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Visual Effects for a 3D Action Game

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Opinnäytetyön tavoitteena oli tutkia teoriaa visuaalisten efektien takana sekä kehittää osaamista visuaalisten efektien luomisessa. Opinnäytetyössä tutustuttiin visuaalisten efektien taiteellisiin perusteisiin. Teoriaa sovellettiin visuaalisten efektien toteuttamisessa 3D toimintapelin prototyyppiin.

Opinnäytetyö on koontanut taiteellisia periaatteita visuaalisten efektien tukemiseksi. Teoria käsittelee efektien yhteyttä pelattavuuteen, väriopin perusteita, muotokieltä ja efekteille tärkeitä animaation peruseriaatteita. Tämän jälkeen opinnäytetyössä haetaan esimerkki efektejä markkinoilla olevista peleistä. Viimeisenä käsitellään efektien luomisprosessia, työkaluja joita käytettiin opinnäytetyössä ja käydään läpi visuaaliset efektit, jotka rakennettiin aiemmin opitun teorian pohjalta. Näin opinnäytetyötä varten syntyi viisi efektiä: miekan huitaisu, indikaatio osumiselle, teleportaatio, laaseri sekä power-up indikaatio. Opinnäytetyötä kannattaa käyttää yhtenä ohjeena visuaalisten efektien maailmaan, koska aiheeseen löytyy monia muitakin lähestymistapoja, joita tämä opinnäytetyö ei käsittele.

Opinnäytetyö auttoi kehittämään graafisia taitoja visuaalisten efektien parissa ja opitusta tulee olemaan paljon hyötyä tulevaisuudessa. Vaikka lopputulos ei ole yhtä hiottu kuin alkuperäisen suunnitelman mukaan, on opinnäytetyöstä ollut paljon hyötyä peligraafikkona kehittämisessä.

Abstract

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The goal of this thesis was to study artistic principles behind visual effects and improve on creating them. The learnings were tested and applied by creating visual effects for a 3D action game's prototype.

This thesis has gathered artistic principles behind visual effects and covers topics such as how to visually effect gameplay, basics of colour theory, shape and animation principles relevant to visual effects. After this the thesis gathers some effects for reference, and covers the tools that were used to create the visual effects for this thesis. Five effects were created: a sword swing, hit particles, teleportation, laser beam and an indication for powerup. The thesis also covers some techniques behind these effects and how they were created. It is best to use the thesis as a guideline for getting started with visual effects, because it covers the basics of making them and there are many other approaches to the subject that the thesis does not cover.

The thesis helped develop the author's understanding of visual effects and skills required to create them. The theory and skills learned here can be used in future game projects. While the end results are not as polished as the author had originally planned, the thesis was very beneficial.

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1 Introduction

Visual effects have a similar role in both movies and games. They give information to the viewer or player and communicate what is happening in a scene. There are some key differences though. When creating visual effects for movies, rendering a single frame can take hours. In game development everything must run real-time. Control of the camera brings another difference. When the player has full control of the camera, visual effects must look good from any angle, any distance and in changing lighting conditions. In movies, visual effects have a specific shot where they need to shine. (Tokarev 25.5.2017).

Visual effects play two crucial roles in video games. They communicate actions happening on the screen and create a believable world for the player to explore. Visual effects can tell the player whether something is dangerous or friendly and how important the actions happening are. Visual effects also play a crucial role in making the world feel lively and dynamic. Without environmental effects the game would only feature static objects. (Tokarev 25.5.2017).

The difficulties between these two roles arise when you don't have a coherent design for the game. Using a certain colour when creating effects for all the in-game enemies can be good practise, but if you use the same colour on something that is friendly later on, the player can get confused. Filling the game with particles is easy, but creating visual effects that clearly communicate everything is hard. (Tokarev 25.5.2017).

Getting into visual effects generally requires a few skills: being able to model simple or fairly complex meshes and then unwrap them, ability to create and modify textures, understanding how particle systems work in a game engine and basic knowledge how materials work and are created. Understanding basic optimization and being able to include it in the creation process also helps. (Henderson 17.9.2017)

Creating visual effects is not all about particle systems though. Quite often you can achieve interesting and beautiful effects through meshes and different unwrapping tricks.

There are a few key differences between stylized and realistic visual effects. Realistic effects try to simulate real-world behaviour and aim to display the same level of detail as the world around us. Stylized effects tend to use fewer small details and focus more on strong shapes, colours and motion as seen in picture 1. This leads to different texture creation techniques. It is common to hand paint textures for stylized effects, while realistic

effects benefit greatly from photography and simulating real-world phenomena in a 3D program and creating textures from that. (Tokarev 6.2.2018).



Picture 1. Gigantic features very stylized visual effects that don't use too many details in their textures. (From arcgames.com, 20.5.2018)

When creating animated textures from real-world footage, you might not be able to tweak the source material though and there can be issues where you get noise in your textures if the original footage doesn't have a high enough dynamic range. These animated textures are quick to create though, and can get an effect into the game quickly. Simulations take longer to develop, but are more flexible in terms of quality and style. (Tokarev 25.5.2017).

This thesis focuses solely on stylized visual effects, though some of the principles and techniques can be utilized when creating realistic visual effects.

2 Principles of visual effects

When I read multiple articles and interviews where different senior position visual effects artists discussed their design principles, workflow and thoughts on visual effects, it became apparent that different people described these subjects quite differently. Some mentioned shapes and colour, others talked about timing and movement. When examining the visual effects these artists had done though, it was clear all of them featured dynamic animations, consistent colour palettes and fit into the game perfectly.

