Course Overview

Embedded devices can be used to control, monitor or assist in the operation of equipment, machinery or plant.

嵌入式系統設計概論與實作

嵌入式應用/產品

結合超音波、溫度、警示訊息，計算距離

應用: 倒車雷達

嵌入式應用/產品

內建慣性元件(加速度, 陀螺儀, 電子羅盤等)

應用: 智慧手環

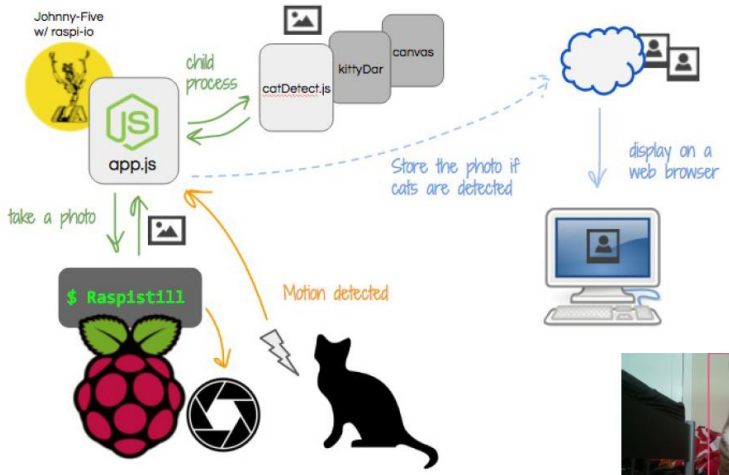
嵌入式應用/產品

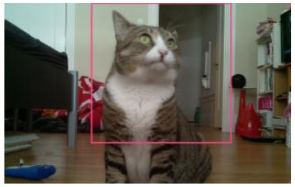
龍珠雷達

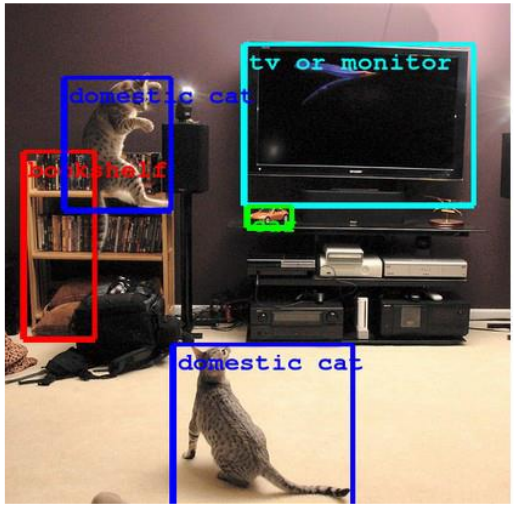
利用**方位感測器**與**三軸加速度**，
配合移動來接近光源。

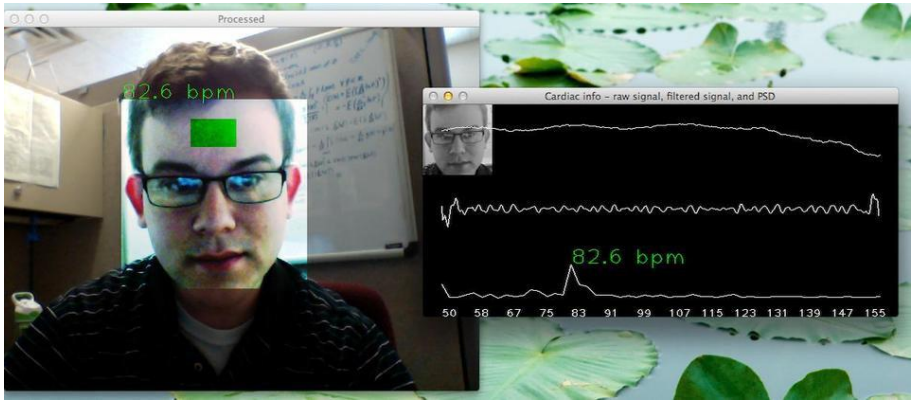
應用: 慣性元件

嵌入式應用/產品









應用: 網路攝影機 與 影像辨識

https://www.mobilegeeks.de/artikel/amazon-echo-apple-homepod-google-home-microsoft-invoke-vergleich/

