



Olly Stanley

Experiential Design
Design Document

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Introduction

What is Experiential Design?

“Experiential design is an incredibly broad term that encompasses several disciplines, but it is essentially the art and science of shaping the customer experience. Whenever someone interacts with your product or service, he or she forms an impression. Good experiential design influences this impression.”

Brief

Create a sensor-based interface to allow users to interact with an audio-visual environment. This could be based on a physical computing model using tools such as the Arduino system or a motion-tracking experience. The project’s outcome should not be simply a mouse driven computer application. Depending on the project content all aspects may not be fully functioning but the overall project features should be clearly communicated in the final presentation. The final design will be evaluated with some form of user testing. Implications for further iterations for the design will be specified.

My Next Steps

Having digested the brief, I will now have a look at what is already out there, what is possible and hopefully this will stimulate some ideas.

“Another World”



iMapp Bucharest 2017 Winner – Gong Zhen

“iMapp Bucharest is one of the biggest 3D international video mapping festivals in the world. Here is the winner, Gong Zhen, a mapping art designer hailing from Shanghai, China. Gong Zhen is also a mapping teacher and mapping exhibition planner.”

The visuals that can be created in projection mapping are mindblowing, you could easily design something really engaging. This is definitely something I am considering.

Gif-iti



“What do you get when you cross animation with AR with graffiti? ‘GIF-iti’ of course. That’s the phrase coined by London-based creative Insa.”



“GIF-ITI is made via a laborious physical process involving numerous layers of painting and meticulous planning. Starting where most artwork ends, GIF-ITI entails photographing each layer the artist paints by hand. These images are then uploaded and overlaid to create the final piece, a looping GIF file which comes to life when released to global audiences online. “

This is such a simple but clever idea and works really well, however I think it would be quite hard to create something like this.

Coral Reed Waterpark



“When Coral Reed Waterpark in the United Kingdom invested £13.3 million in its redevelopment, they needed something that would set them apart from their competitors.

As part of the work, they’ve installed 5 interactive slides. Time in the tubes can be customised with 360-degree projections that enhance the experience of each ride. From flashes of lightening to multicoloured displays, the projections create a thrilling encounter.

At Twentebad in Hengelo (The Netherlands) they’ve taken it one step further. These interactive slides have bought innovative display and gamification together.

Swimmers can ‘play’ the slides by hitting illuminated markers when travelling down the slides at high speed, adding a whole new dimension to the possibilities of the waterslide!”



Melodyian



“Melodyian - an Arduino-based, 3D printable robot that can move around, light up, and make music! It's basically a robot that's wirelessly controlled via MIDI over Bluetooth.”

This project has shown me what strange and unusual things can be made with a midi controller and an Arduino. I don't think this is the route I want to go down however it was interesting to think about.



Principles of Design - Savanna Instinct



The savanna instinct is the theory that humans have an instinctive magnetism towards savanna-like environments. Open area, scattered trees, water and grassiness. Open area to spot predators easy, scattered trees to clamber up, water to drink and grassiness for shelter, food and hunting. This instinct we have inherited from our ancestors who lived

in such environment. You can see this Savanna-like environment in the design of golf courses and parks. Whether a conscience decision or not, these are places that people are drawn towards to find comfort. A walk in the park, seems to refresh your mind. It is said that this instinct weakens as you get older, and is strongest when you are a child.

Principles of Design - Golden Ratio

“What do the Pyramids of Giza and Da Vinci’s Mona Lisa have in common with Twitter and Pepsi? Quick answer: They are all designed using the Golden Ratio.”

The Golden Ratio is a mathematical ratio. It is commonly found in nature, and when used in design, it fosters organic and natural looking compositions that are aesthetically pleasing to the eye.

This harmony and proportion has been recognized for thousands of centuries: from the Pyramids in Giza to the Parthenon in Athens; from Michelangelo’s The Creation of Adam on the ceiling of the Sistine Chapel to Da Vinci’s Mona Lisa; and from the Pepsi logo to the Twitter logo.

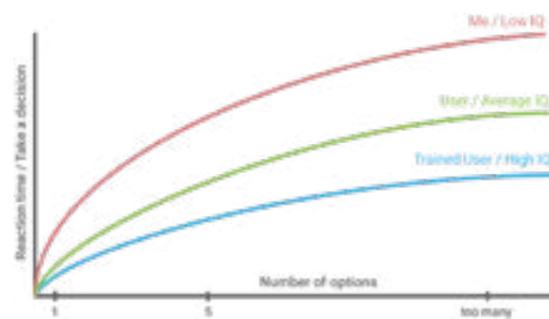


Principles of Design - Hicks Law

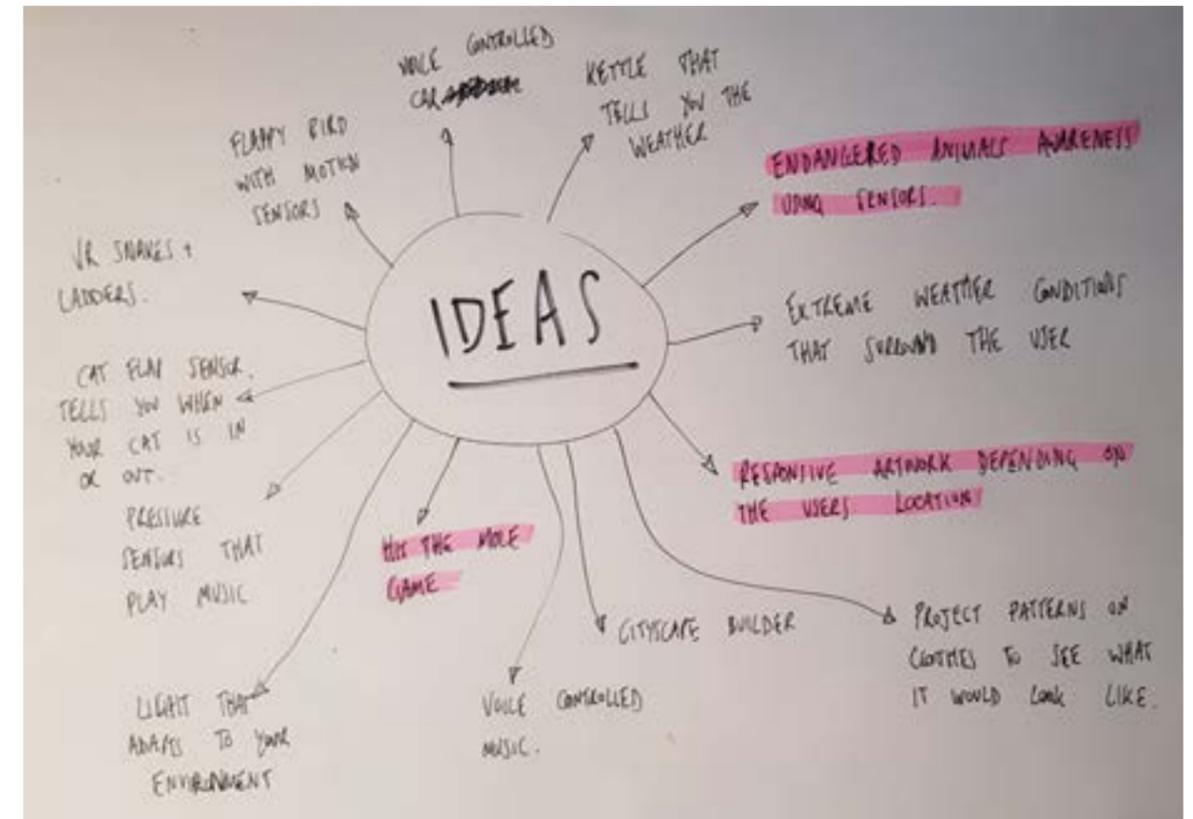


Hick's law is a psychological principle which states that the more options are available to a person, the longer it will take for him or her to make a decision about which option is best.

Hick's law, is named after British and American psychologists William Edmund Hick and Ray Hyman, describes the time it takes for a person to make a decision as a result of the possible choices he or she has: increasing the number of choices will increase the decision time logarithmically. The Hick law assesses cognitive information capacity in choice reaction experiments. The amount of time taken to process a certain amount of bits in the Hick law is known as the rate of gain of information.



Idea Generation

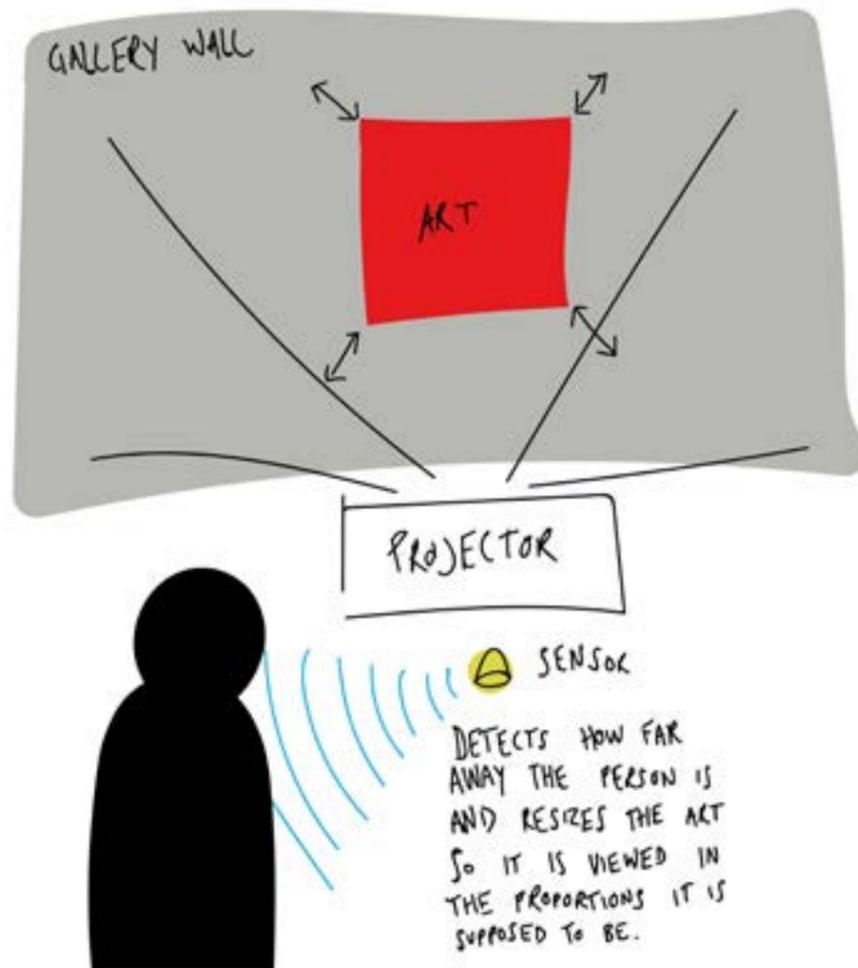


I did a quick brainstorm of ideas that I could come up with; this was a good way of getting my ideas on paper. I have now chosen three of my ideas that I think could become my project.

