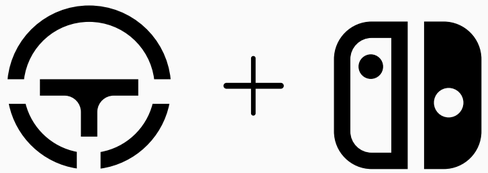
03

## 驾驶类游戏外设 ÷

“多觉叠加作为一类立足于使用者的感觉、认识、思维以及感情等多层级性的通感方式，是一种更高级的感受转变方式，它所带给使用者的是更为灵活、 形象、更深度的高级感官体会。

——《设计》2021年 15期 仝婧

# 设计出发点 goals



方向盘外设对于驾驶类游戏的感受影响极为强烈，市面的相关产品极少。
做游戏方向盘的厂家本来就较少，玩家的可选择就不多了。
市面现有的外观设计非常单调和粗狂，甚至可以说是过于直白。

## 触觉联动

### 触摸的敏感性

手部尤其是指尖的传感器十分密集，当人类个体还是孩童的时候，触觉感知也在感知世界中发挥着举足轻重的地位。

### 多通道反馈效果

表皮的凹凸起伏，在触觉上是一种明显的反馈，但在视觉上也有一定通感效果和感觉传递。

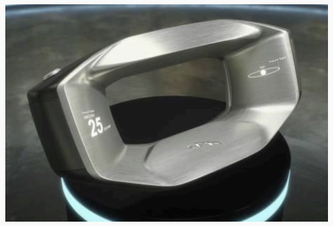
