

Self-Balancing Dancing Segway

Kennard Mah

Access to video and pictures:

https://drive.google.com/drive/folders/li2_h7K0nHX6o55IKXWxxARlcaVrOX2x7?usp=sharing

Brief summary of files and content:

Challenge1.py	Utilise built-in microphone to develop a beat detection code <ul style="list-style-type: none">• Combine beat detection with loudness• Light up LEDs synchronised with music
Challenge2.py	Control speed and direction of motors using IMU <ul style="list-style-type: none">• Control speed and direction with potentiometer• Combine with ability to derive pitch and roll angles from IMU measurements• Display each motor on OLED display
Challenge3.py	Implement PID controller for speed of motors <ul style="list-style-type: none">• Demonstrate PID control algorithm is functioning• Apply pressure to increase friction (video)
Challenge4.py	Dancing Segway (w/o balancing) <ul style="list-style-type: none">• Attach stabilisers to Segway• Develop dancing code with combination of beat detection from Challenge1.py
Challenge4Moves.py	Dance choreography file
Challenge5.py	Self-balancing the Segway <ul style="list-style-type: none">• Implement a PID algorithm using the pitch angle as the set-point variable and control the motors to maintain the pitch angle to be zero (post-calibration)
Challenge5PID.py	PID controller for challenge 5
Challenge5Motor.py	Motor function for challenge 5
Challenges.pdf	<ul style="list-style-type: none">• Brief for each challenges and criteria

We use the following standard modules:

- boot.py
- drive.py
- font.py
- main.py
- mic.py
- motor.py
- mpu6050.py
- oled_938.py
- pybench.py
- user.py