HAND MOTION TRACKING FOR MOBILE VR GAMES

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SCSS 2019

AGENDA

INTRODUCTION

PROBLEM STATEMENT

PROPOSED SOLUTION

PROCESS

RESULTS

CONCLUSIONS

INTRODUCTION

OJBECTIVE:

CREATE AN INERTIAL MOTION TRACKER

CREATE A PING-PONG VR GAME

USE TRACKER TO CONTROL THE GAME

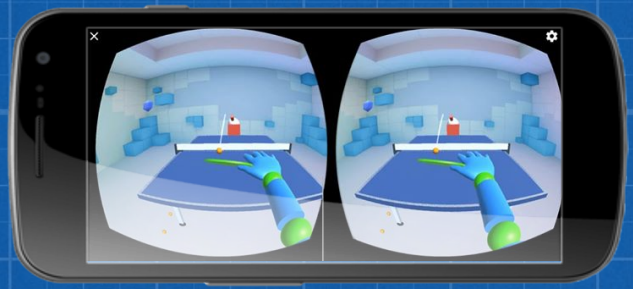
PROBLEM STATEMENT

A CHALLENGE IN VR IS TO CREATE IMMERSIVE INPUT

INERTIAL TRACKING IS ALMOST NEVER USED ON ITS OWN

SHOWCASE HOW SUCH A SYSTEM CAN BE IMPLEMENTED

PROPOSED SOLUTION



PING-PONG
VR

TCP SOCKET

I2C
CONNECTIONS

3 X IMU

PROCESS

RECEIVING DATA FROM SENSORS

CREATE GAME

TRANSFERRING DATA FROM RASPBERRY PI TO GAME

CREATE ARM AND RESOLVE COLLISIONS

INERTIAL MEASUREMENT UNITS (IMU)

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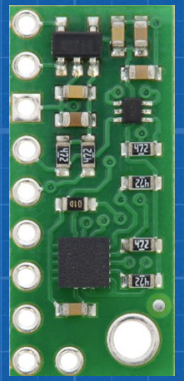

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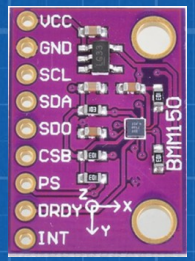

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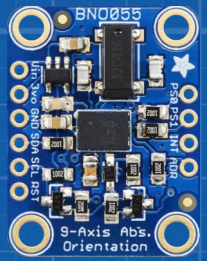
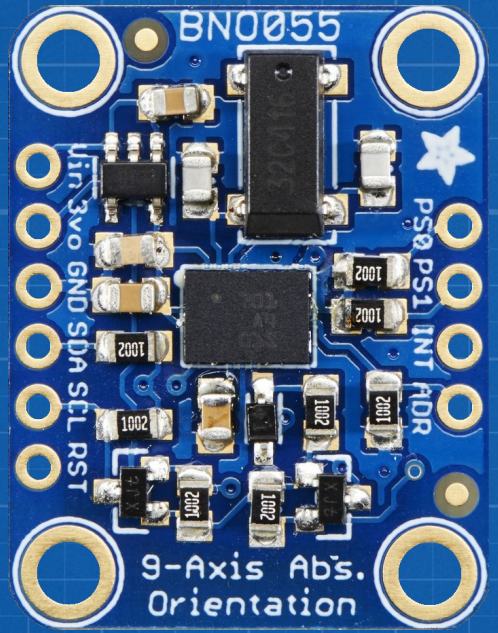


ACCELEROMETER GYROSCOPE MAGNETOMETER IMU

BNO055 IMU



- ABSOLUTE ORIENTATION (EULER/QUATERNION)
- ANGULAR VELOCITY VECTOR
- LINEAR ACCELERATION VECTOR
- MAGNETIC FIELD STRENGTH VECTOR
- SENSOR FUSION