参考文献：How touch can trigger our emotions

# 造型设计

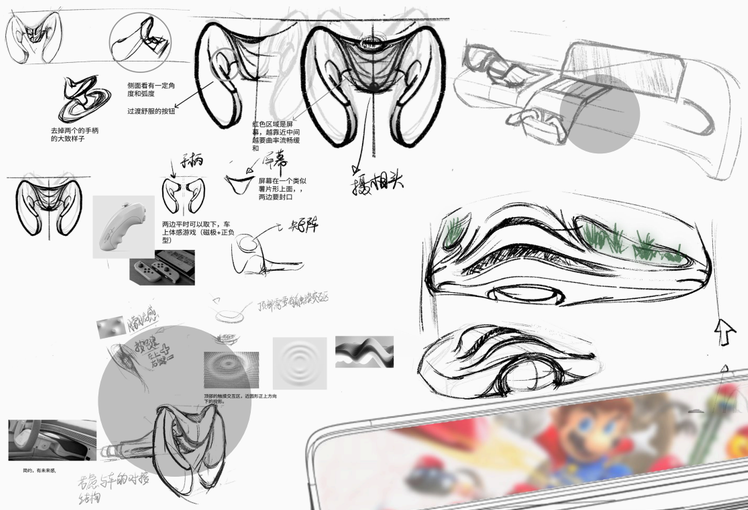
Ske_tch

## 兼顾考量抓握的舒适性

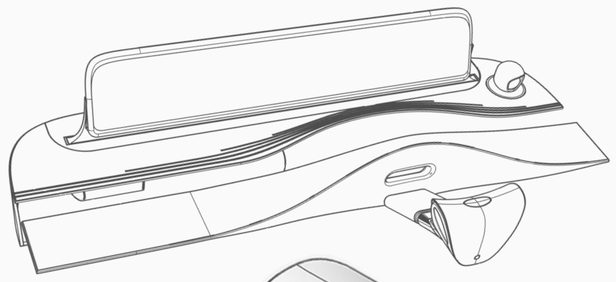
同时由于要在居室中占据大量空间，所有要保证一定美感与空间的融合度

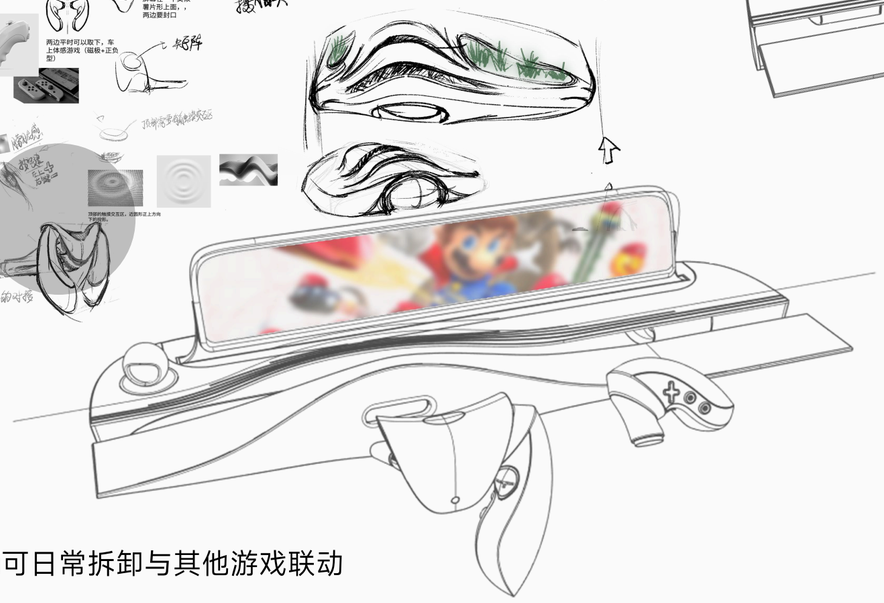


方向盘直径D一般为330-600mm。
在参考了捷豹概念sayer方向盘后，在艺术造型和持握舒适度之间寻求平横





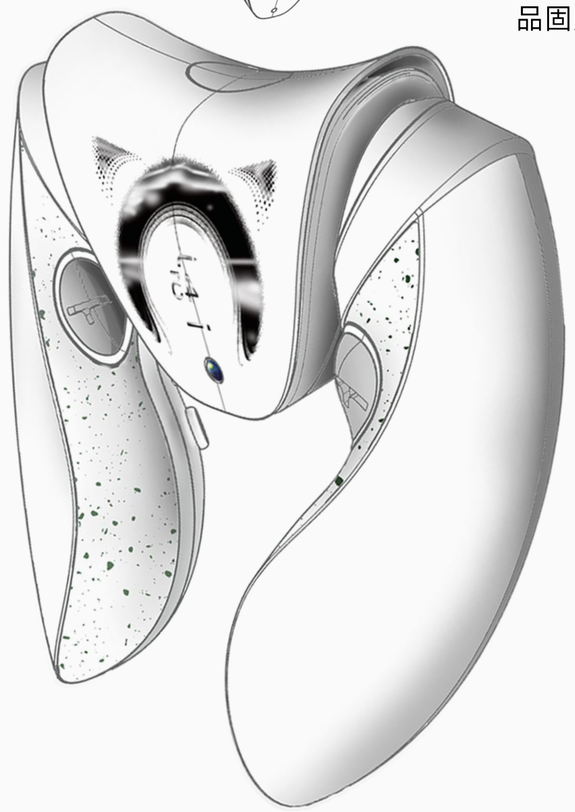


手柄可日常拆卸与其他游戏联动

## 同时设计方向盘的安置固定台

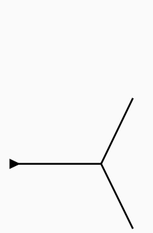
和方向盘的cmf以及造型语义保持一致

