CONVERSION OF VOLCANIC ERUPTION DISASTER MITIGATION SIMULATION DESKTOP BASED GAME TO ANDROID BASED GAME

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Abstract - This paper discusses the game conversion of VolcanicEruption Disaster Mitigation Simulation desktop based game toandroid based game. The conversion performed by considering the limitation of memory of android based devices. Therefore, beside modifying the user interface, we focused the work on optimizing assets in the game to get good performance on android based devices. 3D asset optimization using the decimate method includes the scope of vert, tris, and faces. Optimization of 2d assets uses a method of reducing pixel size and resolution. Unity game engine is used to merge 3D and 2D assets and to compose the user interface of the game.

Indexterms - Game Simulation, Conversion, Android, User Interface, Asset, Optimization, Decimate, Unity 3D, Mitigation, Mountain Eruption.

I. INTRODUCTION

Developing the Volcano Eruption Mitigation Simulation Game intended to give an experience to people (players) so that players can feel and learn as if they are in a real volcano eruption disaster situation. In the eruption disaster mitigation simulation game there is education on how to deal with the situation before, when it occurs and after the disaster occurred. The game develops as a research of the Higher Education Leading Scheme ("PTUPT" scheme) that funding by the Ministry of Research, Technology and Higher Education of Republic of Indonesia, conducted by C. Pardede, S. Puspitodjati, and H. Widowati. Some part of the Game has been built, particulary the tutorial game mode as in [19], and some asset as in [17].
The game, so far, developedon desktop based using game engine unity, blender, and photoshop. Conversion of desktop based game to android based game is intended to attain wider audience. Conversion is done for mobile devices, one of which is a smart phone that is a tool that can be used for many things, including as a medium of learning through games.
Desktop-based volcano disaster mitigation simulation game can be planted on mobile devices but need to be light and fast. Light and fast are important because of the limitations that exist on mobile devices. Here we work on optimizing asset and adjusting the user interfaces in order to get good performance on mobile devices.

II. CONVERSION

Conversion is an activity of change from one system to another or the process of change from one form or format to another form or format. Conversion or commonly called cross platform is frequently done from desktop to mobile or from mobile to desktop. Changes that occur in assets are important in the optimization of applications or games, changes that occur in assets due to the needs of different cross platform devices.

On android assets that are used according to the capacity of the device, an example of a character will change in size, design sharpness, and design details. This change is to reduce the memory capacity used by the asset.

Polygon reduction is one way to reduce the number of polygons in 3D objects by maintaining the original shape. The process of reducing polygons is by identifying two U and V vertices or UV edges and selecting one and then deleting or by moving the vertex for example to vertex v, which is often called edge deletion. Asset conversion has a technique to optimize 3D and 2D asset assets, using decimate and resizing techniques.

III. DECIMATE

Our game have 2D and 3D objects or assets. Objects converted by decimation and resizing (Figure-1). Decimation means reducing a thing by removing part of that thing. One of representation 3D objects is polygonal based modeling. The model made up of vertices connected to each other become polygons. The polygon shape used is usually triangle. The decimation sometimes needed to reduce the size of object by reducing the number of polygons involved without changing the shape.

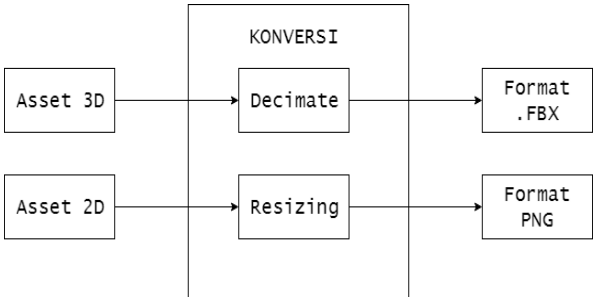


Figure 1: Asset Conversion

Decimate is a feature of the blender application (Figure-2) that can reduce tris (triangels), batches and verts (vertices), on 3D assets. The size of the reduction in doing this optimization using a ratio of 0-1, the smaller the ratio and faces (polys), it will make the 3D model in the form of rigid and even formless. The use of decimate is adjusted to the needs of the device because it affects the performance that will be obtained on the mobile device.

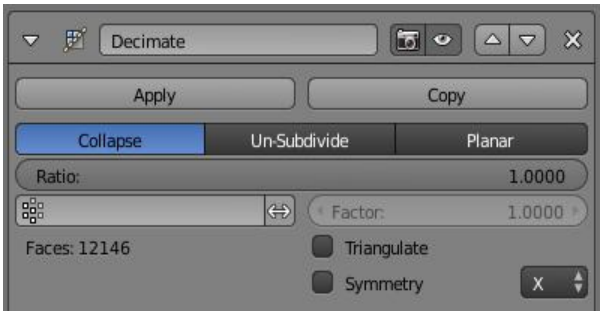


Figure 2: Decimate function in blender

IV. RESIZING

Resizing is changing the size of the number of pixels perinch and saving the same amount by adjusting the dimensions according to the new pixel setting. Changes in pixel size and resolution in 2D images affect memory capacity used by 2D assets on unity, because unity has an internal format to 2D, 2D Texture. The smaller the pixel, the less memory capacity is consumed, the size changes using a multiple of pixels at (128x128, 256x256, 512x512, and 1024x1024) because this size provides the maximum memory capacity.