After browsing through many interviews, articles and forum posts, I came across a visual effects style guide. It was created by visual effects artists working on Riot Games' League of Legends. They sorted visual effects under five key principles: gameplay, value, colour, shapes and timing. I will be using these five principles as my base for creating effects, and I will expand their original concepts with information gathered from other visual effects artists.

2.1 Gameplay

Visual effects are closely connected to gameplay. They need to visualize and communicate actions clearly. They need to be pleasing to look at, but at the same time you can't have too much happening at the same time or clarity of the gameplay suffers. One efficient way to bring clarity into visual effects is to break every effect into primary and secondary elements. (The complete guide to creating visual effects within league of legends 2017).

Primary elements are the effect's main body or purpose. They are the parts that are meant to draw attention to the action that is happening. Primary elements must communicate actions and gameplay clearly. Generally primary elements feature high colour values, clear silhouette, high opacity and a strong shape. (The complete guide to creating visual effects within league of legends 2017).

Secondary elements support the primary element by adding elements that make the effect visually more appealing. They are not supposed to draw too much attention, instead they should bring more contrast and colour variation to the overall effect. Secondary elements should have lower colour values, lower opacity and more subtle movement than the primary element. (The complete guide to creating visual effects within league of legends 2017).



Picture 2. The blue circle and bright centre form the primary element, while the toned down purple acts as a secondary element adding more contrast and visual interest. (From 80.lv, 20.5.2018)

Clarity in visual effects is important, as it allows players to clearly understand what is currently happening and anticipate actions that are going to happen. Especially when creating visual effects for different attacks and spells, the effect should clearly indicate the area and time the attack or spell is in effect and affects other objects or players. (The complete guide to creating visual effects within league of legends 2017).

Visual effects should also communicate how important the action is. Environmental effects should fit into the background so they don't get in the way or get confused with gameplay mechanics. Attacks and spells that don't affect the player or game in a dramatic or significant way should visually indicate they are less important than the mechanics that have a significant effect on the gameplay. This makes gameplay less confusing and important actions feel more satisfying. Level of importance can be controlled and adjusted by modifying the size, shape, saturation and opacity of the effect. (The complete guide to creating visual effects within league of legends 2017).

2.2 Value

Having extremely light value and extremely low value areas next to each other creates contrast. This is the easiest way to get a player's attention. Contrast can be used to create clear silhouettes and indicate areas of effect. Values can also be used to indicate the movement and duration of an effect. For example, toning down the values of an effect can be used to indicate the effect is running out of power and about to end. (The complete guide to creating visual effects within league of legends 2017).

Creating illumination, either by post-processing effects such as bloom or adding a glow to your texture, can add to the magical feel of your effect. This can make your effects feel more alive and give the illusion that they are light or power sources. (The complete guide to creating visual effects within league of legends 2017).

Because contrast is the easiest way to get the player's attention, it can be tempting to push all the light colours towards white and all the darker colours towards black. If there are multiple visual effects on the screen at the same time, this high contrast can make it difficult to understand what is happening and where the player is supposed to look at that time. (Keyser 17.2.2018).



Picture 3. This effect features high contrast without using pure white or full black. The bright centre attracts the eye of the player. (From 80.lv, 20.5.2018)

It can be useful to check how your visual effects look in grayscale. This can clearly show you if the values should be tweaked to decrease or enhance the contrast. Generally, you want to have high contrast on game-changing or important effects, while more common and less impactful effects should use less contrast and more toned-down values. (Keyser 17.2.2018).

2.3 Colour

Colour has a big role in communicating the theme of an effect. Players are used to connecting magical elements to specific colours. For example, reds and oranges generally represent fire, blues and greys are connected to ice and purple and violet tones are commonly used to visualize magic. (The complete guide to creating visual effects within league of legends 2017).

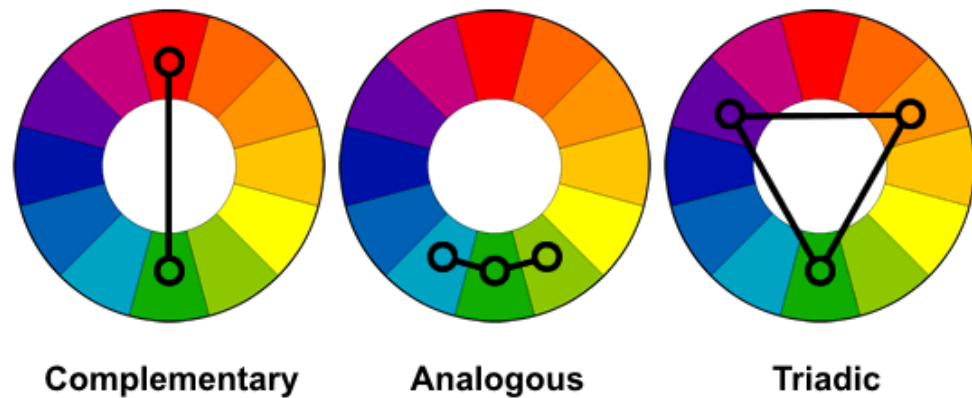
In order to create appealing visual effects, one should have some knowledge on colour theory and association. This thesis covers the basics of colour theory: the colour wheel, colour harmony and how colours could be used.

2.3.1 Basics of colour theory

Colours can be formed in many ways. RGB, CMYK and RYB are some of the different colour systems out there. The RGB system uses red, green and blue to mix all the colours. CMYK generates all colours from cyan, magenta, yellow and black and is commonly used in printing. RYB uses red, yellow and blue, and it is generally used by artists and painters to produce their colours. The RGB colour system it is the most popular system when working on digital art meant for screens. (Decker 2017).