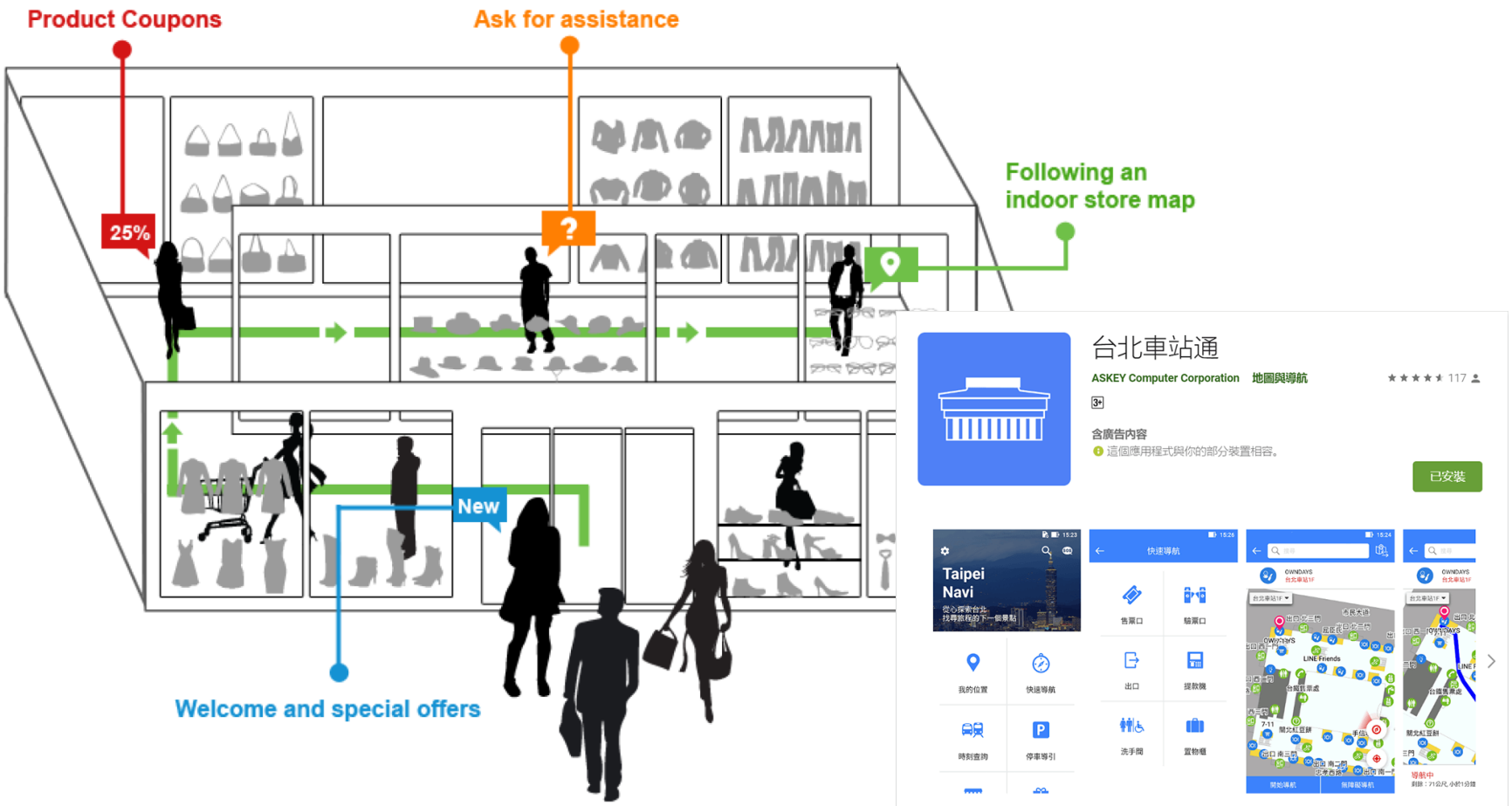
嵌入式應用/產品

語音識別、語言理解、對話...等

應用: 語音助理

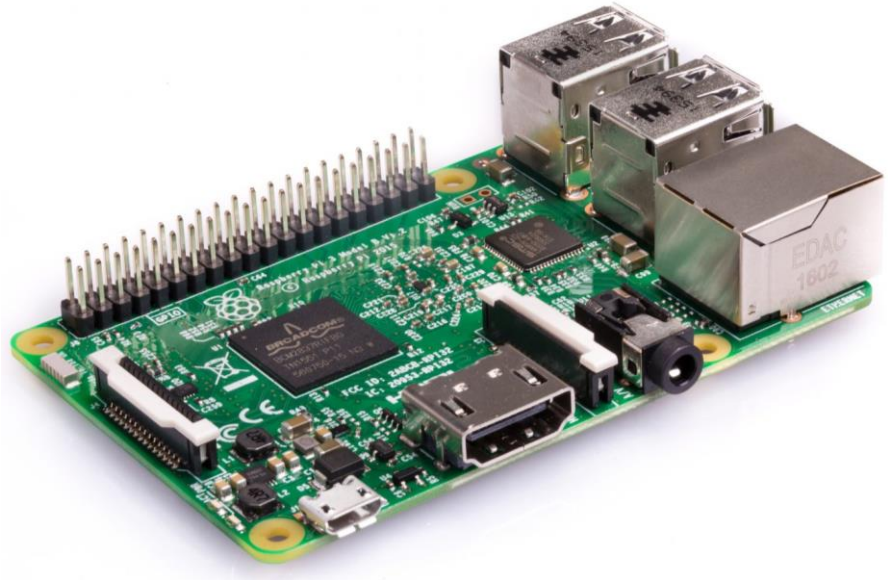