Idea 1 - Responsive Artwork

IDEA 1

The first idea I came up with would be used in somewhere like a gallery. It would use a movement sensor to detect how far away the person is away from the art. Then from this information it would change the proportions of the art so that it is viewed how it is meant to be without having to get any closer to it. This could also be used for things like advertisements.



I really like the concept that I came up with for this. It would be very useful for artists work to be viewed how it should all the time, this way their message can be put across how it is meant to be.

In terms of how it would work it would require sensors to track the position of the person and then change the proportions in relation with the persons position. This could be quite tricky to achieve but definitely possible.

Idea 2 - Animal Awareness Installation

IDEA 2

My next idea is to help people understand how the number of endangered animals are reducing. To do this I would create a projection that includes some engaging graphics of different environments. These graphics would include how many endangered animals there are left at the minute. I would then use a motion sensor so that when someone walks past it would reveal how many would be left in say 20 years. I think this idea would have a big impact on people, and hopefully encourage them to help the endangered animals.



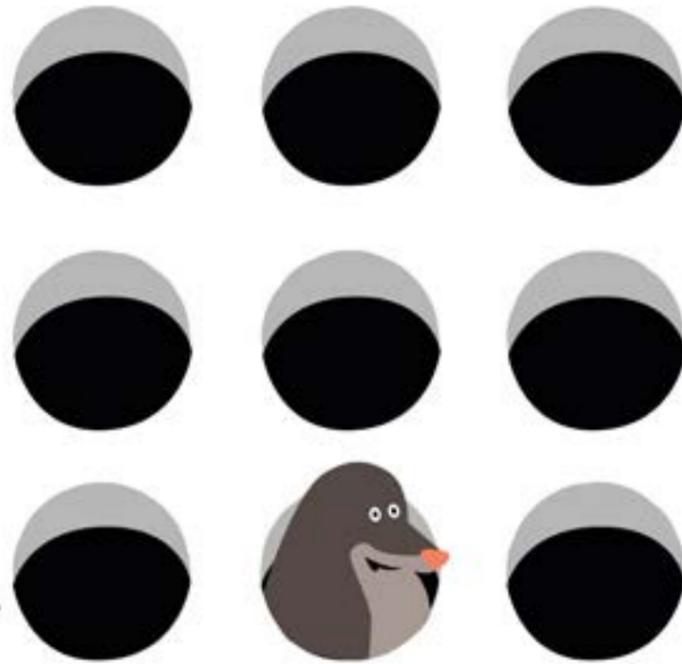
The interaction in this installation would work by having a sensor at one end of the projection, and then read how far the user is away from it. As the user moves along the projection the "in however many years" graphic will be revealed. So if the user stops half way, only half the "in however many years" graphic will be revealed.

This idea of mine has a real purpose behind it, its aim is to make people aware about the number of endangered animals. I think this could become my project concept.

Idea 3 - Hit the Mole Game

IDEA 3

My last idea is to do a hit the mole game. This would take the concept from the original where there are 9 mole holes and the mole will pop up out of one, you have to hit it before it disappears and build a score. I could do this by using pressure sensors so it detects when you hit the hole or I could use a projector with sensors to detect where you are hitting.



PRESSURE SENSORS OR A PROJECTION & SENSORS.

This idea would be really interesting to create and would be good to actually play it, however I don't feel it is original enough and therefore I am not going to develop it any further.

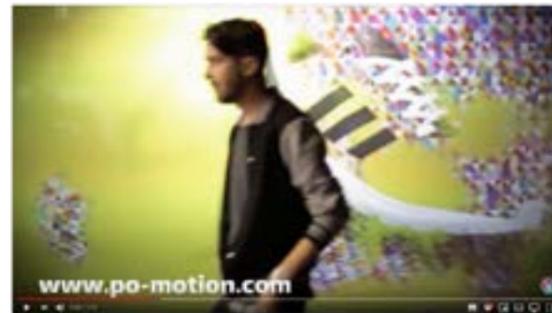
Chosen Idea

I have chosen Idea 2. I feel this project will have the most impact and has a good message behind it. It could actually make people aware of endangered animals. I also feel this one has the most potential to be a really engaging experience.

Goals and Outcomes

- The aim of my project is to try and make people more aware of endangered animals and how quickly their numbers are decreasing.
- The main image will be a projection of the environment that specific animal is located in. The animal could be represented as just the outline of the shape or in full detail. I think doing one animal per environment is the best option so the audience can concentrate on one animal at a time.
- To get the image to transition from the current animal numbers to the future, there are multiple ways of doing this for example a potentiometer, however that is quite boring. A more engaging way for the audience would be to use sensors, so as people walk past it reveals the future numbers. This would attract a lot more users attention.
- Hopefully as people interact with my interface this will make them realise that something needs to be done to save endangered species.

Competitor Research - Lumo Play



Lumo Play Interactive Floor and Wall Projection

"This makes any projector or digital display interactive. Lumo Play allows you to easily create and manage a wide variety of interactive displays and digital signage for advertising, education, and events."

It supports motion, gesture, or touch interaction; there are pre-made games for interactive floors, interactive walls, and touchscreen displays. Patented template system for custom game creation.

These displays in the shop windows are exactly what I want to do with my idea. As someone walks past it reveals the underneath graphic at the same speed as the person is walking. It is interesting to see how they have done their designs but also the transition animation, which is something I haven't thought about yet.

Competitor Research - Funky Forest



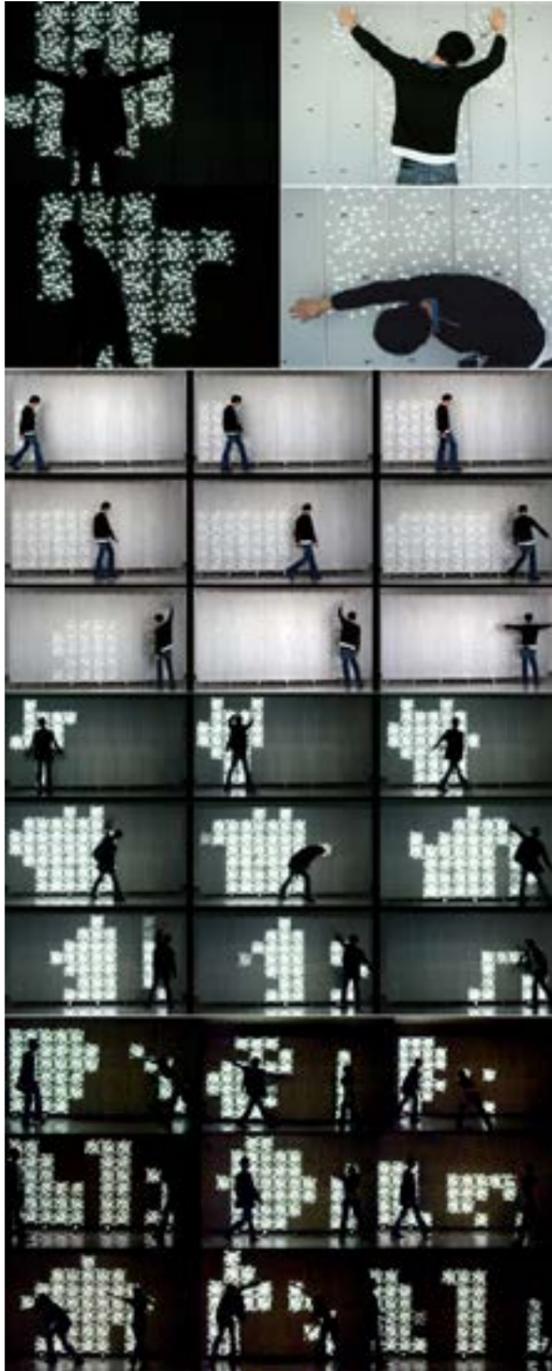
FUNKY FOREST AT THE ART GARDEN

Funky Forest is an interactive ecosystem where children create trees with their body and then divert the water flowing from the waterfall to the trees to keep them alive. The health of the trees contributes to the overall health of the forest and the types of creatures that inhabit it. First installed at the 'Cinekid' festival in Amsterdam, they developed a new version for the Art Garden exhibition at the Singapore Art Museum which features updates creatures, trees and a new particle system.

This installation takes it to another level and has shown me what can be achieved. The way the water acts like real water when objects are blocking it etc is very clever. I wouldn't be able to create anything like this in the time or with the equipment I have but it is a good eye opener.



Competitor Research - Mes-Etoiles



Mes-Etoiles, is an interactive wall that responds to the presence of people by displaying feedback on the wall as light patterns. Equipped with sensors which could sense the viewers' motions, the constellation composed of several hundreds of white light spots on the semi-transparent surface becomes activated as the audience approaches closer. People use their bodies to shape the wall, enjoy the experience and communicate.

They have done a good job at making it easy and fun for someone to interact with this wall. That is the key point I need to take away from this competitor; it needs to be fun and easy to engage with otherwise people won't bother and then it is useless.

Target Audience

For my project the main outcome is to make people aware about endangered animals and make them want to do something about this.

Anyone over 18 can sponsor animals by donating money, so targeting them would be the most sensible thing to do.

However the younger generation are going to need to look after animals when they get older as well. Making them aware at an early age will get them in good habits for when they are older and therefore help save more animals and species.

This is therefore a wide target audience, my designs need to be clear and friendly for most ages. Also the interaction needs to be straight forward so everyone knows how to use it.

User Persona



Megan Hill

Megan is 12 years old. She lives at home with her mum and dad and one younger brother. She is now in year 7 at secondary school and has joined the dance class with her friends, she hopes to enter competitions with her friends as soon as she can.

Age	12
Location	Leeds
Occupation	Secondary School
Hobby	Dance
Status	Single

Scenario
Megan has been learning about endangered animals at school, recently their class went on a trip to an exhibition on endangered animals. She saw the projection and sensor based project, this made her realise that if something isn't done soon these animals are going to disappear. When she got home she asked her parents to sponsor a tiger for her, she wanted to make sure she was doing something to help.

Technology

40%

Internet

50%

Apps

60%

Social



User Persona



Jill Day

Jill lives in London with her husband Mark. They have been married for 15 years and plan to move abroad in a few years to somewhere hotter. Jill is a really successful graphic designer and is going to set up her own business when moving away. In her spare time she loves going to the gym.

Age	45
Location	London
Occupation	Graphic Designer
Hobby	Gym
Status	Married

Scenario
On Jills social media she has been seeing lots of content on this expedition on endangered animals. So she checked it out online, unfortunately it was too far away for her to go and see in person but she loved what she saw online. This made her want to help people find out about the exhibition and the animals in need. So she designed some posters for the exhibition and animals for free to help the cause.