A colour wheel organizes colours around a circle and it consists of primary, secondary and tertiary colours. Secondary colours are created by mixing the primary colours together and tertiary colours are created by mixing a secondary colour with a primary colour. (Decker 2017).

A colour wheel allows us to easily see which colours are complementary, analogous and triadic. Complementary colours are positioned opposite each other on the wheel, analogous colours are next to each other and triadic colours are spaced equally around the wheel. (Decker 2017).



Picture 4. Complementary, analogous and triadic colours visualized on a colour wheel. (From lifehacker.com 20.5.2018)

Colour harmony refers to colour schemes that are pleasing to the eye. A harmonious colour scheme can be created from, for example, analogous and complementary colours. (Morton).

For visual effects, it is ideal to use analogous colours. They create subtle colour variation and can make your visual effects look livelier. When using complementary colours in your effects, one of the colours has to take the role of a secondary colour. This is because the two opposing colours will always compete to be the primary colour, leading to your visual effect feeling busy and disorganized. (The complete guide to creating visual effects within league of legends 2017).

2.4 Shapes

Shape is the best way to communicate what a visual effect is. Clear silhouettes and strong shapes make visual effects easy to read, and makes it easier to understand what is happening in the game. Shape is also a key element when defining the overall style for visual effects. (The complete guide to creating visual effects within league of legends 2017).

According to *The complete guide to creating visual effects within league of legends*, League of Legends utilizes hand-painted textures that must have both sharp and soft

edges, but should not use too much detail. This is important in defining the art style for the visual effects. (The complete guide to creating visual effects within league of legends 2017).



Picture 5. Example of an effect with a strong shape, that utilizes soft and sharp edges in its textures. (From 80.lv 20.5.2018)

Strong shapes are generally used in primary elements to make the overall effect more readable, while secondary effects tend to have more blur to them. Blur can also be used to communicate movement and direction of the visual effect. (The complete guide to creating visual effects within league of legends 2017).

2.5 Timing

Timing creates interesting movement and plays a crucial role when defining what a visual effect feels like. How an effect changes overtime also provides insight on its functionality and duration. The timing of an effect visualizes and communicates different gameplay moments. (The complete guide to creating visual effects within league of legends 2017).

All visual effects should have three parts: anticipation or build up, the main action of the effect and a dissipation or fading out. The anticipation creates a smooth opening for the action and informs the player something is about to happen. The main action visualizes what is happening, and it should feel exciting or powerful. The fading out indicates the

action has stopped without it just abruptly stopping or disappearing. Fading energy or power can be visualized by modifying colour, transparency or size. The fading out of an effect should always be considered as a secondary element. (The complete guide to creating visual effects within league of legends 2017).



Picture 6. Example of an effect fading out. (From 80.lv 20.5.2018)

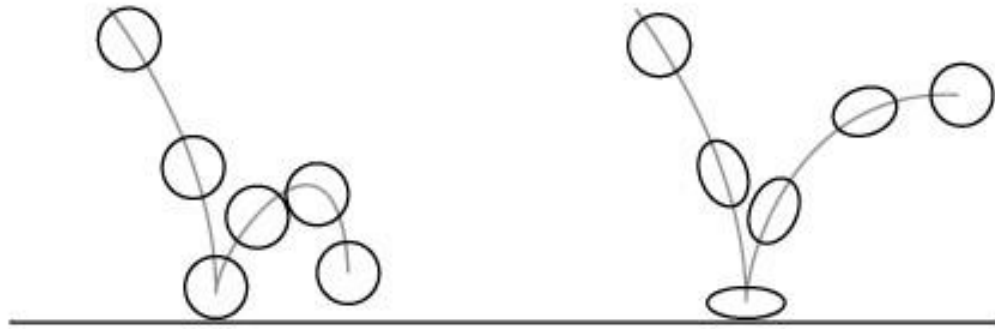
If the game features fast paced gameplay, the visual effects need to happen fast too. This can mean reducing the time the anticipation and dissolving takes. Some effects need to happen immediately, which can reduce the anticipation to only a few frames. If you are building a game that features a lot of different effects on the screen at the same time, it can be useful to reduce the time a fade out lingers on screen. This makes the game more readable and players have an easier time understanding what is happening in the game. (The complete guide to creating visual effects within league of legends 2017).

2.5.1 Animation principles and visual effects

Visual effects make use of key animation principles, as any other dynamic medium would. Principles such as squash and stretch, slow in slow out, arcs, secondary actions and timing are important. They all contribute to the visual effect feeling impactful and dynamic. (Tokarev 6.2.2018).

Michael Lyndon had a talk about animation principles of visual effects in the 2018 Game Developers Conference. Instead of talking about all 12 principles of animation, he covered 10 principles that he deemed most important for visual effects. The two principles were left out because he thought the concept behind them is not as relevant to real-time visual effects. This thesis will cover the 10 principles Lyndon listed as relevant for visual effects.

Squash and stretch makes visual effects feel more alive. Its purpose is to give a feeling of weight and stretching. (Lyndon 2018). This is achieved by expanding and compressing the shape of the effect when it is moving as seen in picture 7.