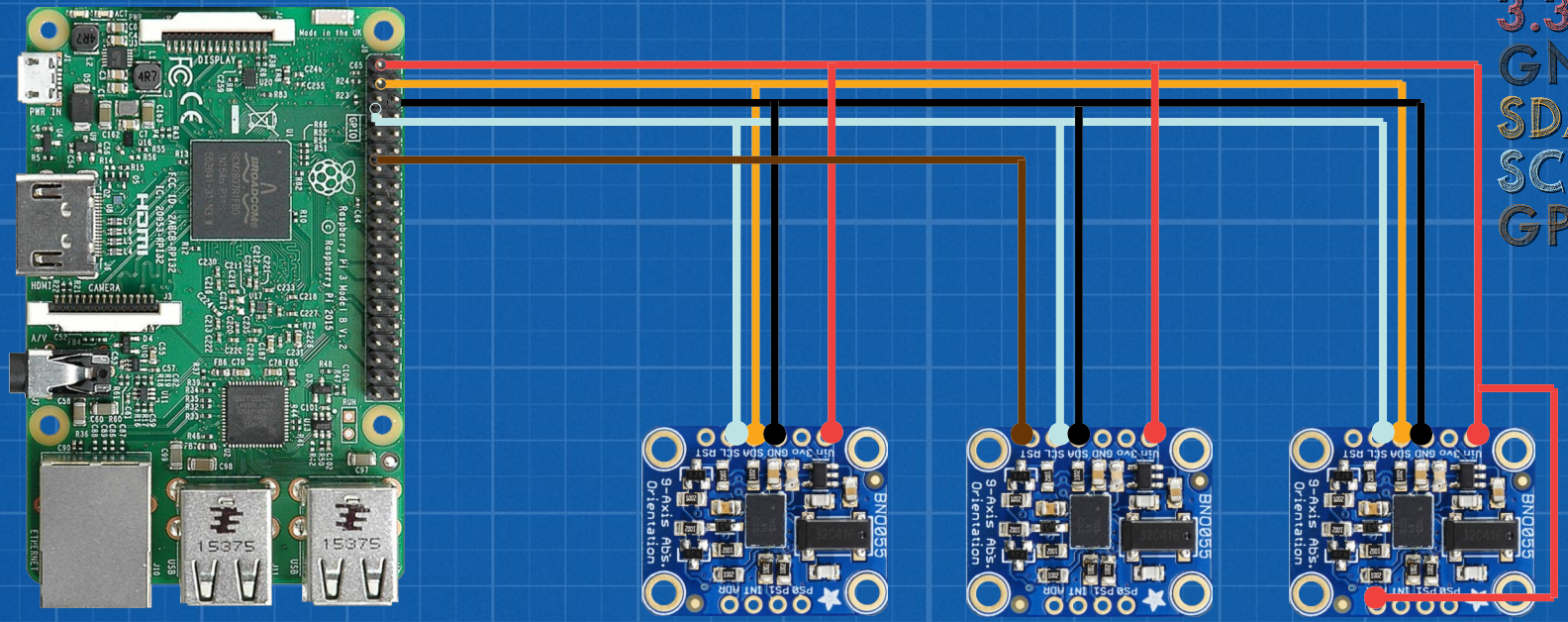
INTER-INTEGRATED CIRCUIT (I2C)

