Source Documentation

Wearable Texture Feedback Controller

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Team Members

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ARDUINO CODE

This Arduino code is used to receive information from Unity and then turn the DC motor and Servo motor accordingly.

```
#include<AFMotor.h>
#include <Servo.h>

// Defining the motors
Servo myservo;
AF_DCMotor motor(1);

String last_item_touched = "LeatherT";

void setup() {
 Serial.begin(9600);

 motor.setSpeed(100);
 motor.run(RELEASE);

 myservo.attach(9);
}

void loop() {

if(Serial.available() > 0) {
 String touch_clothes = Serial.readStringUntil('\n');
 touch_clothes.trim();

 if(touch_clothes.equals("JeansT") ||
touch_clothes.equals("LeatherT")) {
   checkLastItemTouched(touch_clothes);
 } else {
   bringDown();
 }
}

}
```

```
void checkLastItemTouched(String currentItem) {
 if(currentItem.equals(last_item_touched)) {
   bringUp();
 } else {
   changeAndBringUp(currentItem);
 }
}

void changeAndBringUp(String currentItem) {
 last_item_touched = currentItem;
 motor.run(FORWARD);
 delay(200);
 motor.run(RELEASE);

 myservo.write(55);

}

void bringUp() {
 myservo.write(55);
}

void bringDown() {
 myservo.write(130);
}
```

UNITY CODE

SerialCommunication.cs -> This code is used to connect to Arduino and sent relevant information.

```
using System.Collections;
using System.Collections.Generic; using UnityEngine;
using System.IO.Ports;
using System.Threading;
using System;

public class SerialCommunication : MonoBehaviour {

public SerialPort data_stream = new SerialPort("COM3", 9600);

string hoverDenim;
string hoverLeather;
string clothesTouched;

DenimInteract clothesinteractable;
public GameObject denimcube;

LeatherInteractable leatherInteractable;
public GameObject leatherJacket;

void Awake() {

clothesinteractable = denimcube.GetComponent<DenimInteract>();
leatherInteractable =
leatherJacket.GetComponent<LeatherInteractable>();

clothesTouched = "False";

// Open the serial stream and availability on the Arduino
data_stream.DtrEnable = true;
data_stream.RtsEnable = true;
data_stream.WriteTimeout = 300;
data_stream.ReadTimeout = 5000;
```

```
data_stream.Open();
data_stream.WriteLine("1");
Debug.Log("First write to Arduino");

Thread thread = new Thread(Run);
thread.Start();
}

// Start is called before the first frame update
void Start() {
}

void Run() {
  Debug.Log("Inside Run Method ");
  while (true)
  {
    data_stream.WriteLine(clothesTouched);
    Debug.Log("Writing data to Arduino " + clothesTouched);
  }
}

// Update is called once per frame
void Update() {
if(clothesinteractable.isHover == "True") {
  clothesTouched = "JeansT";
 } else if (leatherInteractable.isHover == "True") {
  clothesTouched = "LeatherT"; }
else {
 clothesTouched = "False";
 }
}
}
```

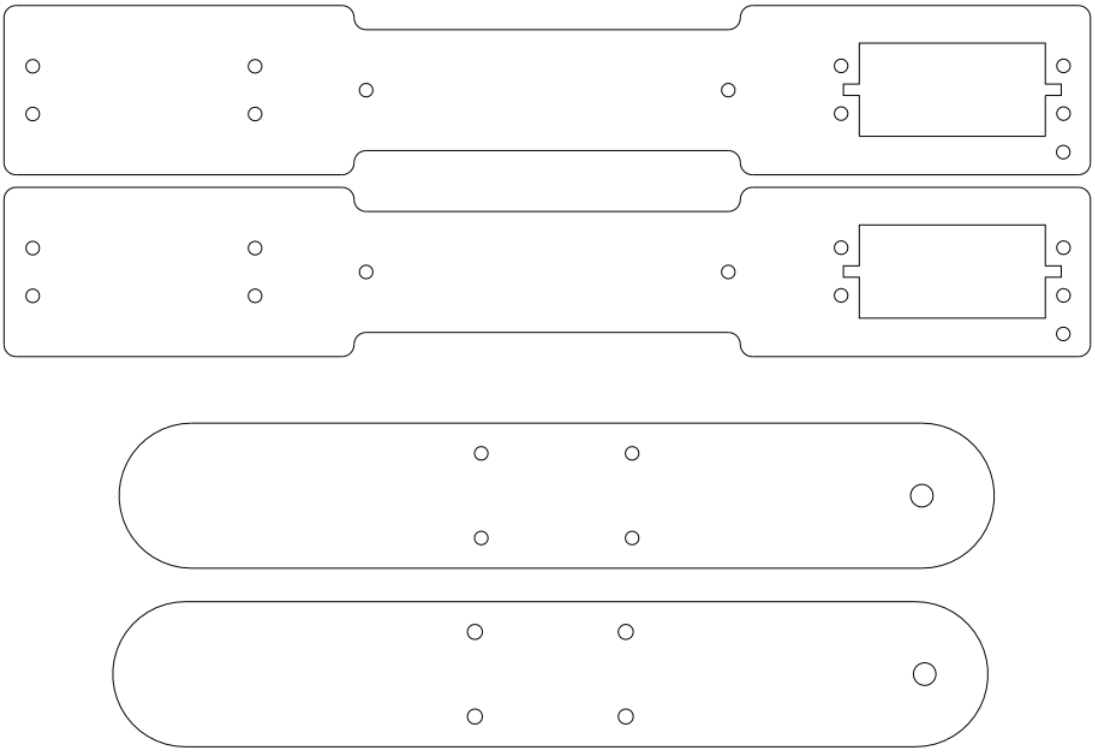
LeatherInteractable.cs -> This script is attached to leather clothes and whenever the hands touch the leather material or exits the hover, an event is triggered which is used to convey relevant information to Arduino.