Technology

80%

Internet

50%

Apps

90%

Social



User Persona



Jonah Cox

Jonah lives in Lincoln with his wife, Carol and his two kids. He has been married for 8 years and plans to stay in Lincoln with his family forever. He has been a vet for 9 years, therefore he is a big animal lover. In his spare time he plays the violin and has recently achieved grade 5.

Age	34
Location	Lincoln
Occupation	Vet
Hobby	Violin
Status	Married

Scenario
Jonah wanted to make sure his kids are aware of which animals are endangered, how long they have left, and what can be done to help save them. He saw there was an exhibition on near by so he took the family out at the weekend to go and see it. Jonah was pleased with how much the kids learnt and he is going to recommend it to the rest of his family.

Technology

70%

Internet

80%

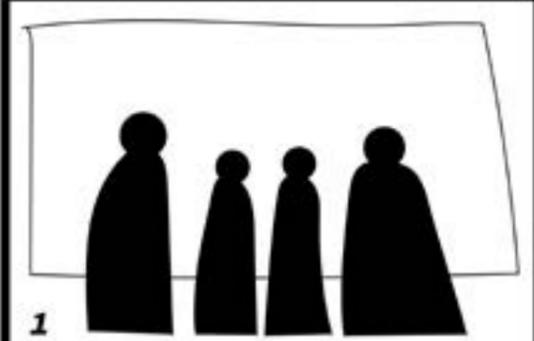
Apps

40%

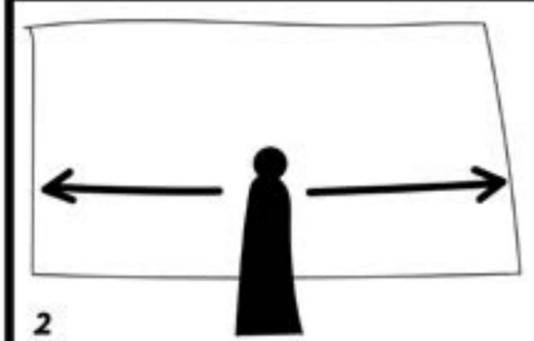
Social



Storyboard - Research



1
The Jones family saw an advert for this endangered animal installation, so they went to check it out.



2
They take it in turns to interact with the installation, having lots of fun at the same time.



3
Chloe the daughter, had no clue how many animals were endangered before seeing this.



4
Ben the son, his favourite animal is the tiger. The installation told him how long they have left if nothing is done.



5
The family found the installation really engaging and made them want to try and help the endangered animals.



6
So when the Jones' got home, they went and sponsored an endangered animal each to try and make a difference.

Component Research - Sensor Control

Ultrasonic Sensor - HC-SR04

The HC-SR04 ultrasonic sensor uses sonar to determine distance to an object like bats do. It offers excellent non-contact range detection with high accuracy and stable readings in an easy-to-use package.

From 2cm to 400 cm or 1" to 13 feet. Its operation is not affected by sunlight or black material like sharp rangefinders are (although acoustically soft materials like cloth can be difficult to detect). It comes complete with ultrasonic transmitter and receiver module.

How it Works:

1. The transmitter (trig pin) sends a signal: a high-frequency sound.
2. When the signal finds an object, it is reflected and...
3. The transmitter (echo pin) receives it.

My Decision

There are a lot of limitations in infrared sensors, like the inability to use them in sunlight due to interference. Ultrasonic sensors work using sound waves, detecting obstacles is not affected by as many factors which is why I am going to use the ultra sonic sensor.

Component Research - Projector

The projector I will be using will just be the one that is available to me in my University Studio Room.

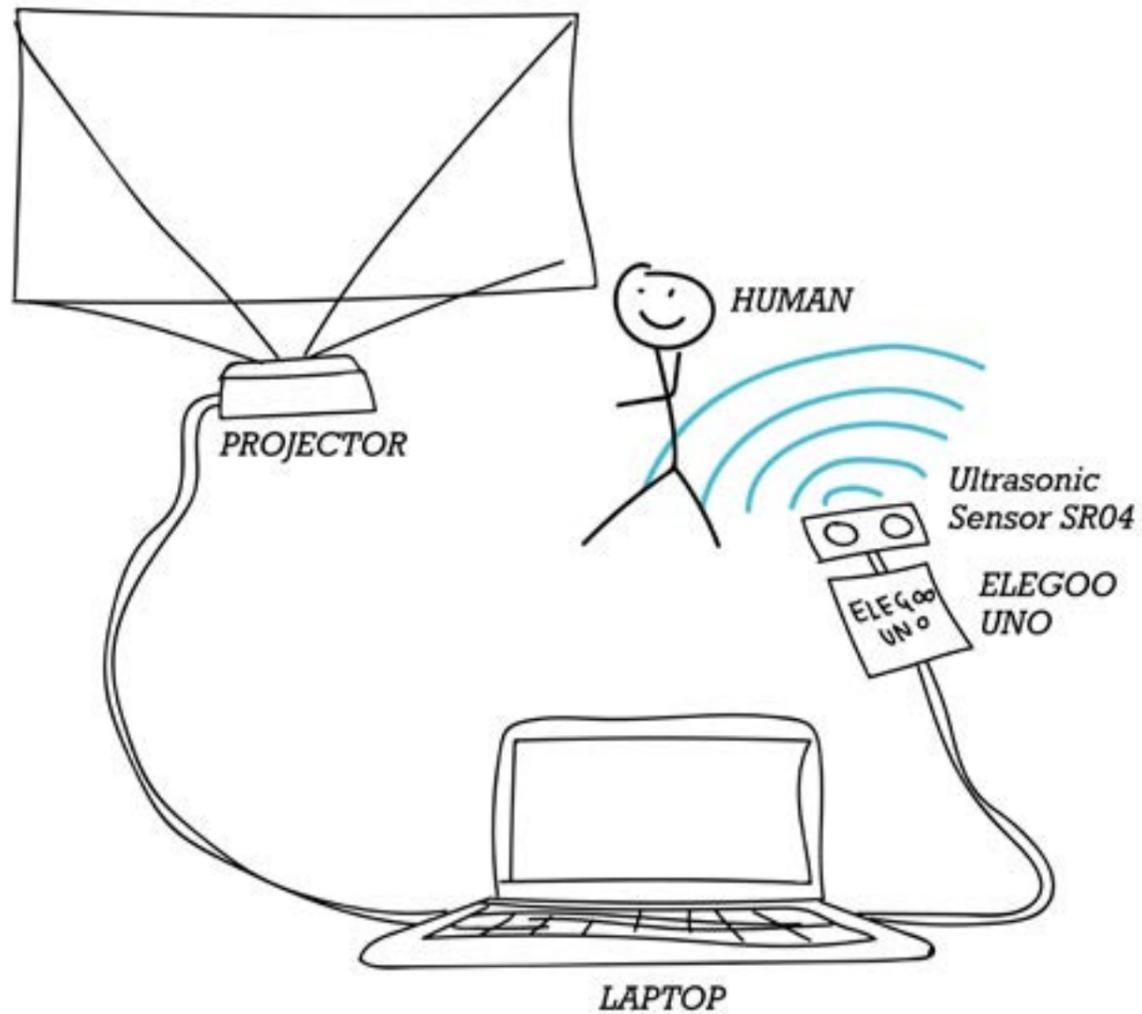
Component Research - Elegoo Uno R3

The Elegoo Uno R3 has been given to me as part of the project so I will definitely use this. There is no need to research into any other controllers.

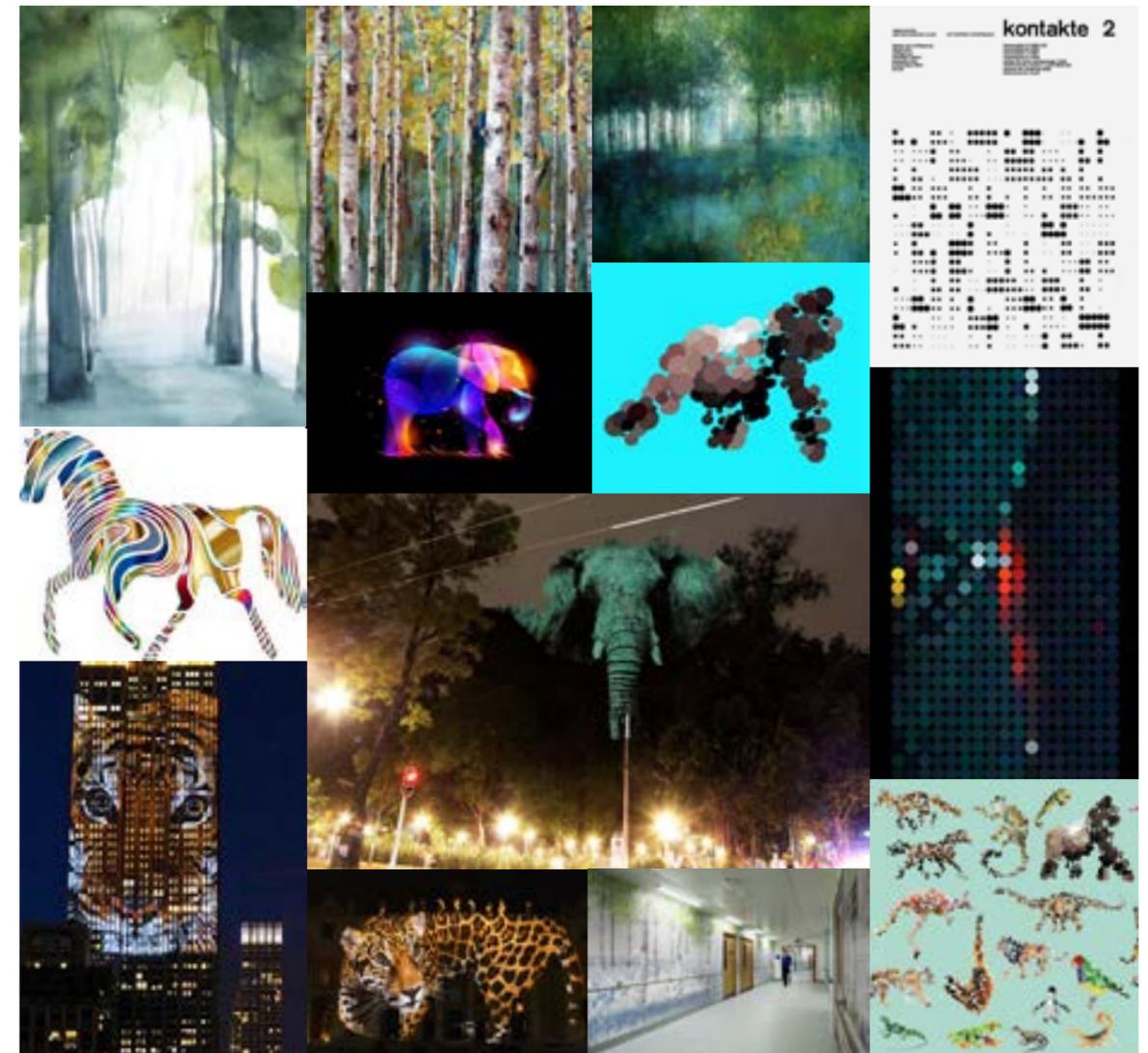
List of Final Components

- Elegoo Uno R3
- Projector
- Ultrasonic Sensor SR04
- Wires
- Laptop
- Breadboard