CONNECTION PROTOCOL

MULTIPLE SLAVES

USES ADDRESSES

I2C CONNECTION



RECEIVING DATA FROM BNO055

CALIBRATION

GYROSCOPE

STANDING STILL, IN ANY POSITION

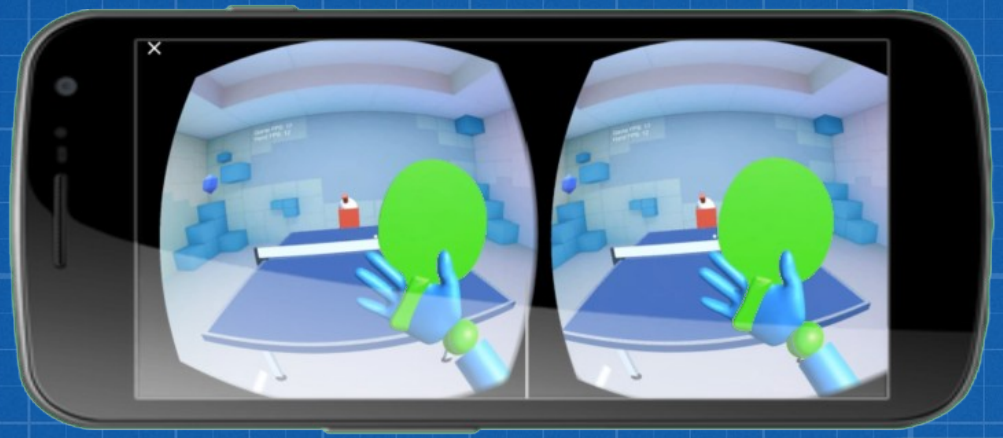
ACCELEROMETER

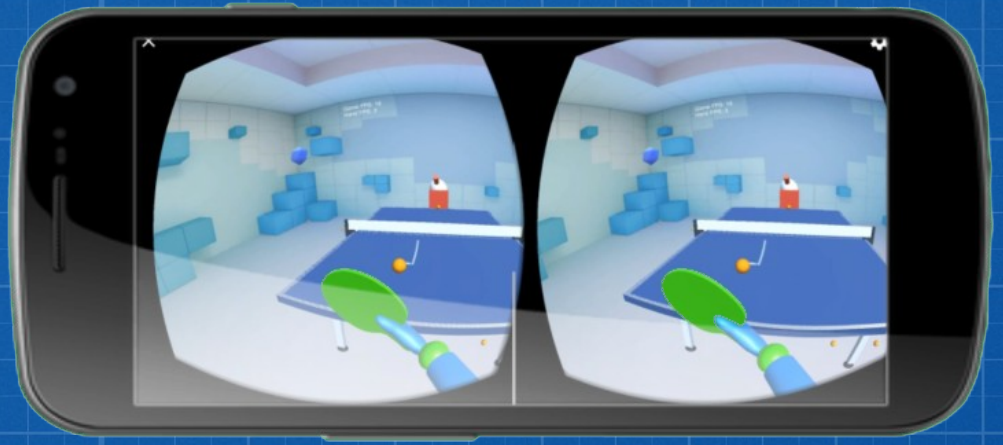
GET A CUBE, PUT IT ON ALL FACES

MAGNETOMETER

MOVE IT AROUND FOR A BIT

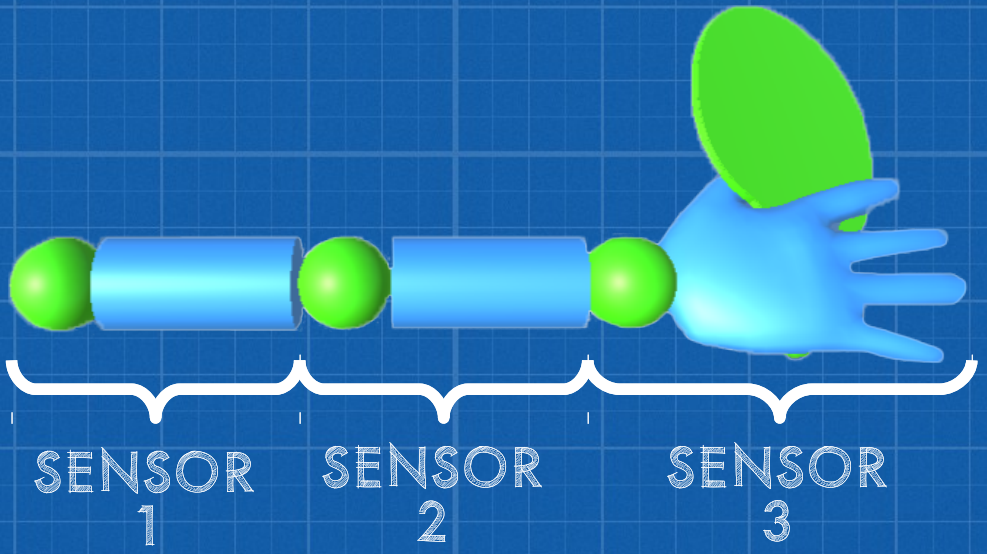
PING-PONG GAME





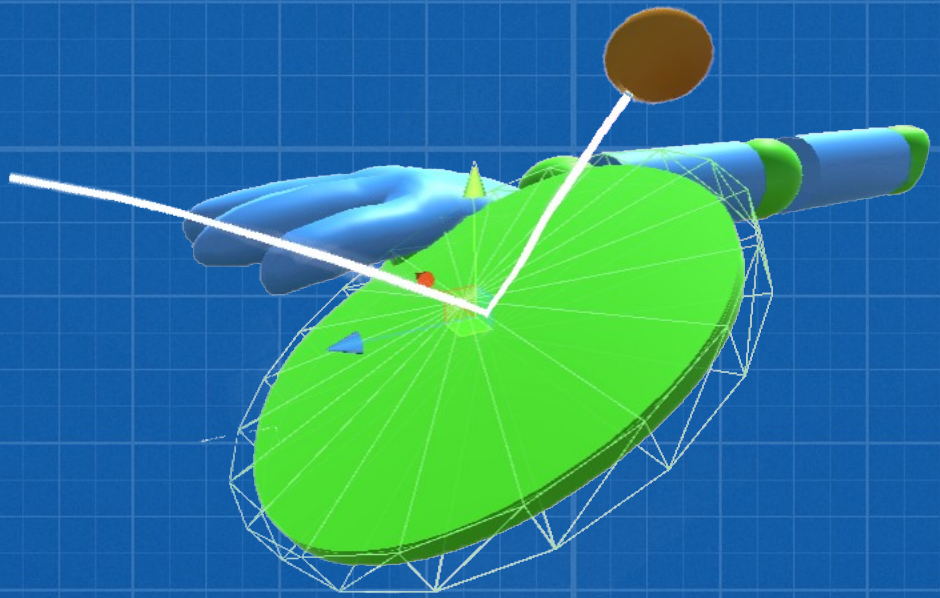
MAKING THE ARM

FORWARD KINEMATICS



COLLISION DETECTION

WRAPPER / FOLLOWER



RESULTS

GOOD ACCURACY

GOOD RANGE OF MOTIONS

AVERAGE SPEED

GOOD IMMERSION

CONCLUSIONS

CAN BE DONE

WORKS WELL

HAS POTENTIAL

QUESTIONS AND ANSWERS

THANK YOU