嵌入式應用/產品

藍牙BLE Beacon封包，夾帶廣告訊息

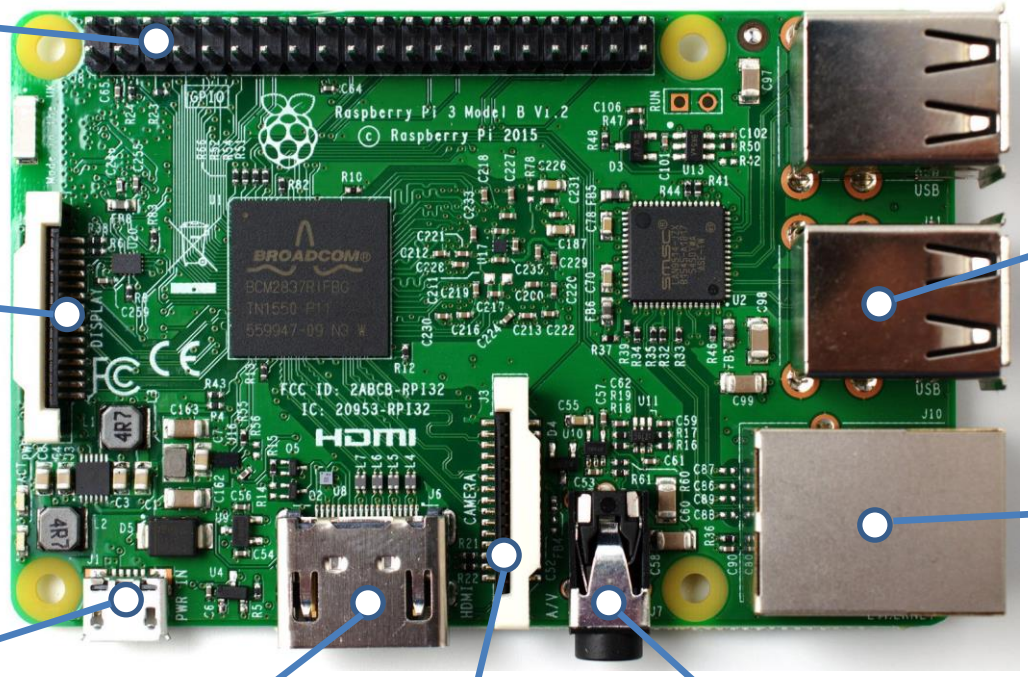


應用: 推播訊息、定位(Beacon)