Visual Process Map



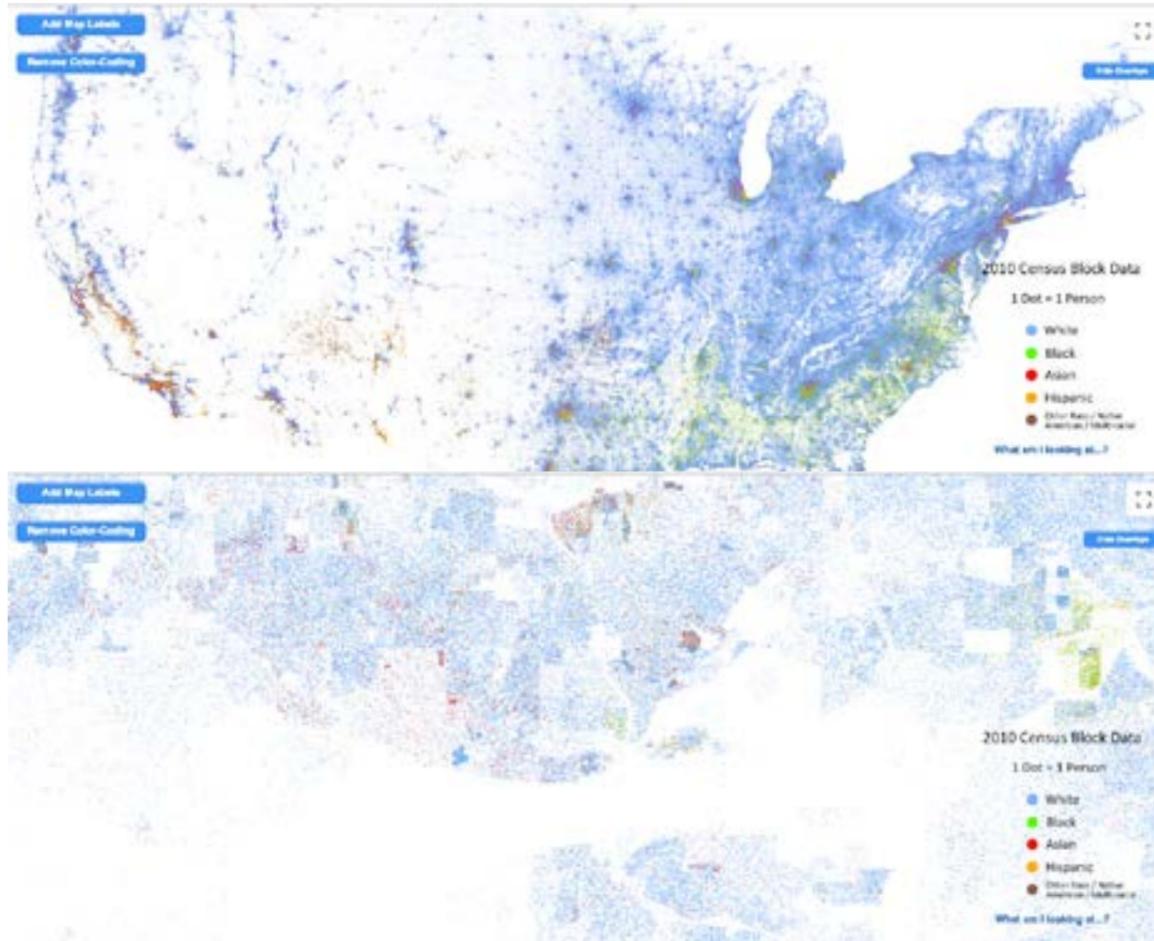
Graphic Moodboard



Here I have collected some existing graphics including some projections. Some are ideas for backgrounds, which are quite abstract. Others are ideas for how the animal will be presented; I really like the idea of using dots to simplify the graphics. I could also use the dots to represent the population of that animal. This would therefore be a visual representation of the population at the same time as being an interesting graphic.

I am now going to do a little research on how people have used dots in a visual way to represent figures, I know it has been done on maps for various subjects.

Visual Research - Racial Dot Map



This racial dot map is an American snapshot; it provides an accessible visualization of geographic distribution, population density, and racial diversity of the American people in every neighbourhood in the entire country.

The map displays 308,745,538 dots, one for each person residing in the United States at the location they were counted during the 2010 Census. Each dot is color-coded by the individual's race and ethnicity.

<https://datavizproject.com/data-type/dot-density-map/>

This is what my idea is going to be similar to; one dot represents each animal, and instead of them being in the shape of the US, it will be the shape of the animal.

Content Research

To be able to start thinking about designing my installation, I need to gather together all the content I will require. This way I can design based off the information I collect.

I found this website which has a list of endangered animals, facts about them, and how many are estimated to be left.

I am going to choose 5 endangered animals to focus on, then create a graphic for each one. Then link these with the Arduino so that as the user gets closer to the sensor the more endangered the animal is on the projection.

- <https://www.thisisinsider.com/endangered-animals-2018-3>

1. The Amur Leopard

This subspecies - which is also known as the Far East leopard, the Manchurian leopard, or the Korean leopard, despite being nearly extinct outside of the Amur River basin in eastern Russia - can run upwards of 37 miles an hour and jump as high as 19 feet in the air.

According to a census, there are only around 60 Amur leopards left, all living at Russia's Land of the Leopard National Park.

2. The Sumatran Rhino

The population of Sumatran rhinos is very unstable, and only 80 are estimated to still be alive.

Now, they only exist in Borneo and Sumatra.

Poaching has increased in the region due to an increase in demand for rhino horns. In addition, deforestation, road construction, and the presence of invasive species have all contributed to a dwindling habitat for Sumatran rhinos.

Content Research

3. Philippine Crocodile

Fewer than 200 adult Philippine crocodiles are believed to exist in the wild. The crocs are the victims of habitat loss and entanglement in fishing equipment.

4. The Vaquita

The vaquita, the world's rarest marine animal, was first discovered in 1958. As few as 30 of these cetaceans (an order of animals that include whales, dolphins, and porpoises) remain in the wild, according to the WWF. This represents a decline of more than 92% since 1997.

Similar to the Philippine crocodile, they also fall prey to entanglement, though, confined to the Gulf of California, climate change might also have a negative impact on their ability to persist as global warming could impact habitat conditions and the food chain.

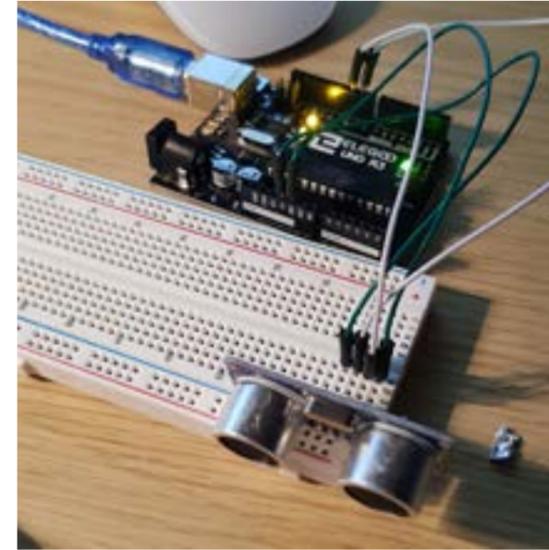
5. The Sumatran Tiger

Less than 400 Sumatran tigers still exist, and they can only be found on Sumatra, an Indonesian island.

Poaching leads to nearly 80% of Sumatran tiger deaths, and there is no proof that poaching has gone down much in the past two decades, according to the WWF.

Deforestation also triggers a deadly cycle - as habitats are destroyed by human activity, tigers look for food elsewhere and are more likely to run into humans as they move away. They may attack livestock or harm people, and villagers in turn kill more tigers in retaliation.

Getting the Sensor Set Up



The first element I wanted to get working was the sensor. Once I have the sensor giving me data/values, I can then insert my graphics. I would say if the value is in this range, then display this graphic etc...

To get the sensor up and running I started by making the circuit, this was very simple. It involves four pins that link with the sensor; the trig and echo go to pin number 9 and 10 which will be set up in the code; the Vcc and Gnd go to the 5V and Gnd in the Elegoo.

```
void setup() {
  // Define the pins
  const int trigPin = 9;
  const int echoPin = 10;

  // Define variables
  long duration;
  int distance;

  pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
  pinMode(echoPin, INPUT); // Sets the echoPin as an Input
  Serial.begin(9600); // Starts the serial communication
}

void loop() {
  // Clears the trigPin
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);

  // Sets the trigPin on HIGH for 10 micro seconds
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);

  // Reads the echoPin, returns the sound wave travel time in microseconds
  duration = pulseIn(echoPin, HIGH);

  // Calculates the distance
  distance = duration * 0.034 / 2;

  // Prints the distance on the Serial Monitor
  Serial.println(distance);
}
```

Setting up the pin numbers for the sensor.

Creating variables.

Setting the trigPin as an output. Sets the echoPin as an Input. Starts the serial communication.

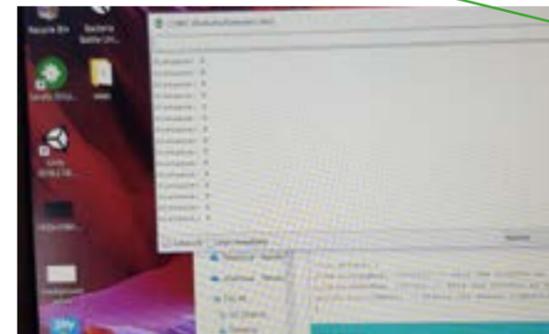
Clears the trigPin.

Sets the trigPin on HIGH for 10 micro seconds.

Reads the echoPin, returns the sound wave travel time in microseconds.

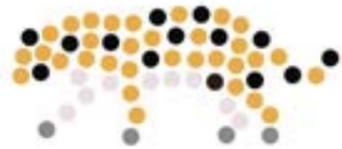
Calculating the distance.

Prints the distance on the Serial Monitor.



Here on the left is an image of the distance values being displayed on the Serial Monitor. This shows everything is working.