配合支架穿插可以把产品固定在交互位置

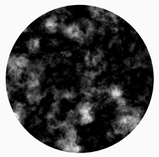


# 触感模拟

实现原理以伺服电机带动单位平面做竖直直线运动，通过机械运动原理来实现立体图形的整体运动，加入自动化程序后控制矩阵可以实现各种立体的图形。

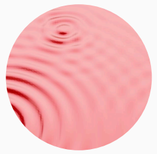


噪波（伪随机

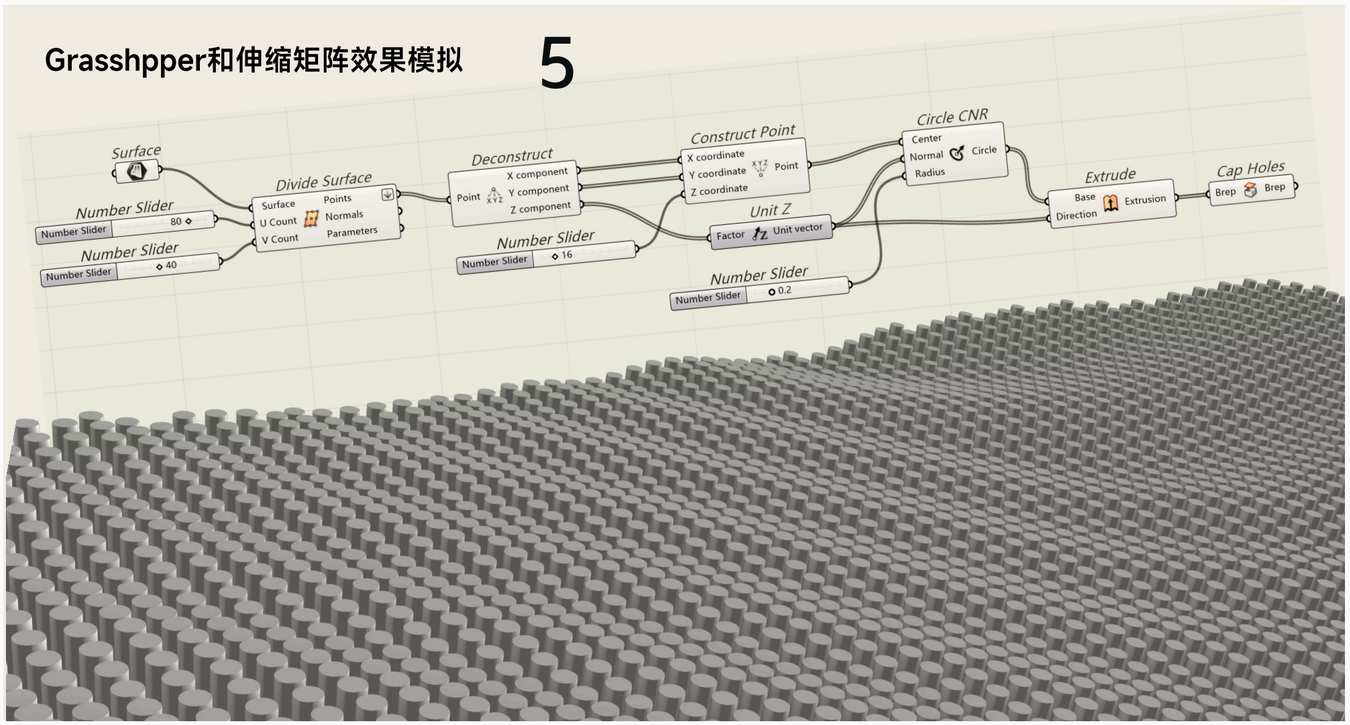


对应情绪识别
负面参数

波纹干涉（规则



对应情绪识别积极参数，峰值对应实时value

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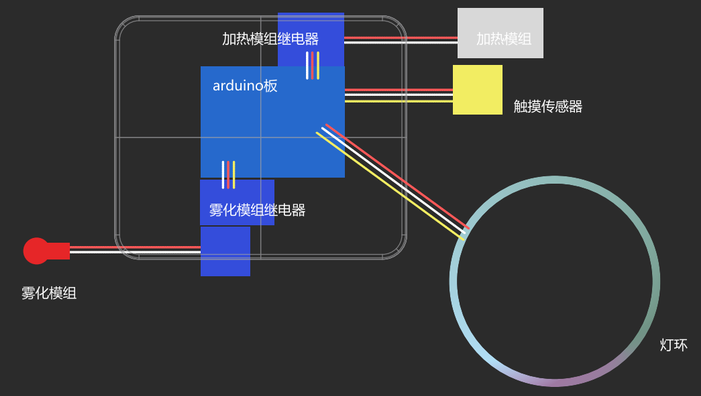
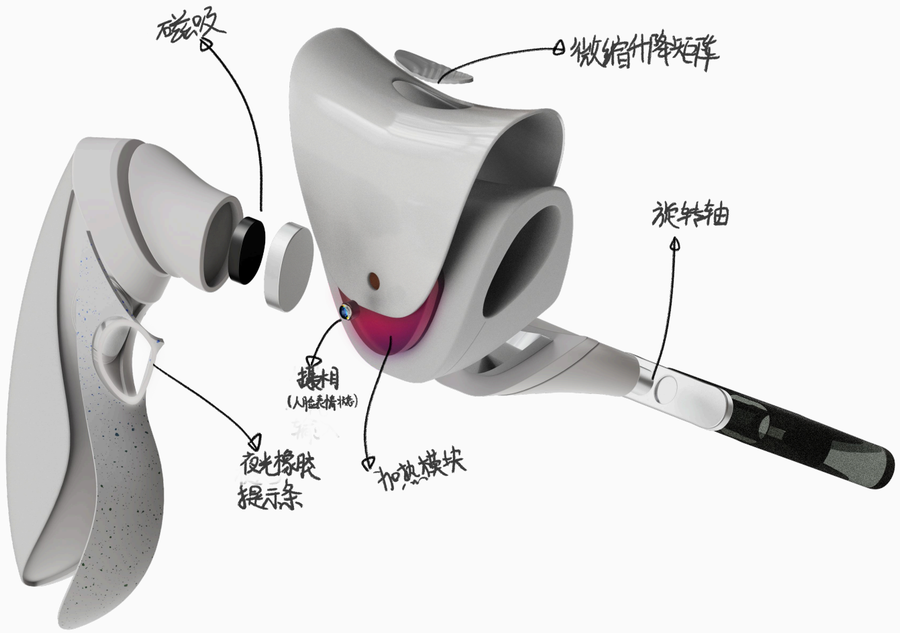
## 原型模拟