Use Raspberry PI
to create an embedded application



Raspberry PI 硬體週邊



40 GPIO pins

Display interface

USB 2.0 *4

10M/100M
Ethernet port

Power supply

HDMI

Camera interface (CSI)

Combined 3.5mm audio jack
and composite video

Raspberry PI 3 Model B

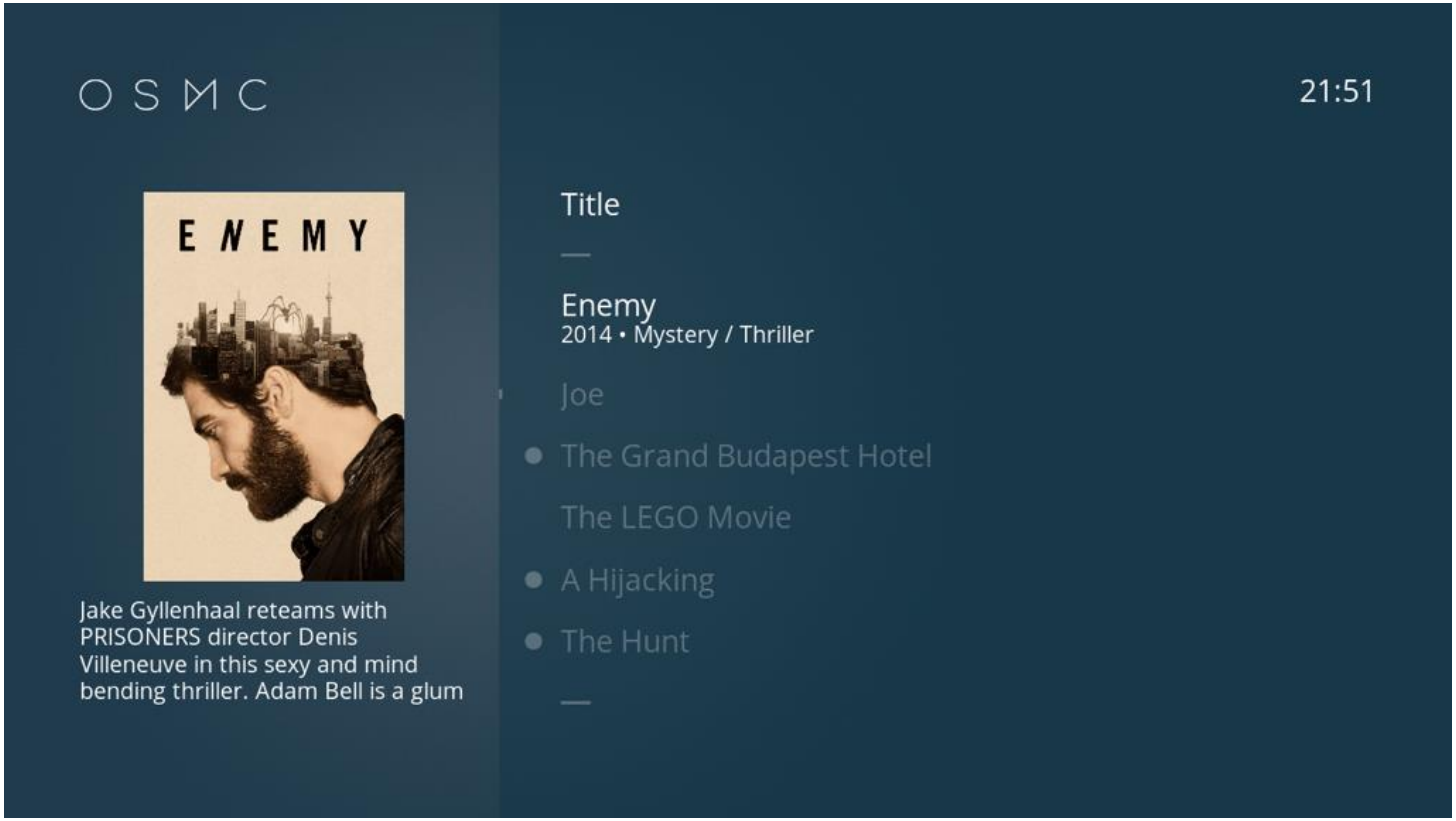
- Raspberry PI 3 model B:
  - 主要有以下功能:
    - 1.) SD 卡: 當成內建的硬碟使用，一般來說最少需要有4GB 的容量，建議用比較穩定的牌子，這樣可以確保讀取資料正常
    - 2.) HDMI 輸出顯示
    - 3.) USB 的輸入端口: 如滑鼠與鍵盤
    - 4.) RJ45網路線端口
    - 5.) Micro USB 電源端口: 僅供電, 無資料傳輸用途
    - 6.) 內建802.11n Wi-Fi 與 藍牙4.1