Picture 7. Bouncing ball demonstrating squash and stretch. (From animationmentor.com 21.5.2018)

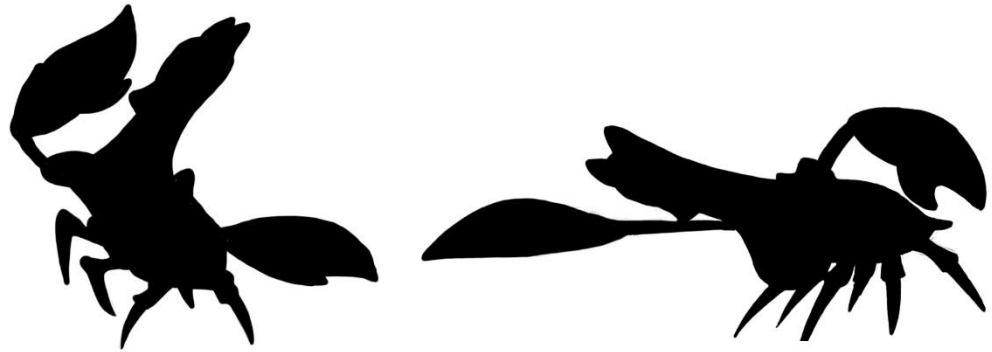
Anticipation is where the whole effect begins. You want to tell your players something is about to happen. Natural movement rarely starts abruptly, there is always an anticipation for it. Leaving out anticipation can create robotic animations and effects. (Lyndon 2018).



Picture 8. Demonstrating anticipation. (From animationmentor.com 21.5.2018)

Timing refers to how something is moving, how it speeds up or slows down. It can be modified based on your ideas, what you are trying to visualize and how the effect is supposed to behave in the game's world. (Lyndon 2018).

Solid poses can help you strengthen your effect. Fleshing out the key frames of your effect tells how your effect should change overtime. Designing strong key frames can make your effect feel more dynamic. (Lyndon 2018).



Picture 9. Examples of strong poses. (From animationmentor.com 21.5.2018)

Exaggeration is used to make the effect easier to read. The idea is to add more extreme variation into your effect. This can make the effect feel more lively and dynamic. You should aim to over-exaggerate your effects, because you can always tone it down if it goes too far. (Lyndon 2018). Not having enough exaggeration however can make your effect feel flat. Exaggeration can be applied to anything, from size to colour to other principles.



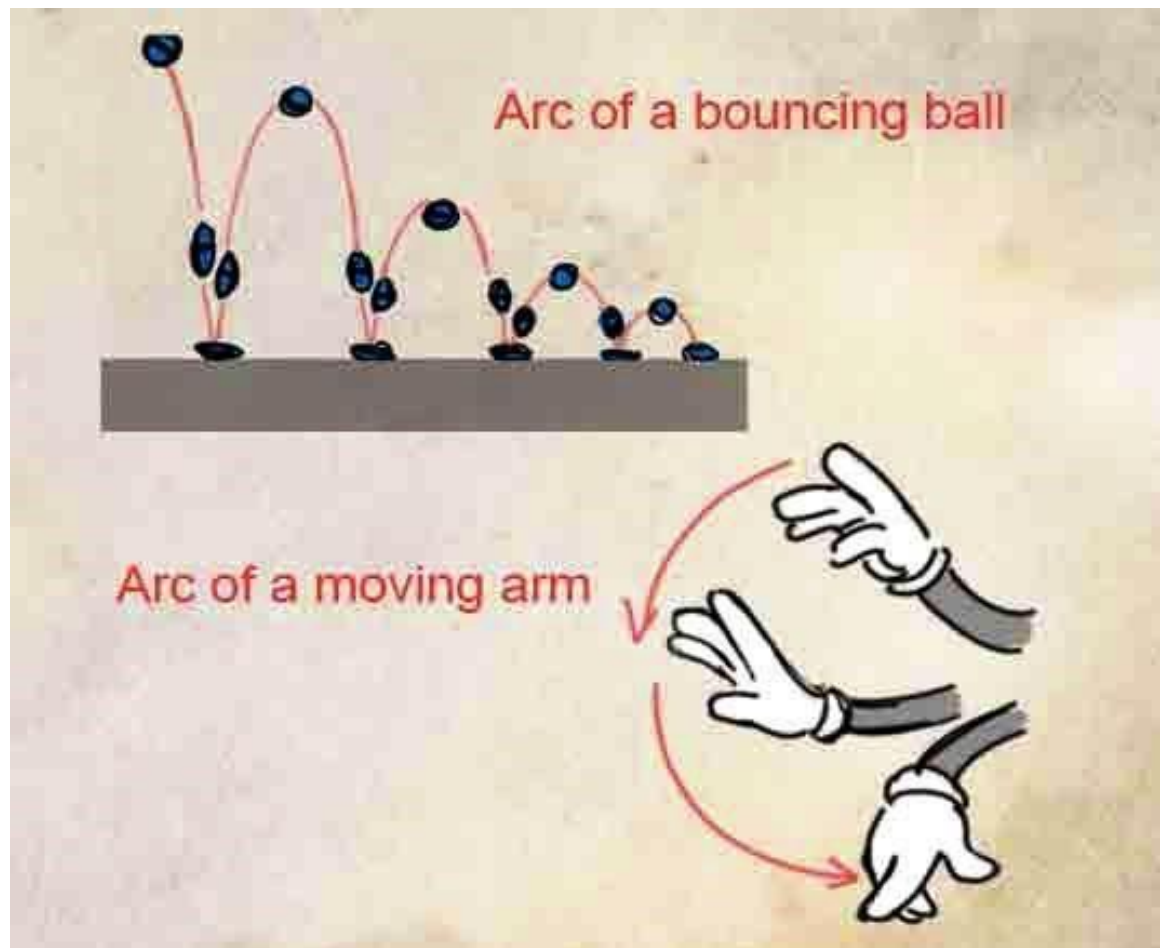
Picture 10. Example of exaggeration in animation. (From animationmentor.com 21.5.2018)

Slow in and out is used to bring more natural movement to your effects. Most objects around us need some time to accelerate or slow down. Leaving this principle out can produce robotic effects. (Lyndon 2018).