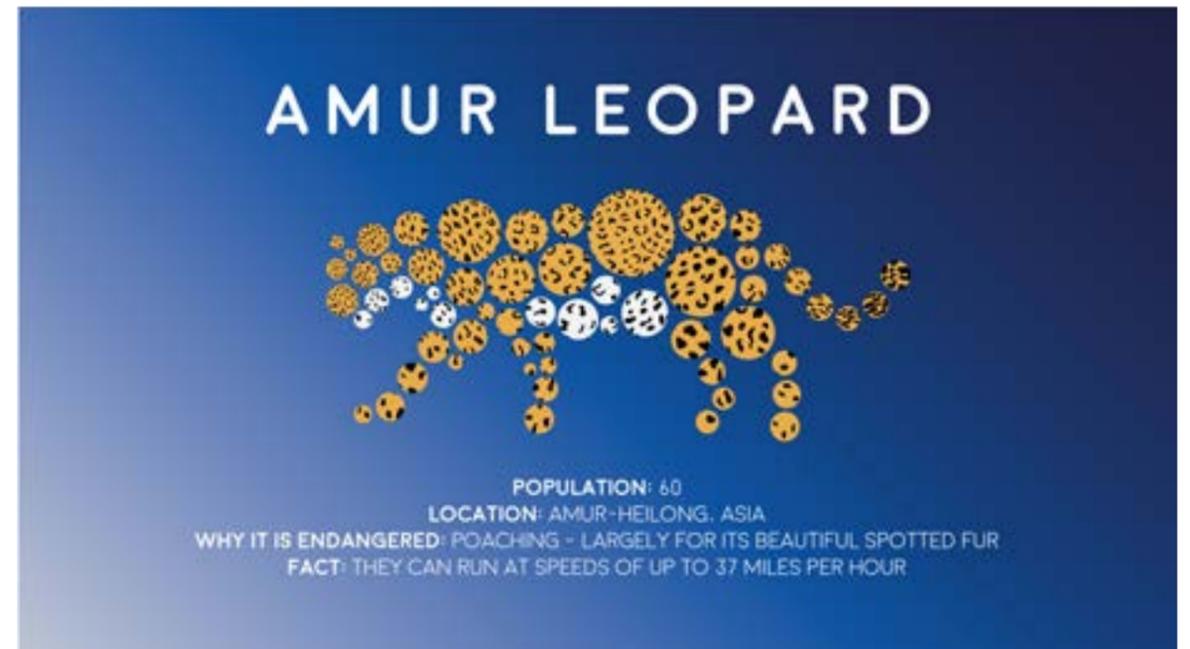
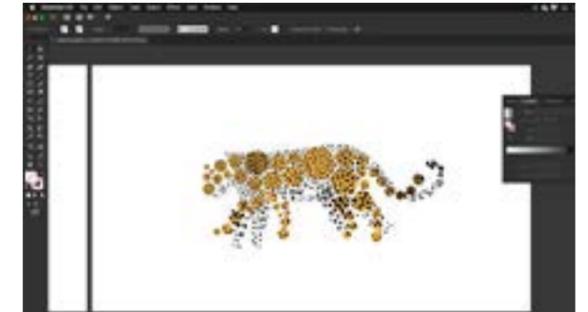
Creating a Visual Style



I started off by counting out the amount of circles I had to make the animal. I then used a grid technique so that all the circles had equal spacing. In the first one I used an actual image and cropped it to the shape of the circle. It looked alright however I wanted my graphics to be more abstract than real life. I moved on by playing around with different colours and patterns but still thought it looks a little boring. At the start

I wanted the circles to be all the same size; they represent 1 animal each so therefore they should all be the same. However they don't look very interesting, so I tried it with different sized circles and it instantly looked a lot more exciting. It gives them more shape and detail so I am going to continue with this technique throughout and develop the animals further.

Amur Leopard Development



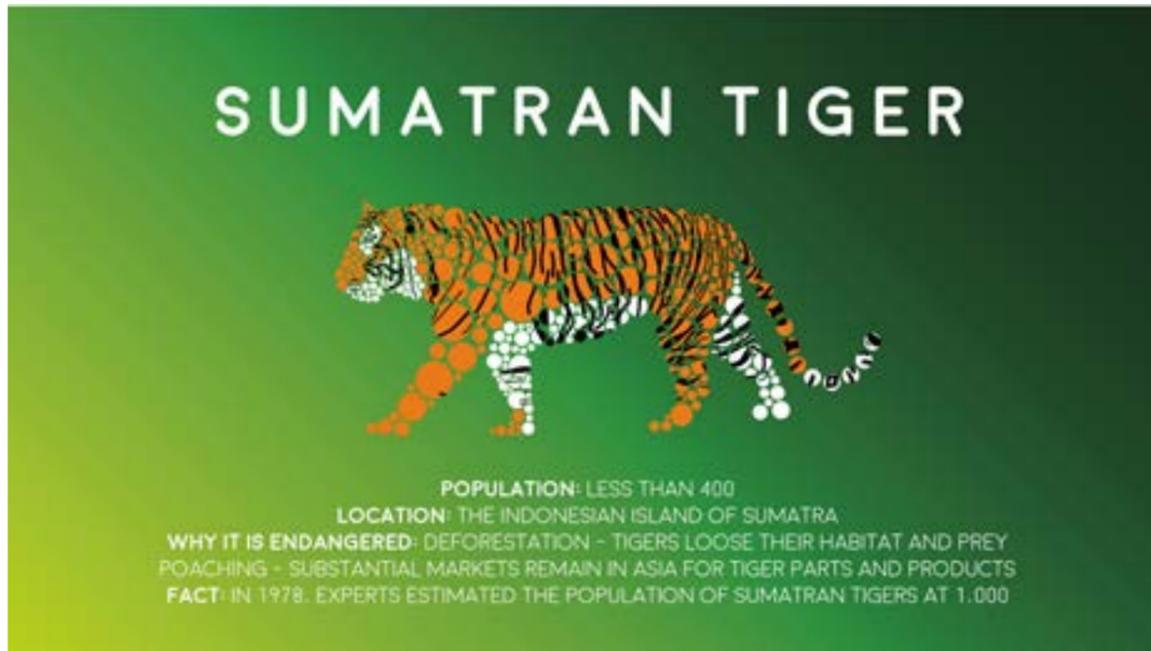
In the top left image, I tried drawing leopard print directly onto the top of the circle shapes. This worked however it didn't look very natural, for example none of the spots overlapped the edges, they were all in the middle.

I then experimented with a few different fonts and found this rounded one which I liked, it fits well with the circle theme.

So in the next image I drew out a whole leopards print all at once so that it overlapped the circles. Then I just clipped the print to the circular shapes, this way it looked a lot more natural and more of a pattern.

I am now going to do the same with the other animals and see how they turn out.

Sumatran Tiger Development

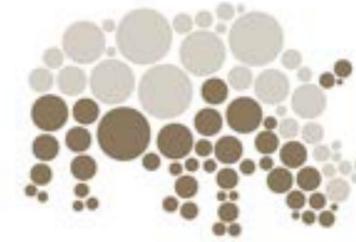


There is 400 left of this animal, so I had a lot more circles to use which meant I could go into more detail and get the shape more accurate.

I again drew the pattern and then clipped it to the shapes, it worked really well because the stripes are long and go all the way down the body.

I played around with different gradient backgrounds, I liked the dark purple one which contrasted well but I thought the background should represent the animals actual environment, in this case a jungle.

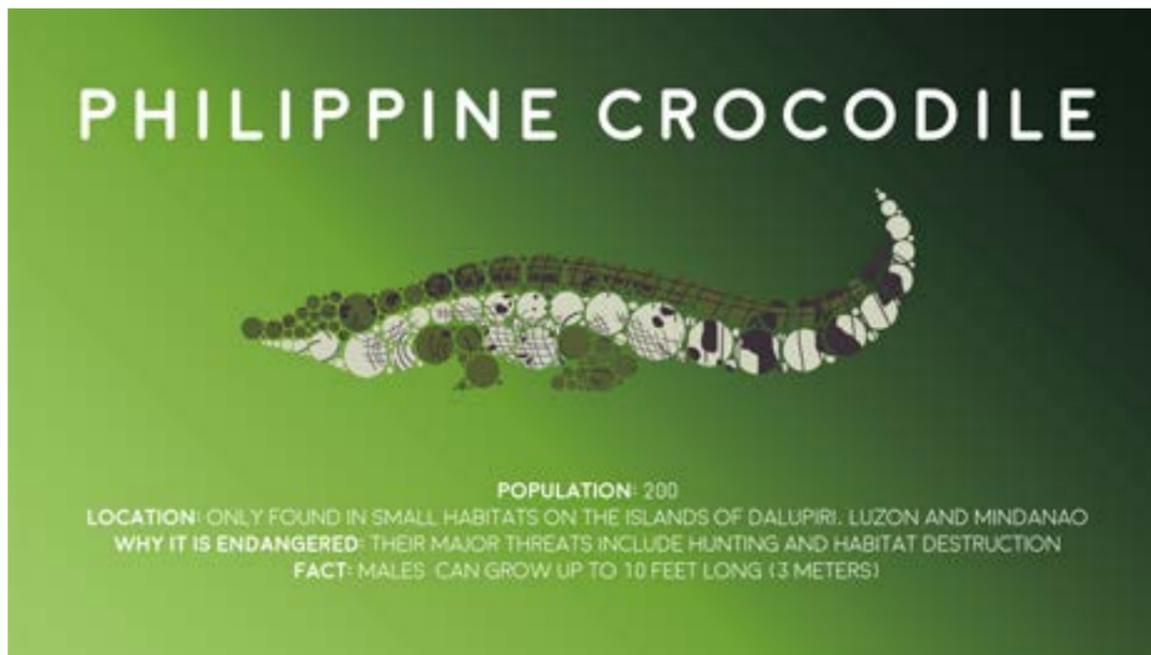
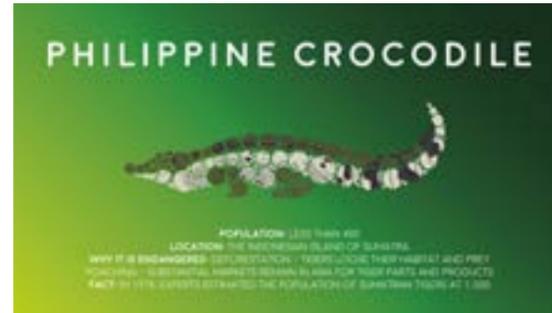
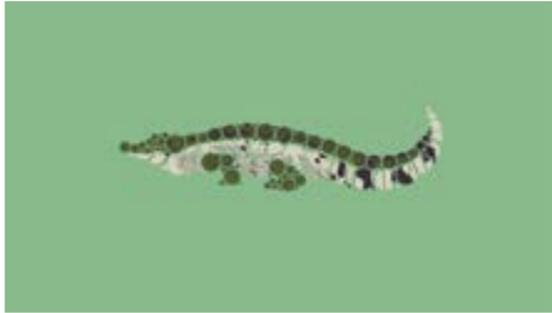
Sumatran Rhino Development



With only 80 of this animal left, it meant I wouldn't be able to go into much detail as I only have 80 circles to use.