Raspberry Pi 可以用在?

- 桌機 (Raspbian, Ubuntu)
  - FTP, Web, NAS, AP, 自動化控制…等
- 多媒體影音作業系統
  - OSMC (Open-Source Media Center)
  - OpenELEC (Open Embedded Linux Entertainment Center)
- 遊戲機 (RetroPie、PiPlay)
- 網站滲透測試 (Kali Linux)
- IoT應用
  - 連接特定感測器，讀取數值進行分析
- 嵌入式應用
  - 前面提到的倒車雷達、智慧手環、網路攝影機、語音助理…等。

Raspberry Pi 可以用在?

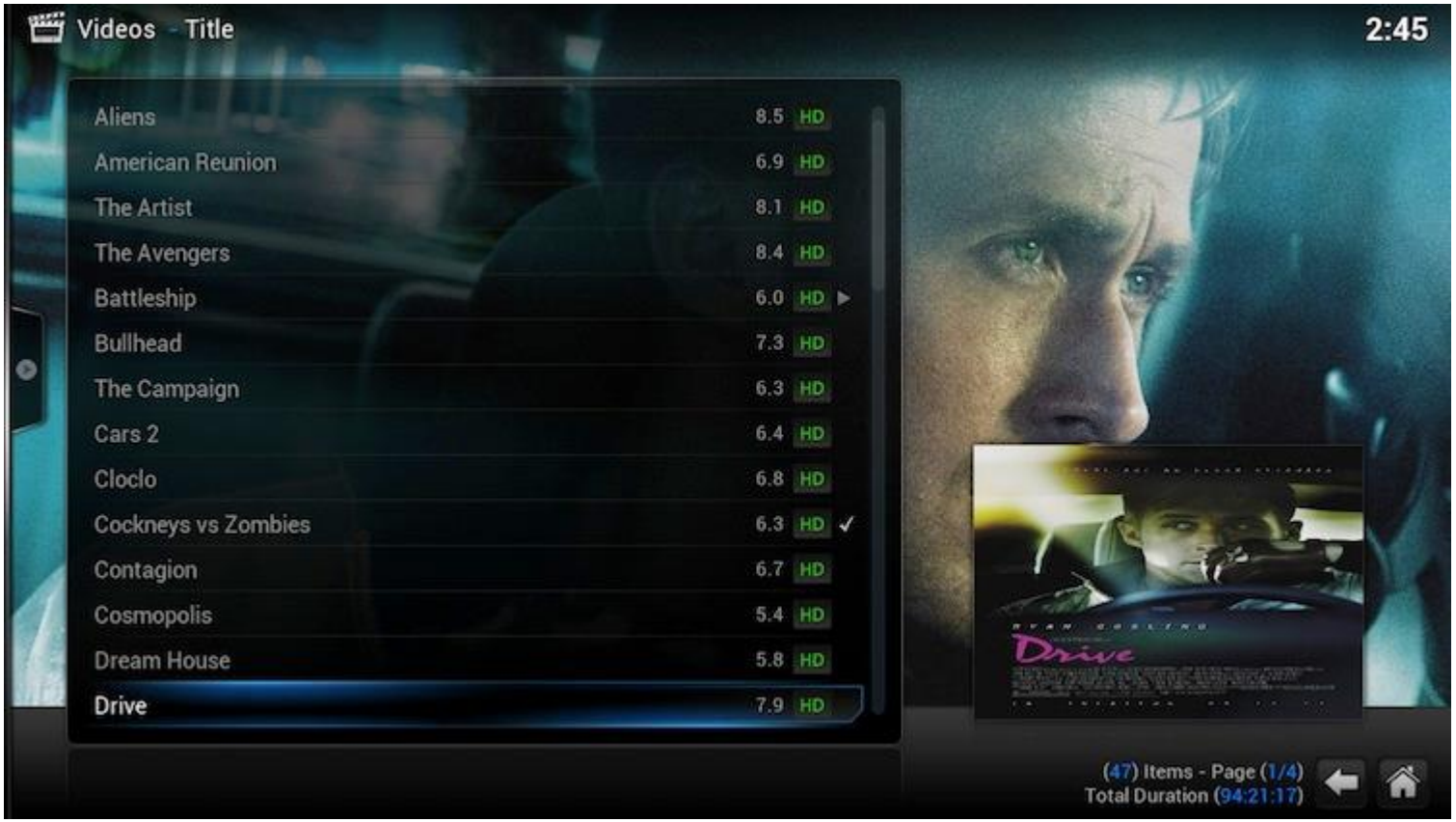
- OSMC



https://osmc.tv/download/

Raspberry Pi 可以用在?

- OpenELEC



http://openelec.tv/get-openelec

Raspberry Pi 可以用在?

- RetroPie

http://makezine.com/projects/build-retro-gaming-console-raspberry-pi/

Raspberry Pi 可以用在?