Staging defines what the player should be focusing on. It communicates what the most important thing on the screen is and presents it in a clear and easily readable way. You should focus on the most important actions and avoid unnecessary clutter and details. (Lyndon 2018).

Secondary action supports the primary element of your effect, without distracting the player. It brings more life to the effect and scene. (Lyndon 2018).

Arcs help make movement realistic and pleasing to look at. Most movement and actions follow an arc or a circular path. Arcs can also give your animations a better flow. Mechanical objects and characters rarely follow this rule, and their actions and movement are usually animated in sharper straight lines. (Lyndon 2018).



Picture 11. Arcs in movement. (From animationmentor.com 21.5.2018)

Follow through adds realism. Movement rarely stops abruptly, instead it slows down and follows the laws of physics. (Lyndon 2018).

3 Effect references

As stated in multiple interviews, most visual effects artists take the same first steps when creating visual effects. After they know what effect they want to create or have an effect they have been tasked to create, they gather references. This chapter gathers references for the visual effects I will be creating for this thesis. It also briefly discusses possible techniques you can use to create them.

Generally, you can get nice results with your visual effects if you create a good texture or material. Sometimes the workflow can focus more on custom or procedural shaders or animated texture sheets though. (Tokarev 25.5.2017).

3.1 Melee attack

Creating trails for sword swings is a common practice in action games. The effect gives the action more impact and makes it easier to follow. In some games the sword swinging animation can be so fast that you would have a hard time seeing it without the visual effects.



Picture 12. A sword swing effect from Gigantic. (From arcgames.com 18.5.2018)

I found two popular methods for creating visual effects for sword slashes. The first method features the source, for example a sword, leaving a trail behind. This method is generally used when the sword swinging animation has more movement than just a simple swing.

The second method utilizes a circular mesh with a hollow centre. You offset the texture along the mesh to create a circular movement. This method is popular when the attack animations consist of multiple fairly simple arcs.



Picture 13. Attack effect from Dragon Age Inquisition (From dragonage.wikia.com 18.5.2018)

3.2 Hit particles



Picture 14. Attack and its hit effect from DmC: Devil May Cry. (From ttdila.com 18.5.2018)

Hit particles are used to tell the player an attack has connected with its target. They can also be used to tell the player how effective their attack was. For example, in Monster Hunter 4 Ultimate the hit particles are bigger if the player hits a weak spot, and smaller if the attack bounced off or hit a zone that takes reduced damage.



Picture 15. Gigantic uses strong and clear shapes when indicating an attack hit. (From arcgames.com 18.5.2018)

Visual effects for sword hits generally utilize particle systems. Their appearance varies a lot depending on the visual style of the game. Cartoony games tend to indicate hits with spiky or star-shaped flashes, but different fluid splashes can also make their appearance.

Hit particles need to happen immediately, so these effects rarely have a clear anticipation before the main action, or they use only a few frames for it. The sword swinging effect and animation could also be considered as the anticipation for this effect, as players generally expect a reaction when they hit different surfaces or other players.

3.3 Teleportation

Visual effects for teleportation and dashing can vary a lot. Unlike sword slashes, I couldn't find a consistent technique for creating this effect. Some games make the character invisible or mostly transparent, some use portals to create the effect, sometimes the teleporting object is dissolved and materialized back and sometimes the character just creates a flashy and colourful trail behind them.



Picture 16. A teleport effect fading out in Dragon Age Inquisition. (From Reddit.com 18.5.2018)

3.4 Laser beam

I found two popular methods for creating laser beams.

The first method is used if the length of the laser beam changes depending on its surroundings, for example if it hits a nearby wall, it won't go through it but can reach past it if aimed correctly. The idea is to create a camera facing mesh from the starting point to a nearby surface. You will most likely need to tile a seamless texture for the laser beam, because stretching or squishing textures generally results in the effect feeling less polished.



Picture 17. Laser beam from Halo. (From martianchronicles.wordpress.com 18.5.2018)

If the laser beam is always the same length, you can model a mesh for it in the desired shape and size. Texturing will also be slightly easier because you know the starting point and length, so you can plan accordingly.



Picture 18. Laser beam mod for Fallout 4. (From nexusmods.com 20.5.2018)

3.5 Powerup

Powerups are a common mechanic and effect in fighting and action games. Generally the user charges energy towards itself, there is an explosion effect and the user is engulfed in raging energy. The type of energy being charged and used to powerup the user can vary a lot and is defined by the theme and elements of the character.

Powerups that are attached to certain body parts are generally created with particles and custom materials. As seen on picture 19, the hand has a glowing texture.



Picture 19. Powerup from God Hand. (From gamespy.com 20.5.2018)

4 Execution of effects

You can approach visual effects the way animators approach animations. After you have figured out what kind of textures, materials and meshes you will use, you should block out the key elements. This way you can get a feel how the effect could work in a game engine.

Before you start creating your effects though, it is beneficial to know what tools and components you have available.