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class LeatherInteractable : MonoBehaviour {
public string isHover = "False";

public void HoverOver() {
 GetComponent<Renderer>().material.EnableKeyword("_EMISSION");
 isHover = "True";
 }

public void HoverEnd() {
 GetComponent<Renderer>().material.DisableKeyword("_EMISSION");
 isHover = "False";
 }
}
```

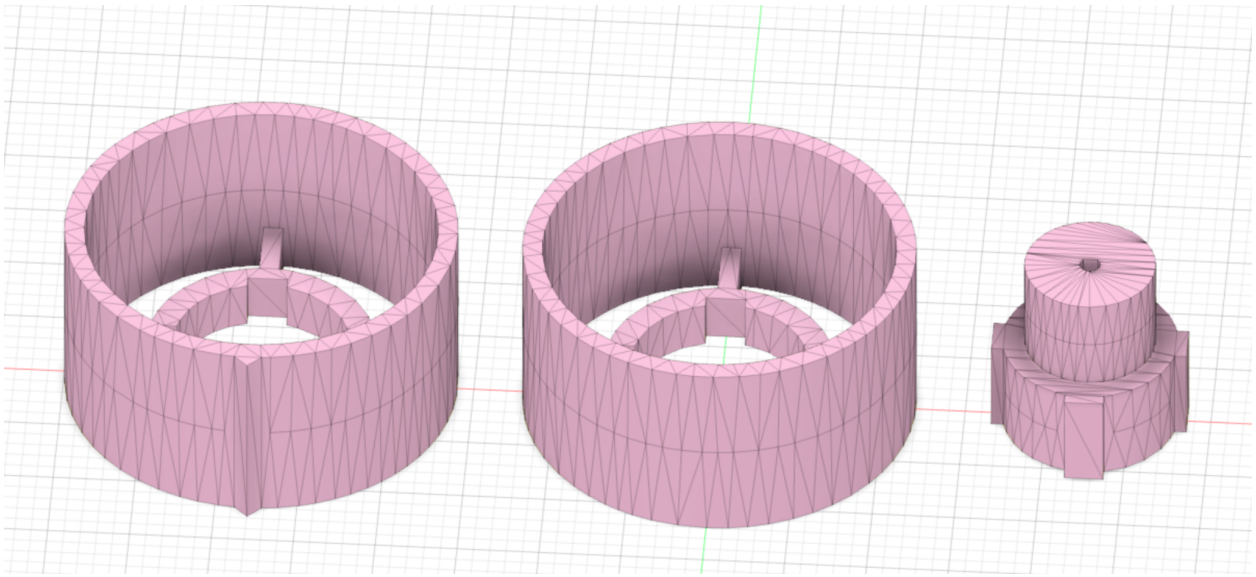
DenimInteractable.cs -> This script is attached to the denim clothes and whenever the hands hover over the clothes or exits the hover, an event is triggered which tells Arduino to rotate the wheel on denim material and then bring it up so user can feel the texture.

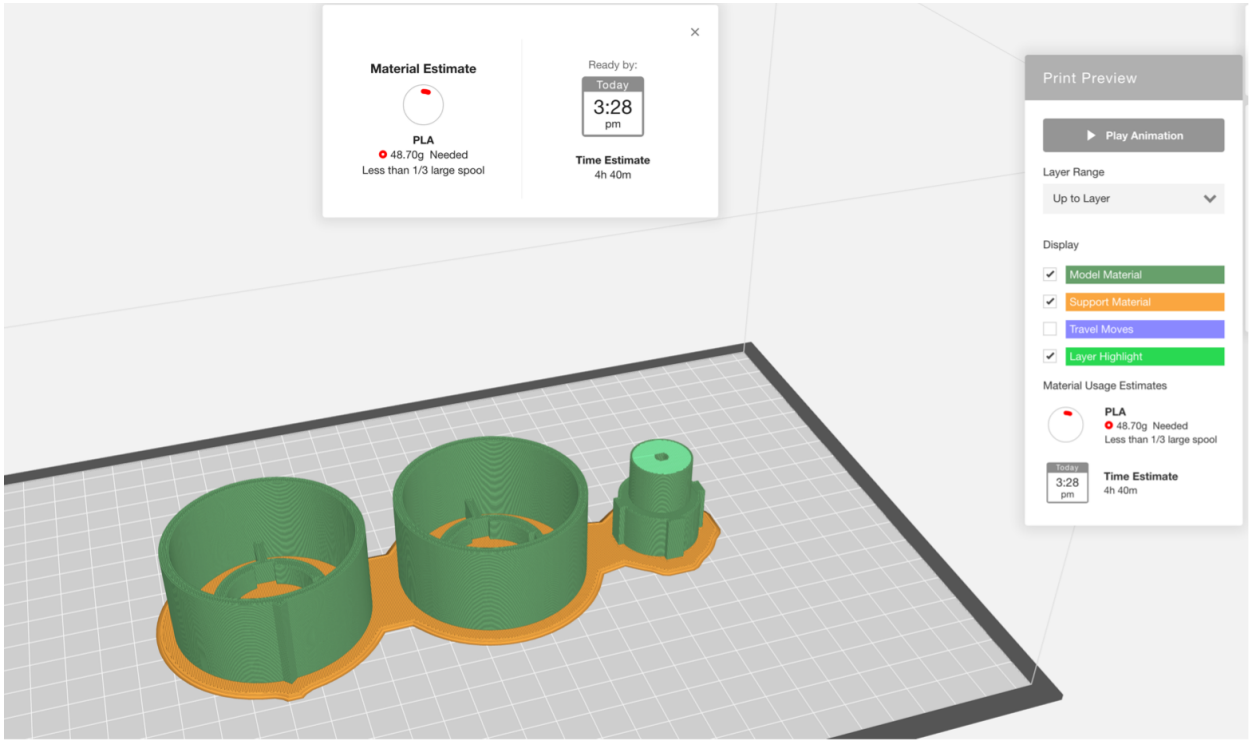
```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class DenimInteract : MonoBehaviour {