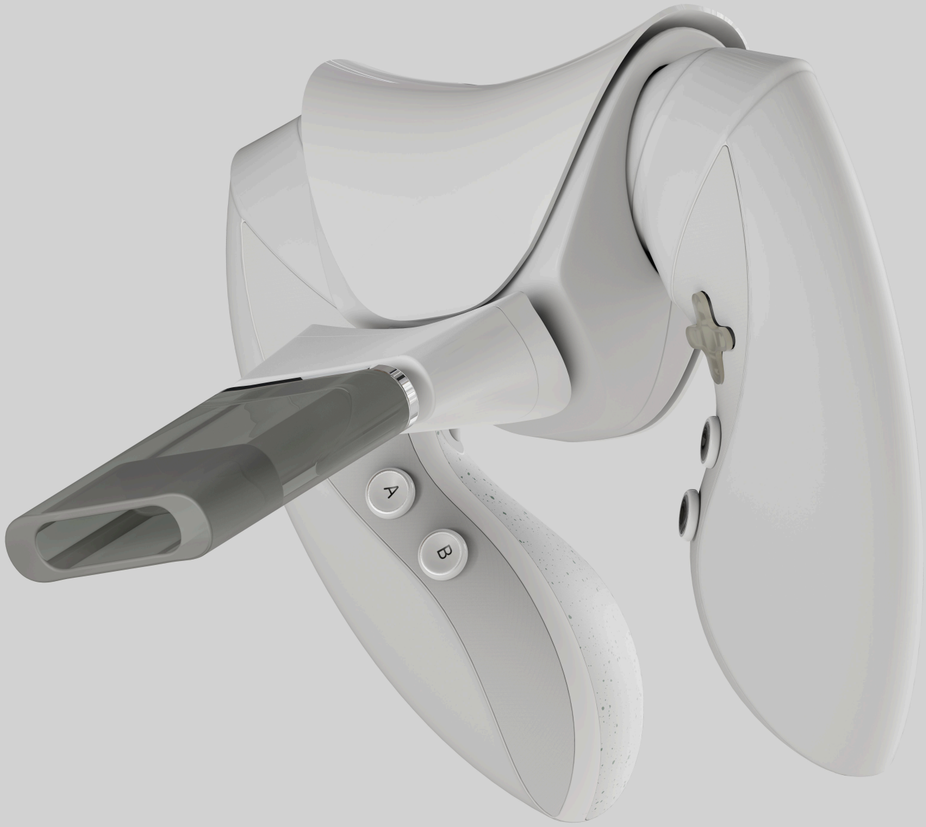
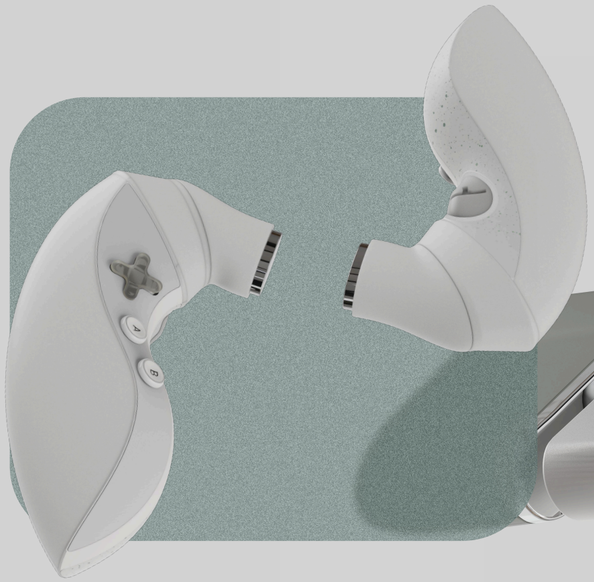
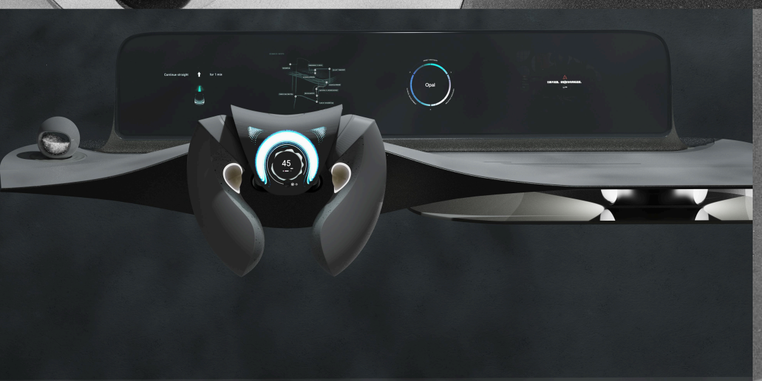



```python
config = ConfigProto()
config.gpu_options.allow_growth = True
session = InteractiveSession(config=config)
# parameters for loading data and images
detection_model_path = 'trained_models/facemodel/haarcascade_frontalface_default.xml'
emotion_model_path = 'trained_models/float_models/fer2013_mini_XCEPTION.33-0.65.hdf5'
emotion_labels = {0:'emotional',1:'emotional',2:'emotional',3:'good',
                  4:'emotional',5:'surprise',6:'nomal'}

face_detection = cv2.CascadeClassifier(detection_model_path)
emotion_classifier = load_model(emotion_model_path, compile=False)
emotion_target_size = emotion_classifier.input_shape[1:3]
emotion_window = []
frame_window = 10

serialPort = "COM4"
baudRate = 9600
ser = serial.Serial(serialPort, baudRate, timeout=0.5)
print("参数设置：串口=%s ，波特率=%d" % (serialPort, baudRate))
demo1 = b"1"  # 将0转换为ASCII码方便发送
demo2 = b"2"  # 同理

# starting video streaming
cv2.namedWindow('window_frame')
video_capture = cv2.VideoCapture(0)
while True:
    bgr_image = video_capture.read()[1]
    gray_image = cv2.cvtColor(bgr_image, cv2.COLOR_BGR2GRAY)
    rgb_image = cv2.cvtColor(bgr_image, cv2.COLOR_BGR2RGB)
    faces = face_detection.detectMultiScale(gray_image, 1.3, 5)
    for face_coordinates in faces:
        x1,y1,width,height = face_coordinates
        x1,y1,x2,y2 = x1,y1,x1+width,y1+height
        #x1, x2, y1, y2 = apply_offsets(face_coordinates, emotion_offsets)
        gray_face = gray_image[y1:y2, x1:x2]