4.1 Tools used

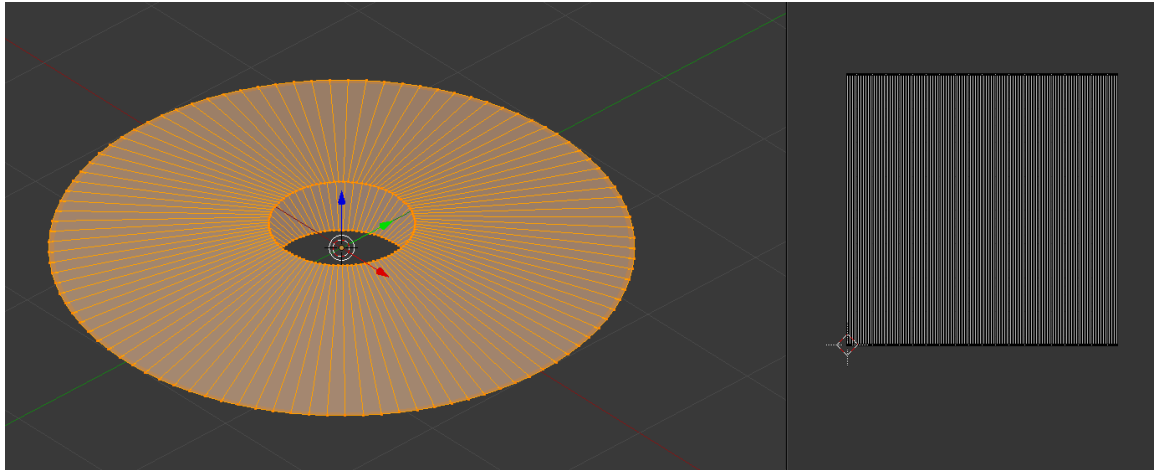
I created these visual effects in the Unity game engine. The engine offers a robust particle system, line and trail renderers and access to the asset store. For shader creation I used a plugin called Shader Forge. It is a node-based system that can speed up your shader experimentation. Shader Forge has its limitations though, as it does not support adding passes to your shaders. Manually tweaking or rewriting the shaders makes them incompatible with Shader Forge.

For texturing I used an open source painting program called Krita. It is quite good for hand painting textures and creating seamless patterns. Krita can have some stability issues though, as some users have reported problems with crashing and unbearable framerates. Personally, I didn't have too many problems with Krita, although using some features, such as palettes, caused the program to crash twice.

All the models and meshes were created and unwrapped in Blender. Blender is an open source 3D computer graphics software that you can use to create 3D models, rigs, animations, simulations and more.

4.2 Melee attack

I decided to use a circular mesh instead of a trail renderer for my sword swing effect, because the prototype will feature fairly simple arcing animations for the attacks. The effect needs to happen fast though and I don't want to add too much clutter to the screen. This means the anticipation and fading out need to happen quickly.



Picture 20. The circular mesh used to create the sword swinging effect and its unwrap.

I started out by drawing a concept of the three key stages of the effect: how it will start out, what it will look like full swing and how it will fade out. As seen in the picture X, the effect will start out as a small stretched eclipse. The main body of the effect is a clean stripe with a glowing centre. The effect will dissipate by shrinking back to a stretched eclipse.



Picture 21. First concepts of the sword swinging effect.

I wanted to keep my effects nearly opaque so they would pop out of the game world. I tried to avoid using transparency when fading out effects, instead I focused more on animations and creating a custom shader to dissolve the textures. I also wanted bright colours for the effects and ended up using a complementary colour scheme for the sword swinging effect, where a bright yellow works as the primary colour and a toned-down purple works as the secondary colour.

After having a clear concept, I created the circular mesh in Blender and started testing different textures. Finding the right shape took some time and I spent a lot of time switching between Unity and Krita.

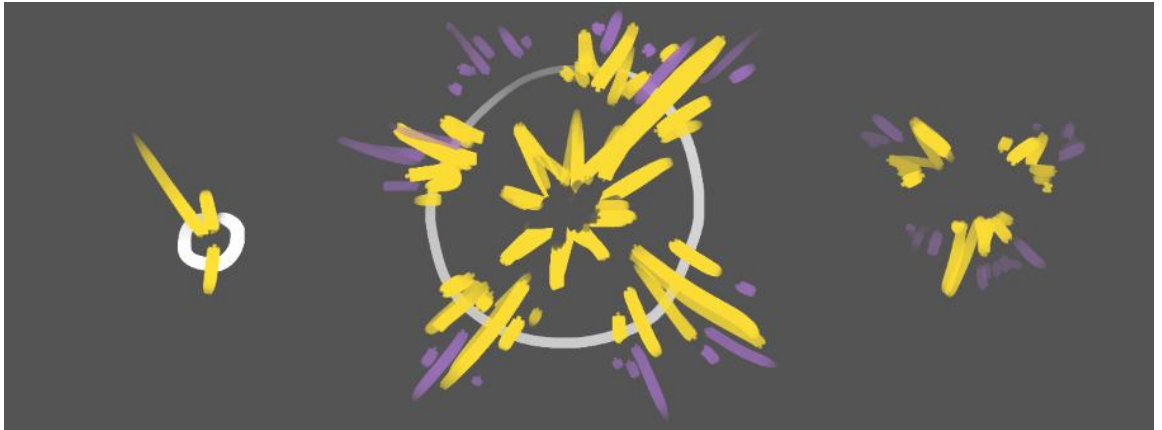
The final effect consists of the mesh, a particle system and two textures, one for creating the main body for the sword swing and the other for bringing some secondary movement into the effect.



Picture 22. Sword slash in Unity.

4.3 Hit particles

Because the prototype will feature cartoony graphics and we wanted to avoid blood and gore, the hit particles rely heavily on strong, spiky shapes. As with the sword swinging effect, I started out by creating simple concept art for the hit particles. The effect starts with a small bright flash, pushes long spikes out during the main action and eventually dissolves and shrinks into small shreds.



Picture 23. Early concept of the hit particles.

I broke the effect down into three parts. One primary element and two secondary elements. The primary element is a cartoony circle of spikes that gets dissolved over its lifetime. The secondary elements are some smaller spikes and a smooth round circle that grows outwards. The small spikes bring more movement into the effect and makes the impact feel snappy. The smooth circle supports the primary element by creating more contrast and making the bright primary element pop from its surroundings. It also brings some contrast to the shapes.