- PiPlay

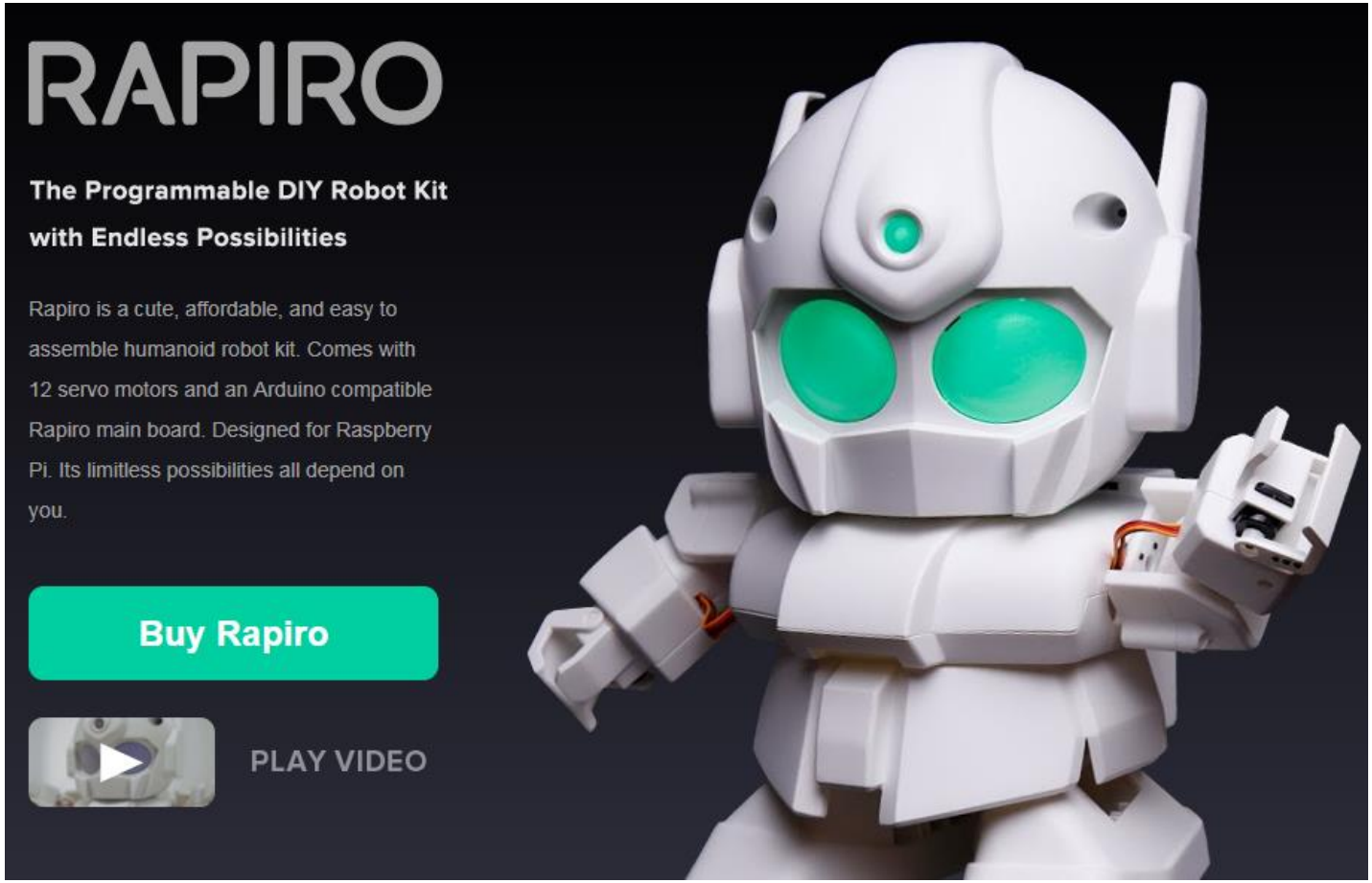
http://piplay.org/

Raspberry Pi 可以用在?

- Kali Linux

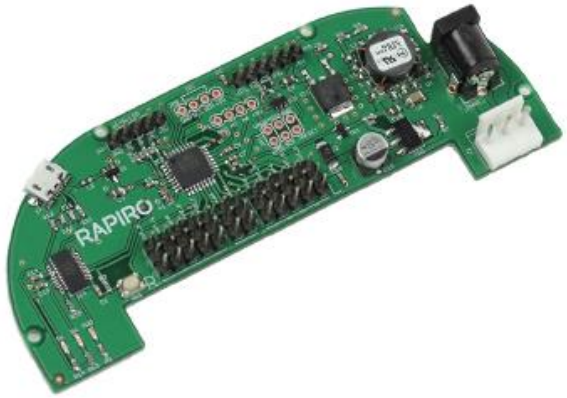
https://www.kali.org/

RAPIRO


RAPIRO
The Programmable DIY Robot Kit
with Endless Possibilities
Rapiro is a cute, affordable, and easy to assemble humanoid robot kit. Comes with 12 servo motors and an Arduino compatible Rapiro