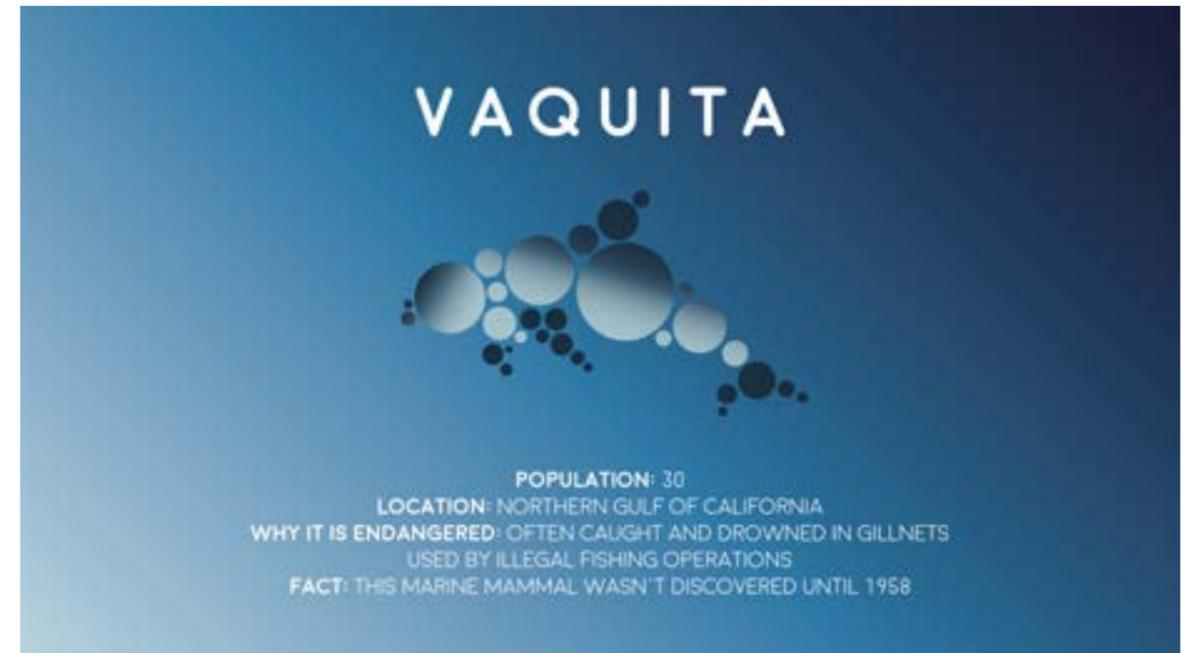
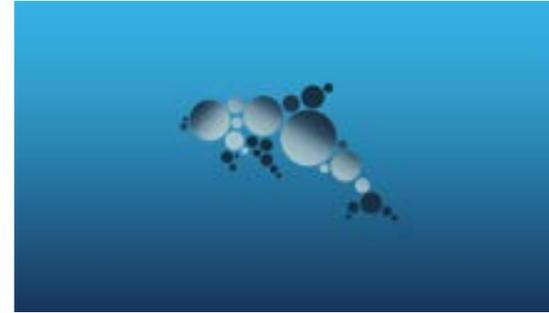
The patterns that worked so effectively on the previous two, I couldn't use on this because a rhino doesn't have a pattern. So I used the creases and lines on the skin instead. It doesn't look anywhere near as good as the other two, however you can tell what it is and it still fits in. I believe I have done the best I could with what I had.

Philippine Crocodile Development



The croc has 200 of its species left. Therefore I could go into quite a lot of detail. I am pleased with how it turned out. The scales were quite hard to replicate, and were all over the body, so I only did them in certain places otherwise the pattern would have been too dominating.

Vaquita Development



This animal is the most endangered with only 30 left. This was quite a challenge having to create the graphic with such little circles, I had to use a lot of large circles. However I am happy with the shape, you can instantly tell what it is.

Like the rhino, this animal has no pattern. It is similar to a dolphin, so it has a gradient of colour on its body. Instead of a pattern I decided to try a gradient and I am pleased with the outcome. It still fits in with the rest of the graphics as a set, it doesn't look out of place which is the main thing.

Updated Idea

Before I carry on I am going to explain how my idea has developed and what direction it is going in now.

At the start my idea was to create an installation that changed as someone walked across it. Changing from the current animal number to the future predicted animal number.

My idea developed as I did my research. I decided to change my idea so that as the user gets closer to the sensor, a more endangered animal is revealed. This way the user can control which animal to view. The ideas for my graphics developed as I looked into dot maps. I came up with the idea of one dot representing one animal which I think is a really good way of showing the numbers visually. I have also decided to add sounds to the experience by using the animal noises to match the graphics.

Adding Sounds

I have browsed online for the different animal noises; I found one that matches each of the animals I am using.

I then edited them so that they are all the same volume and so that they have a similar sound.

These sounds will be what I bring into my processing code.

Processing Code - V1

```

animals_processing
import processing.serial.*;
Serial myPort;
String val;
PImage croc_graphic, leopard_graphic, tiger_graphic, rhino_graphic;
int distance;

void setup() {
  String portName = Serial.list()[0];
  myPort = new Serial(this, portName, 9600);

  croc_graphic = loadImage("croc_graphic.jpg");
  leopard_graphic = loadImage("leopard_graphic.jpg");
  tiger_graphic = loadImage("tiger_graphic.jpg");
  rhino_graphic = loadImage("rhino_graphic.jpg");
  vaquita_graphic = loadImage("vaquita_graphic.png");

  size(1920, 1080);
}

void draw() {
  if (myPort.available() > 0) {
    val = myPort.readStringUntil('\n');
  }

  println(val);
  try {
    val = val.replaceAll("\\\\0", "");
    distance = Integer.parseInt(val);

    if (distance > 50) {
      image(tiger_graphic, 0, 0, 1920, 1080);
    }
    else if (distance > 40 && distance < 50) {
      image(croc_graphic, 0, 0, 1920, 1080);
    }
    else if (distance > 30 && distance < 40) {
      image(rhino_graphic, 0, 0, 1920, 1080);
    }
    else if (distance > 20 && distance < 30) {
      image(leopard_graphic, 0, 0, 1920, 1080);
    }
    else if (distance < 20) {
      image(vaquita_graphic, 0, 0, 1920, 1080);
    }
  }
  catch(Exception e) {
  }
}

```

- This links processing with arduino.
 - Create object from Serial class.
 - Data received from the serial port.
 - Importing the graphics in.
 - int is datatype for integers, and distance is a variable I created.

- Opens the port I am using and the rate at what I want it.

- Naming my graphics and linking them to the file. I had to add the files to the sketch as well by going Sketch > Add File.

- Setting the size of my canvas.

- This bit of code just tells me if there isn't a port available by saying '\n'.

- Reads the value from the sensor through arduino and then into processing and prints the value out through the Serial Monitor.

- This "try" catch is used to handle exceptions when code isn't working. I tried with out it first and it didn't work.
 - parseInt changes a String into an integer, I did this so that the sensor values can be read.

- These if statements are saying if the distance value is within these ranges then display this graphic. So I did this for all 5 of my graphics, for now I used much smaller ranges so it was easier to test.

- This is the end of the try code.

Processing Code - Final

```

animals_processing
import processing.sound.*;
import processing.video.*;
import processing.serial.*;

Serial myPort; // Create object from Serial class
String val; // Data received from the serial port
PImage croc_graphic, leopard_graphic, tiger_graphic, rhino_graphic, vaquita_graphic;
Movie myMovie;
SoundFile croc_audio, leopard_audio, tiger_audio, rhino_audio, vaquita_audio;
int distance;

void setup() {
  String portName = Serial.list()[0];
  myPort = new Serial(this, portName, 9600);

  croc_graphic = loadImage("croc_graphic.jpg");
  leopard_graphic = loadImage("leopard_graphic.jpg");
  tiger_graphic = loadImage("tiger_graphic.jpg");
  rhino_graphic = loadImage("rhino_graphic.jpg");
  vaquita_graphic = loadImage("vaquita_graphic.png");
  myMovie = new Movie(this, "vaquita_animation.mp4");
  croc_audio = new SoundFile(this, "croc_audio.wav");
  leopard_audio = new SoundFile(this, "leopard_audio.wav");
  tiger_audio = new SoundFile(this, "tiger_audio.wav");
  rhino_audio = new SoundFile(this, "rhino_audio.wav");
  vaquita_audio = new SoundFile(this, "vaquita_audio.wav");

  size(1920, 1080);
}

void draw() {
  if (myPort.available() > 0) {
    val = myPort.readStringUntil('\n');
  }

  println(val);
  try {
    val = val.replaceAll("\\\\0", "");
    distance = Integer.parseInt(val);

    if (distance > 60) {
      image(myMovie, 0, 0, 1920, 1080);
      if (tiger_audio.isPlaying()) {
        tiger_audio.stop();
      }
    }
    else if (distance > 50 && distance < 60) {
      image(tiger_graphic, 0, 0, 1920, 1080);
      if (croc_audio.isPlaying()) {
        croc_audio.stop();
      }
      tiger_audio.loop();
    }
    else if (distance > 40 && distance < 50) {
      image(croc_graphic, 0, 0, 1920, 1080);
      if (tiger_audio.isPlaying()) {
        tiger_audio.stop();
      }
      if (rhino_audio.isPlaying()) {
        rhino_audio.stop();
      }
      croc_audio.loop();
    }
    else if (distance > 30 && distance < 40) {
      image(rhino_graphic, 0, 0, 1920, 1080);
      if (croc_audio.isPlaying()) {
        croc_audio.stop();
      }
      if (leopard_audio.isPlaying()) {
        leopard_audio.stop();
      }
      rhino_audio.loop();
    }
    else if (distance > 20 && distance < 30) {
      image(leopard_graphic, 0, 0, 1920, 1080);
      if (rhino_audio.isPlaying()) {
        rhino_audio.stop();
      }
      if (vaquita_audio.isPlaying()) {
        vaquita_audio.stop();
      }
      leopard_audio.loop();
    }
    else if (distance < 20) {
      image(vaquita_graphic, 0, 0, 1920, 1080);
      if (leopard_audio.isPlaying()) {
        leopard_audio.stop();
      }
      vaquita_audio.loop();
    }
  }
  catch(Exception e) {
  }
}

void mouseEvent(MouseEvent e) {
  println();
}

```

- Installed the sound and video software so I can use them in my code.

- Importing my animation and sounds.

- Naming my sounds and animation and linking them to the files.
 - myMovie.loop() is so that the animation plays on repeat without stopping.

- I have added the animation into a new if statement so it plays at the beginning when the user is furthest away.