public string isHover = "False";

public void HoverOverDenim() {
 GetComponent<Renderer>().material.EnableKeyword("_EMISSION");
 isHover = "True";
 }

public void HoverEndDenim() {
 GetComponent<Renderer>().material.DisableKeyword("_EMISSION");
 isHover = "False";
 }
}
```

LASER CUTTING FOR MECHANICAL HAND CONTROLLER



3D PRINT FILES FOR INTERCHANGEABLE HAPTIC WHEELS



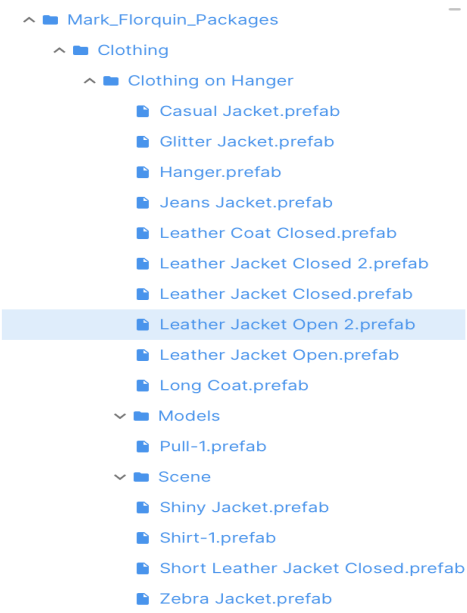


UNITY ASSET STORE FOR CLOTHES ON HANGER

URL LINK:
https://assetstore.unity.com/packages/3d/props/clothing/clothing-on-hanger-52359#description

Total file size: 215.0 MB | Number of files: 126

Leather Jacket Open 2.prefab



ITEMS USED IN PROJECT FABRICATION (KIT LIST)

NAME	QUANTITY	PROCURED FROM
75:1 Micro Metal Gearmotor HP with Extended Motor Shaft	1	Core Electronics
DSS-P05 Standard Servo (5.1kg)	1	Core Electronics
Battery Holder - 1x18650 (wire leads)	1	Core Electronics
9V Battery	2	Core Electronics
9V Battery Clip	1	Core Electronics
L239D Motor Driver	1	Self