main board. Designed for Raspberry Pi. Its limitless possibilities all depend on you.
Buy Rapiro
PLAY VIDEO

RAPIRO

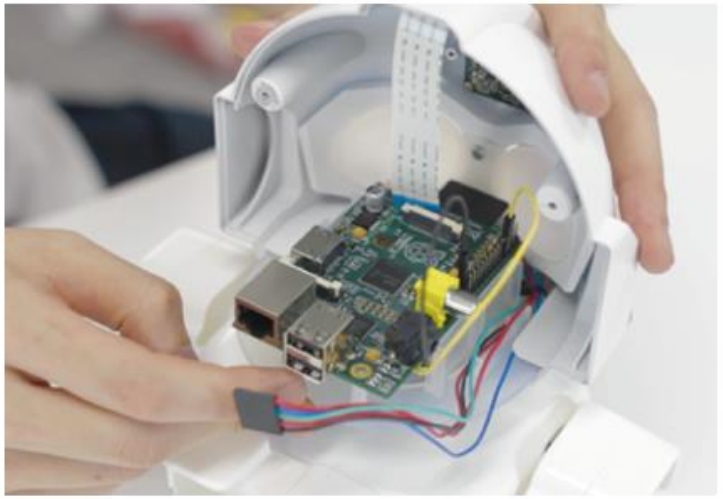
Arduino Compatible Controller



The Rapiro main board works like an Arduino board, and it can be reprogrammed using Arduino IDE. Rapiro is not only for those who have programming skills but also for beginners.