- In all the other if statements I created before, I have added an if statement inside of them. This says; if the sound from the one next to it in the range is playing, stop that and loop the one that is meant to be on. This way it stops the audio playing from before and then plays the one that is linked to the graphic. I did this for all the graphics and audio so that the audio played with the right animal.

My processing code 'v1' was just my starting point where I got the graphics to work. I then built on top of this code in my 'final' one where I added the sounds and animation as well.

My Arduino code didn't need to change after I had done it the first time. This was because I was just using it to get the values from the sensor, so once I had the values I didn't need to do anything else.

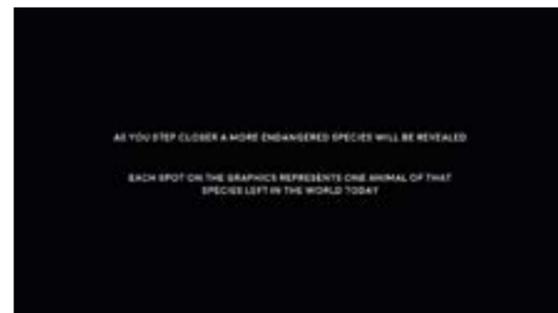
Intro Animation

At this point in the project I currently have the graphics working with the code, so as you get closer it changes to a more endangered animal. I have now realised I need a introduction graphic to inform the user about the problem I am trying to tackle, but also how to interact with it.

So I am going to create this in a very simple form so the user can easily read it.

I decided to use some figures to try and shock users into helping endangered animals. I got these figures from:

- <https://www.theguardian.com/environment/2017/feb/25/half-all-species-extinct-end-century-vatican-conference>



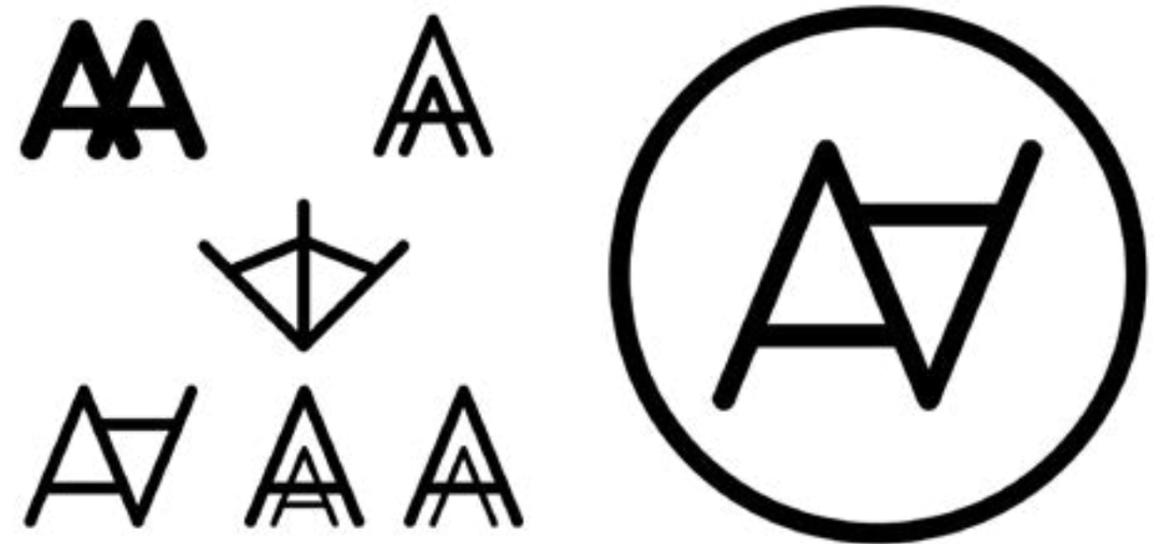
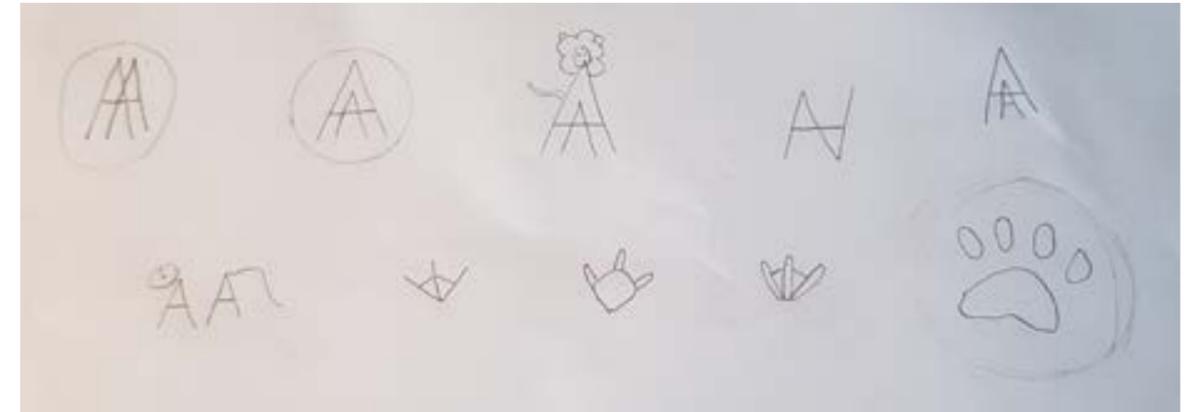
Here is what I created, I wanted it to be straight to the point and for there to be no distractions when the user is reading it.

I am going to try and create this as a little animation so that it will play on loop until triggered by someone getting closer. An animation that is moving is more likely to attract someones attention.

Logo Development

For the name of my installation I have chosen "Animal Awareness". I didn't want to complicate anything and wanted the name to literally represent what the installation is about.

I am now going to create some ideas for a logo to represent my installation.

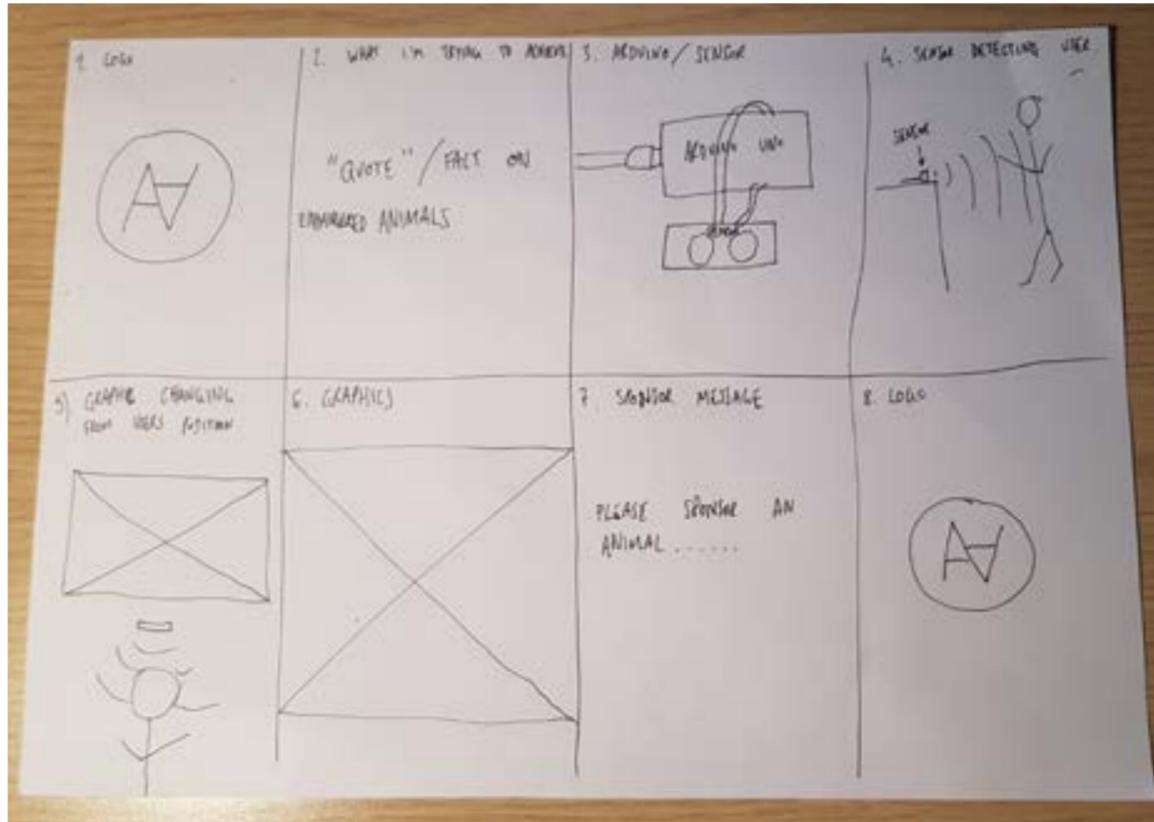


I started off by sketching some ideas down. The two main themes I had were the AA representing Animal Awareness, and trying to get it to look like an animal or a paw shape.

I decided to keep it simple and go with the initials. I liked the idea of it being flipped; the fact they are the same letter means it will be symmetrical which looks neat. The bottom right image is my final logo design.

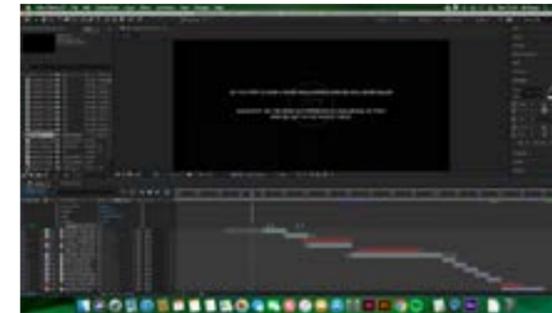
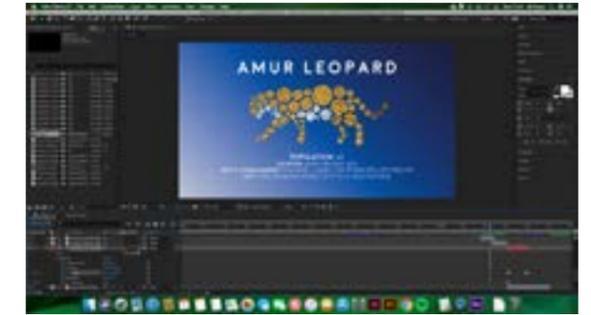
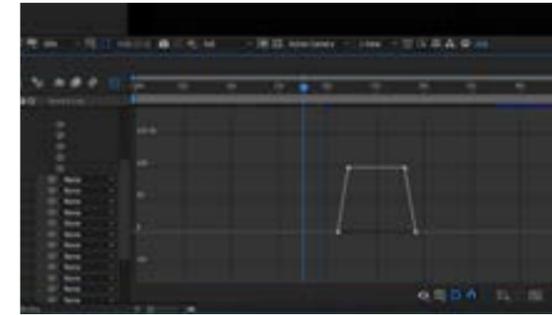
Video Storyboard

This is a storyboard I created for my video. This has given me a good understanding of what content I need and what kind of shots I will require to shoot.