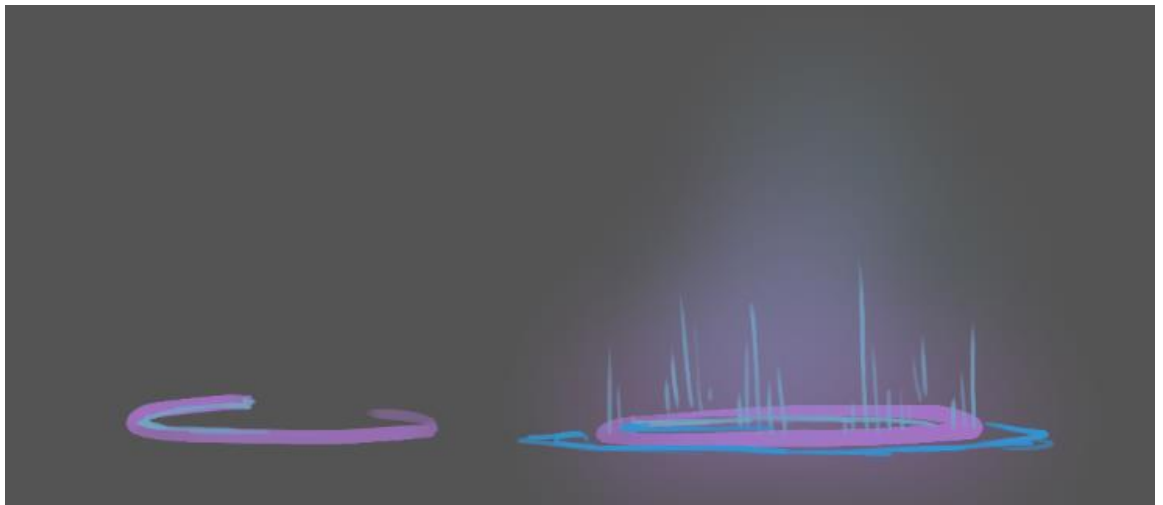
Because this visual effect is closely connected to the sword swinging effect, I wanted it to feature a similar colour palette. Yellow acts as the primary colour again and a toned-down purple brings contrast to the effect.



Picture 24. Hit particle in Unity.

4.4 Teleportation

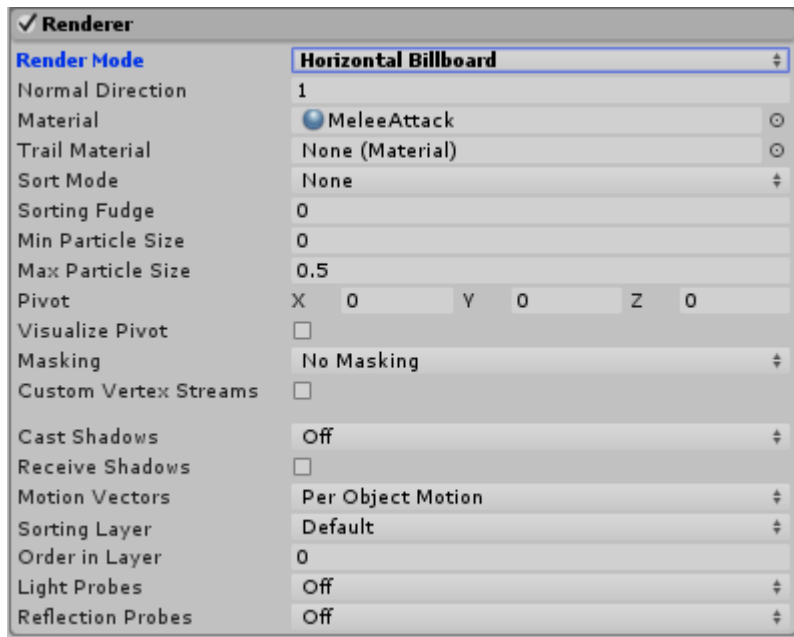
I broke the teleportation effect into three stages. The first stage is the character casting this ability. Because the gameplay mechanic is immediate, the effect must match it. There wasn't too much time for anticipation. The second stage is the actual teleportation mechanic. The character is completely invisible. The third stage is the effect's fadeout, where the character becomes visible again.



Picture 25. Early idea for teleportation.

I wanted to create a portal for this effect instead of a trail. I created many concepts for different portals and ended up using a glowing circle on the ground. Because the effect is magical in nature, it was important to add some blur and glow into the main texture.

I used horizontal particles to create the glowing circle on the ground. This means the particles are always rendered horizontally instead of turning to face the camera. As a default setting, Unity makes the particles face the camera, but this can be changed under the Renderer settings in the particle system as seen in picture 26.



Picture 26. Renderer settings of the particle system.

To bring more glow into the effect and to make it easier to see, I added a cylinder-shaped mesh on top. The cylinder is a secondary element. It brings a secondary movement to the effect and features a soft texture.

