically given as a group of polyon. The work of the Model constructor is to change the 3D model to depth images. Instead of data compression the method of concatenation is used.

B. INTERACTIVE WARPER

The 3D Warper can be allowed to run on mobile devices as new images and input can be accepted and allowed to run successfully and interactively. The hierarchy order of the input image detecs whether the image should be warped in back to front or frot to bank order.
The equation of Warping involves floating-point arithmetic. As we are dealing with basic devices and most of the basic devices have only fixed point representation, we tend to use this and inturn it increases the improvement of frame rate ratio.

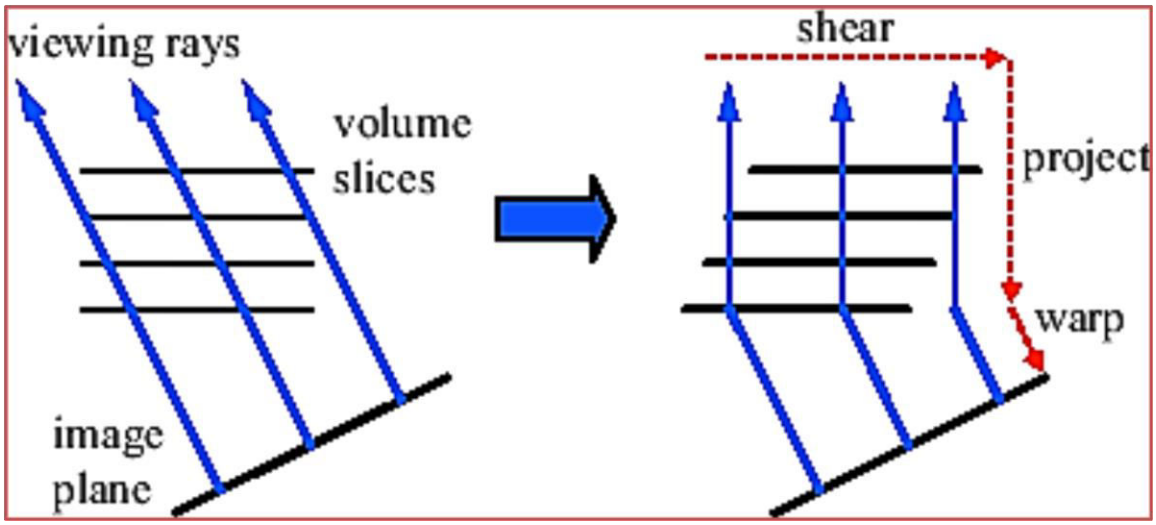


Fig 2: Shearing and Warping

Algorithm

Recent 3D cameras are capable of scanning large areas with adequate refresh rates. The warping algorithm framed by Mc-millan is of great use in image-based rendering technique.

The 3D image shown in Fig1.gives the information in each pixel in terms of depth [5]. The pixels are represented in the form of (3x4) matrix. When compared to the old methods of storing 3D pixels, the warping algorithm has less computing power. The formula for warping algorithm is calculated by using the following formula

(u2,v2) = u1a+v1b+c+ (del1) d , u1e+v1f+g+ (del1) h

u1i+v1j+k+(del1)1 u1i+v1j+k+(del1)1

The above equation calculates the x and y axis of 3D output image.
Where :
u1, v1 are the input image pixel.
u2, v2 are the output image pixel.
del 1 denotes the depth [1]
Computation of the computed image in terms of depth and colour is easily and effectively calculated using warping algorithm.