My next step is to film the shots in my storyboard and then I can start putting it together in After Effects.

After Effects Development



Here are some screenshots of me creating the video in after effects. I changed the scale of text and objects a lot to transition from one screen to the next. I had to use the easy ease tool and then the graph to get a smooth transition.

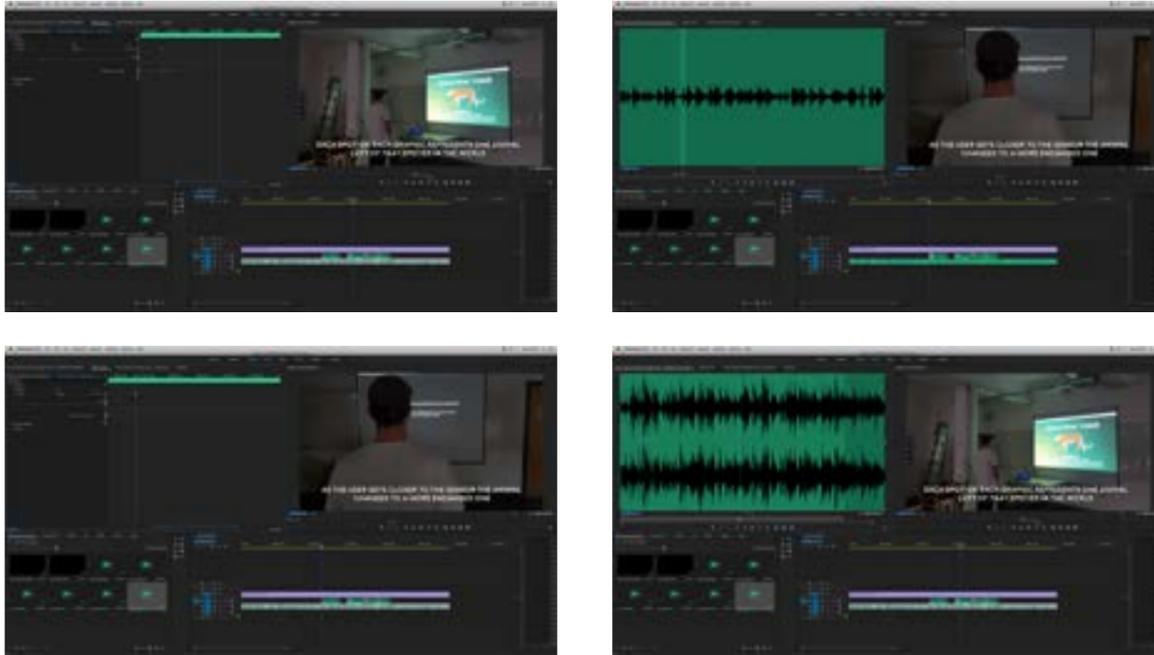
I also changed the opacity of screens to transition from one to another very frequently, this is a really easy but effective method.

Using text on top of videos to describe what is going on was the most effective way to communicate with the audience.

Keyframing was the key to making sure all my animations and editing not only worked but were in time with each other.

Next I shall export this video and then bring it into Premiere Pro, so that I can add a sound track to it.

Premiere Pro Development



I started by finding a backing track online; I wanted one that was nice and chilled so that it doesn't take all the attention away from my installation.

I then cropped it so it fit to the length of my video. After, I changed the volume level at different points in the video. At the start and end I made the audio fade in and out, and when ever there was animal noises from my installation I turned the backing track down as well.

Finally I exported this and that was my video done!

User Testing



John Barrow

55
Plumber
Nottingham

"I went to view the installation with my wife and two kids. We all loved it, the kids were totally engaged. The sound made it feel very real. I also thought the visual style throughout including the branding which was very good. We let the kids sponsor an animal when we got home because they were desperate to help out, it has helped teach them a real lesson."



Tracy Flint

42
Teacher
Sheffield

"I took my year 7 class to the gallery the other week, and the Animal Awareness installation was on there by chance. This was definitely the one that attracted most of the kids attention, it displayed a really good message to them and was visually captivating. I like how it starts off with a fact, this instantly makes you want to do something to help."

User Testing



Miles Oliver

27
Zoo Keeper
London

"As a zoo keeper I was keen to go and look at how this installation was helping endangered animals. I was very impressed by it; the visuals were very engaging and it makes it a lot easier to understand how many animals are left through the number of dots. The fact the user has to interact with it means it keeps their attention for longer."



Kate Gold

14
School
Liverpool

"I went with my mum at the weekend. I really liked how when you got closer the animal changed and the sounds were really cool. I felt really bad for the tiger so my mum allowed me to sponsor one. I chose the tiger because they are so cute!"

User Testing



Jane Sheldon

64
Retired
Essex

"I have a real passion for wildlife and nature, so I went to see this installation. I was so impressed by how engaging it was, it really made me want to sponsor an animal, so I did when I got home. When I was at the installation there were lots of kids that were captivated by it, which is really good because these young ones are going to be the ones that can make a difference in saving species from being endangered."



James Towel

19
University
Falmouth

"My friend told me to go and see this installation so I did. I do graphic design at university so I went to have a look at what I could learn from the branding and visual style. I was really impressed with the concept behind the spots on the graphics, that is really clever. The video and logo style is very minimal which is good because the main focus should be on the goal of the installation; making people aware of endangered animals."

Final Graphics

SUMATRAN TIGER



POPULATION: 400
LOCATION: THE INDONESIAN ISLAND OF SUMATRA
WHY IT IS ENDANGERED: DEFORESTATION - TIGERS LOOSE THEIR HABITAT AND PREY
POACHING - SUBSTANTIAL MARKETS REMAIN IN ASIA FOR TIGER PARTS AND PRODUCTS
FACT: IN 1978, EXPERTS ESTIMATED THE POPULATION OF SUMATRAN TIGERS AT 1,000

PHILIPPINE CROCODILE



POPULATION: 200
LOCATION: ONLY FOUND IN SMALL HABITATS ON THE ISLANDS OF DALUPIRI, LUZON AND MINDANAO
WHY IT IS ENDANGERED: THEIR MAJOR THREATS INCLUDE HUNTING AND HABITAT DESTRUCTION
FACT: MALES CAN GROW UP TO 10 FEET LONG (3 METERS)

Final Graphics

SUMATRAN RHINO



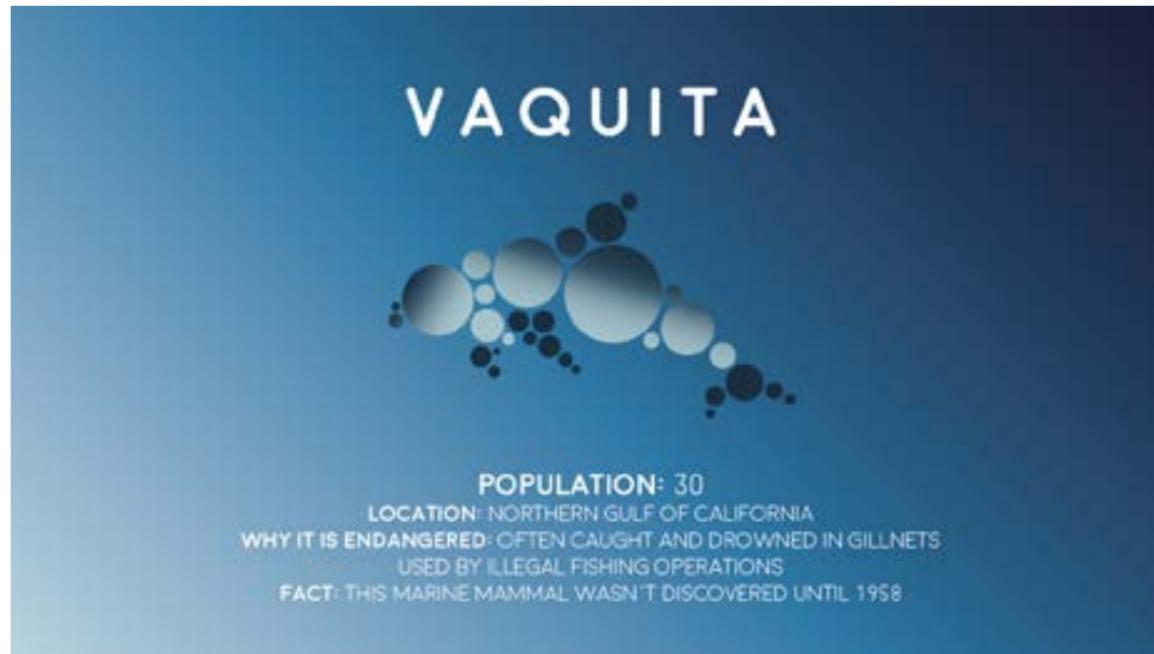
POPULATION: 80
LOCATION: BORNEO AND SUMATRA
WHY IT IS ENDANGERED: POACHING - THEIR HORNS ARE MADE OF A HAIR LIKE SUBSTANCE AND IS REVERED FOR MEDICINAL USE. ALSO VALUED IN THE MIDDLE EAST AS AN ORNAMENTAL DAGGER HANDLE
FACT: THEIR TWO HORNS ARE CONSIDERABLY SMALLER THAN THEIR AFRICAN RELATIVES

AMUR LEOPARD



POPULATION: 60
LOCATION: AMUR-HEILONG, ASIA
WHY IT IS ENDANGERED: POACHING - LARGELY FOR ITS BEAUTIFUL SPOTTED FUR
FACT: THEY CAN RUN AT SPEEDS OF UP TO 37 MILES PER HOUR

Final Graphics



Final Video

Evaluation

When I first started this project I wanted to create something that would help a real life problem. I believe my project does just this.

Overall I am really happy with how my project has turned out. I have created a sensor-based interface which allows users to interact with an audio-visual environment, which is exactly what the brief was.

My installation works really well; I feel it could be put in an actual gallery and have a real impact on the public. I am pleased with how the graphics turned out; first of all the meaning behind them and how each dot represents one animal, and also how engaging / visually captivating they are. From the user feedback they said it really attract their attention.

If I had more time I could have made my graphics into animations, so the animals would move and interact with the audience. This would be a good way of engaging the users even further.

Future Development

If my project were to be developed even further, it could be projection mapped in say a museum, overlaying sculptures of the actual animals.

It could also be projection mapped on to big buildings, this would mean a lot more people would see it and therefore the message behind my project would spread further.

Another idea; it could be developed into the virtual reality world so that you get a even better experience where you can walk around and interact with the animals.

There are plenty of directions that this concept could take, as long as the message of saving endangered animals is kept as the priority.