        try:
            gray_face = cv2.resize(gray_face, (emotion_target_size))
        except:
            continue
        gray_face = preprocess_input(gray_face, True)
        gray_face = np.expand_dims(gray_face, 0)
        gray_face = np.expand_dims(gray_face, -1)
        emotion_prediction = emotion_classifier.predict(gray_face)
        #emotion_probability = np.max(emotion_prediction)
        emotion_label_arg = np.argmax(emotion_prediction)
        emotion_text = emotion_labels[emotion_label_arg]
        emotion_window.append(emotion_text)

        fuck = np.argmax(emotion_prediction)
        if len(emotion_window) > frame_window:
            emotion_window.pop(0)
        try:
            emotion_text = mode(emotion_window)
        except:
            continue
        color = (0, 0, 255)
        cv2.rectangle(rgb_image, (x1, y1), (x2, y2), (0, 0, 255), 2)
        cv2.putText(rgb_image, emotion_text, (x1, y1), cv2.FONT_HERSHEY_SIMPLEX, 2,
bgr_image = cv2.cvtColor(rgb_image, cv2.COLOR_RGB2BGR)
cv2.imshow('window_frame', bgr_image)
if ((fuck <= 2)|(fuck == 4)):
            c = '1'
else:
            c = '2'
c = ord(c)
if (c == 49):
        ser.write(demo1)
if (c == 50):
        ser.write(demo2)
if cv2.waitKey(1) & 0xFF == ord('q'):
    break
```

参考情绪识别项目
https://github.com/hanghang2333/emotionrecognition

# 结构及CMF




由于近年来体感游戏的火爆，设备的智能性要做前瞻型考量，驾驶行为作为一种人类感性交互的娱乐化生活方式。温度，气味，触觉三位一体的交互反馈，会给驾驶游戏更多重维度的体验。对驾驶行为保留一定程度兴趣的顾客，也不会拒绝为提升游戏体验的气味和震动、温度。可以拆卸的手柄也可以一定程度兼容掌机游戏。
ps：左右主按键分别对应加速减速，将油门和刹车这两种显示的设施装置与游戏机进行合理融合，功能替代

# 多角度渲染图