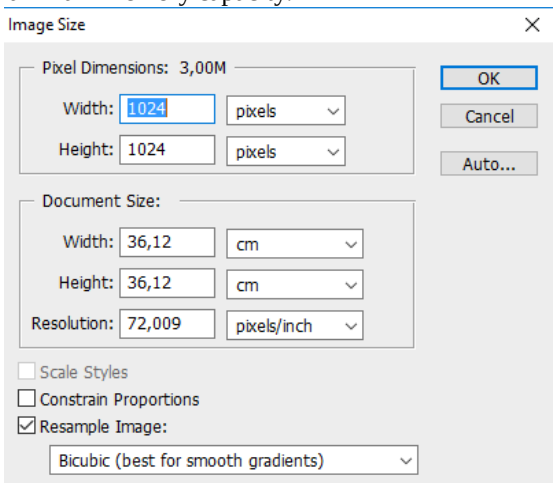


Figure 3: Resizing in Photoshop

V. CONVERSION ASSET 3D

3D asset conversion is needed in making games on mobile devices, the assets used previously come from personal computers which means having asset specifications according to the capacity of the device.Optimizing conversions on assets adjusting the needs of mobile devices by using the decimate techniques found in the blender application can reduce tris, batches and verts. 3D asset optimization results have an impact on game rendering because it affects the performance of the game to be played.

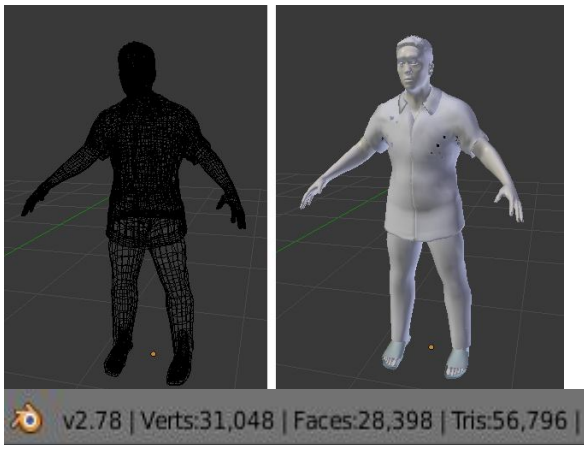


Figure 4: Our charater game before decimate function applied

It could be seen that number of parts that formed that character is 31,048 verts, 28,398 faces, 56,796 tris. After decimation, the character becomes smaller with 4,730 verts, 6,324 faces, and 3735 tris. Other characters are also we decimated as in Table-1. All of our 3D properties assets is also decimated.

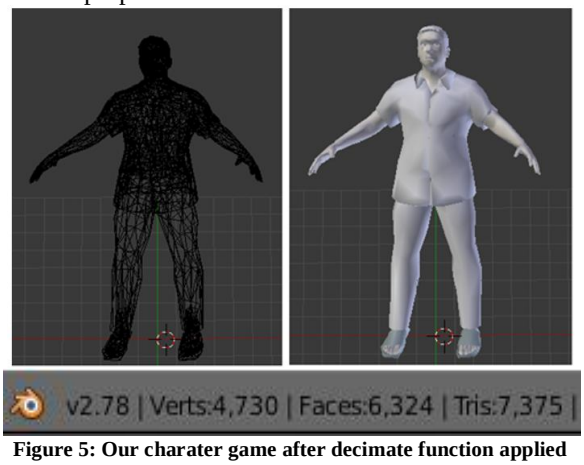


Figure 5: Our charater game after decimate function applied

Table-1: 3D CharacterAsset decimated

Name Asset	Before	After
MainPlayer	MainPlayer.blend	MainPlayer.fbx
Ayah	Ayah.blend	Ayah.fbx
Ibu	Ibu.blend	Ibu.fbx
Adik	Adik.blend	Adik.fbx

VI. CONVERSION ASSET 2D

Assets in 2D also converted. 2D's that was identified in the game are mostly texture used in 3D objects and user interface. 2 Objects that we resized are textures of house, properties, cows, and characters. Some textures of characters that we thought needed to resize are skin, eyes, eyebrows, clothes, pants, and shoes. Here is one of our eye texture resizing. The asset imported first from blender or unity into Photoshop. Resizing performed in Photoshop. Eye texture resizing in Photoshop from size of 1024x1024 to 256x256, as in Figure 6 and Figure 7.



Figure -6: Eye texture of size 1024x1024



Figure -7: Eye texture of size 1024x1024

Finished with resizing and decimating, altogether are united in Unity to become 3D object 2D objects with smaller size.

CONCLUSION

Conversion is used as a way to change a format that is different from one form to another.By conserving assets contained in the game, 3D assets and 2D assets use decimate and resizing techniques.Decimate is used to reduce the size of tris, batches and verts on 3D assets. Resizing is used to shrink pixels and resolution on 2D assets. Optimization using decimate function in blender and resize function in Photoshop has been successful applied in 3D and 2D objects of our game. The objects have smaller size and have good performance in android based.

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