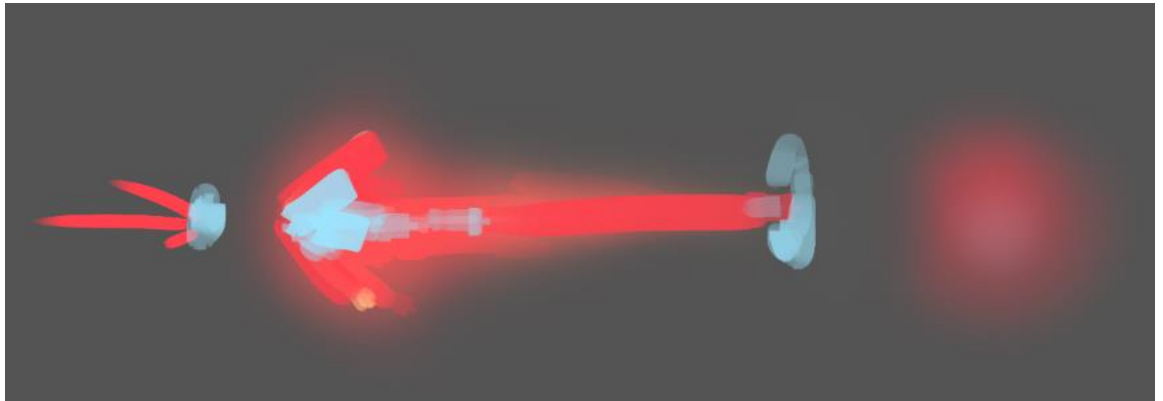
Because of the magical nature of this effect I used purple as the primary colour. Because the effect or the game mechanic are not aggressive, I wanted to use a calm colour palette. I decided to use analogous colours and used different blues in the secondary elements.



Picture 27. Teleport effect in Unity.

4.5 Laser beam

As with the teleportation, I broke the laser beam effect into three stages. The first stage flashes a few thin lines where the laser beam will be firing. The second stage is the laser beam itself, and it consists of two particle systems and one line renderer. The line renderer is a component, that takes two or more points in the 3D space and draws a straight line between them. The third and last stage is a fadeout for the beam, that leaves the beam's source glowing for a while before cooling down.

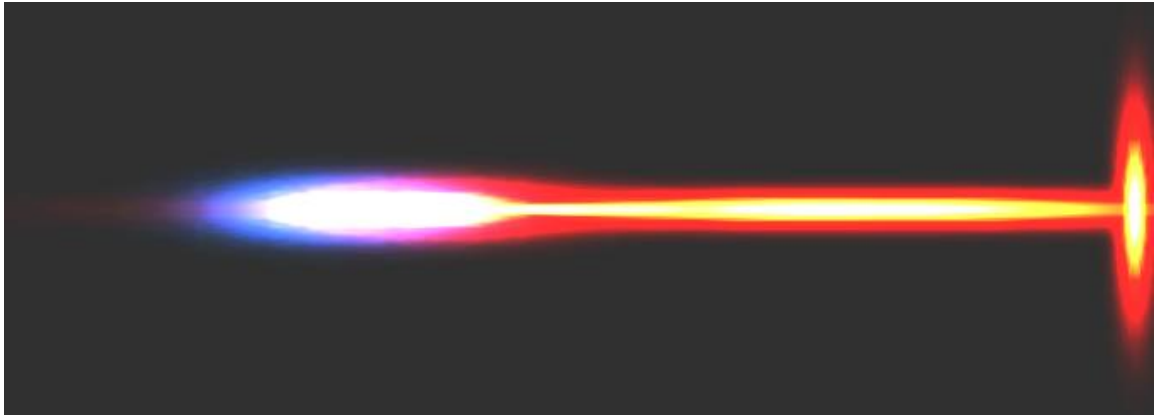


Picture 28. Early ideas for the laser beam.

I spent a lot of time trying to get the laser beam texture just right. It had to be seamless because the laser beam doesn't have a predefined length. Many of the textures I created either didn't have enough details or didn't fit the designed art style.

It was also important to get the anticipation right for this effect. Because the laser beam takes some time before it actually fires, there is a lot of time for the anticipation.

The laser beam is very aggressive as a game mechanic, so I used a lot of spiky shapes when creating the effect. The anticipation got thin spikes as indicators and I tried to utilize strong angles in the main texture. The primary colour for this effect is red, and because I wanted to create a lot of contrast, I chose a triadic colour palette with yellow and pale blue as secondary colours.



Picture 29. Laser beam in Unity.

4.6 Powerup



Picture 30. Ideas for the powerup.

This effect consists of two main elements, the anticipation for the actual mechanic and an indicator for when the mechanic is in use. The idea was to have the effect behind the character when she charged the powerup, and to give her hands a flaming aura when the powerup is active.

The theme for the powerup was fire and flames and I wanted the shapes and colours to reflect that. The colour palette is analogous with reds and yellows forming the effect. I wanted to create a very stylized fire for the effect, so I used a simple texture to create the primary element.

The effect relies heavily on the particle system to create the movement for the flames and to change the colour of the texture. The flames start with a pale yellow colour, transition to yellow and turn red right before the particle fades away.



Picture 31. Powerup in Unity.

5 Conclusions

There are many ways to approach visual effects. You can feature 2D sprite sheet animations, rely heavily on shaders and materials or use meshes and unwrapping to create interesting shapes and movement. This thesis covers only a small portion of the techniques behind visual effects and as such, it should be considered as a guideline to getting started in the field. Because visual effects utilize many different skills, it is recommended to learn basic skills of 3D modelling, texturing, 2D animation and drawing.

Personally, I learned a lot when reading about the principles of visual effects. Even though the industry does not have standard effect creation guidelines, reading and understanding *The complete guide to creating visual effects within league of legends* was a good starting point. Studying the subjects mentioned in the style guide and reading multiple interviews from senior position visual effects artists gave me a new angle to approaching effects.

I ended up using a lot of time studying theory, which was very helpful for myself, but wasn't the best decision for this thesis. I spent less time creating and polishing the final effects than I had originally planned. I am still happy with the end results and taking the time to learn the artistic principles was worth it for me.

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