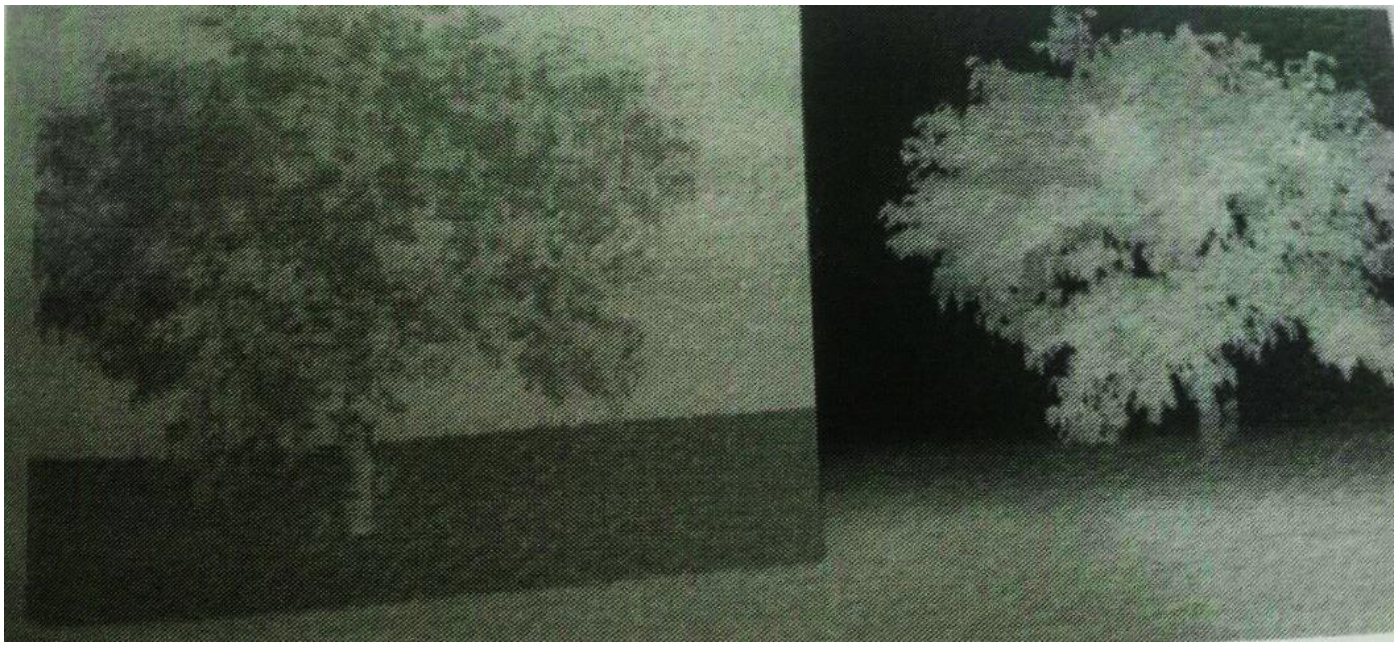


Fig2. Left shows the original image and right shows the warping image

Disadvantages of Warping Algorithm

Rasterization technique is a major disadvantage of the warping algorithm. When we copy the output directly it produces much space between adjacent pixels. This may result in change of image sometime. The above disadvantage could be rectified by drawing a rectangle to each of the pixel which is slightly larger than the pixel..

Working Process

The input to 3D warper is given in the form 2x2 matrixes. The depth image is given as 3x4 matrix form.

[1 0 0 0]

[0 1 0 0]

[0 0 0 1] (3 x 4 matrix)

The above 3 x 4 matrix includes depth to 2D screen space coordinates.The warping equation is more effective when compared to the above method. This involves more of arithmetic operations which give accurate results.

The working of warping equation is calculated for each pixel. The following results are produced.

Time Complexity = O(n2). [2]

n = Resolution of image in both horizontal and vertical direction.This is the point which is most advantageous to the small screen mobile device users.

```
[maxwl]-m_VLeft(maxw1)<<6)/1)<<4;
}
}

Public class MyCanvas extends Canvas
    Graphics 3D g3ds;
    World world;
{
Int  1 = (m_Right[maxwl] – (m_left[maxwl] >>6;
If (1>0)
{
du = (((m_URight[maxwl]-m_ULeft(maxw1)<<6)/1)<<4;
dv = (((m_VRight
    Int current time = 0;

Public MyCanvas() {                                    [3]
G3d = Graphics3D.create();
Object root[] = Loader load("world.m3g")
World = root[0];
}
```

```
Protected void paint(Graphics g) {                    [4]
G3d.bindTarget(g);
World.animate(current Time);
Current Time +=50;
G3d.render(world);
G3d.releaseTarget();
}
```

Hence the Warping algorithm given above can be converter to any language perceptively. A detailed study was made on 3D graphic processing on mobile, by using various rendering methods. Most of the rendering techniques are explained.

Conclusion

A detailed study was made on 3D graphic processing on mobile, by using various rendering methods. Most of the rendering techniques are explained.Image Based Rendering is considered an efficient and effective rendering; which is most compatible with mobile devices. Image Based Rendering adapts Warping algorithm which demands less computing power and that is what required for our mobile devices.3D Warping algorithm is implemented using Interactive warper. Extension to Image Based Rendering is an application of 3D graphics which is used in construction of 3D map is also discussed. Various optimization techniques involved and the technique of Binary Space Partitioning is discussed in detail. The implementation is covered by drawing 3D graphic image using Warping algorithm. We have present alternative approach to accomplish 3D rendering on mobile devices. It takes advantage of the smaller display areas of mobile devices and is capable of rendering complex 3D models because its performance does not degrade for 3D models with large polygon counts.

Future Enhancement

In the future, we can have a library that will requires only minimal effort to port any existing 3D rendering program such as those written in OpenGL to interact with users on mobile devices, without the users noticing that most of the rendering is actually done on a remote server.

References:

[1].Miao, Dan, Wenwu Zhu, and Chang Wen Chen. "Low-delay cloud-based rendering of free viewpoint video for mobile devices", Applications of Digital Image Processing XXXVI, 2013.

[2]. J.E. Bresenham. Algorithm for Computer control of a Digital plotter. IBM Systems Journal, 4(1) :35-40, 1965.

[3]. T – Saito and T. Takahashi, Comprehensible rendering of 3D, 2004.

[4].Leonard McMillan. An image-based approach to three dimensional computer graphics, 2002.

[5] Leonard McMillaan and Gary Bishop.“Plenoptic Modeling: An image-based rendering system”, 2005.