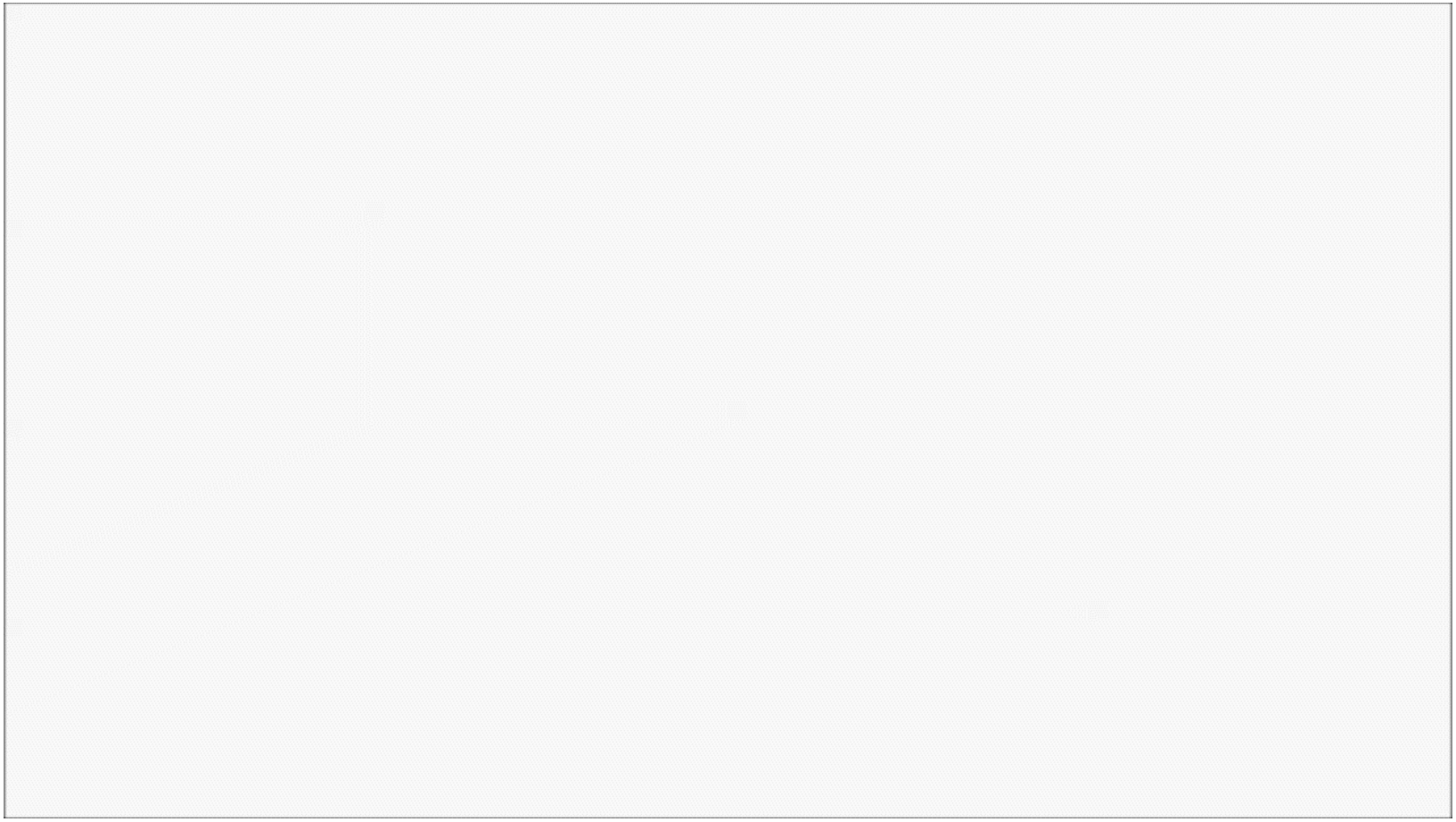
Arduino is a combination of an 8-bit AVR based microcontroller board and C++ like development environment (Arduino IDE).

You can install Raspberry Pi



If you want more functions, you could do it by installing a Raspberry Pi (sold seprately) inside Rapiro. Raspberry Pi can be programmed with a wide variety of programming languages for Linux. Depending on your programming, your Rapiro could give you message notifications with Wi-Fi enabled or could protect your home as a security robot using a camera module!

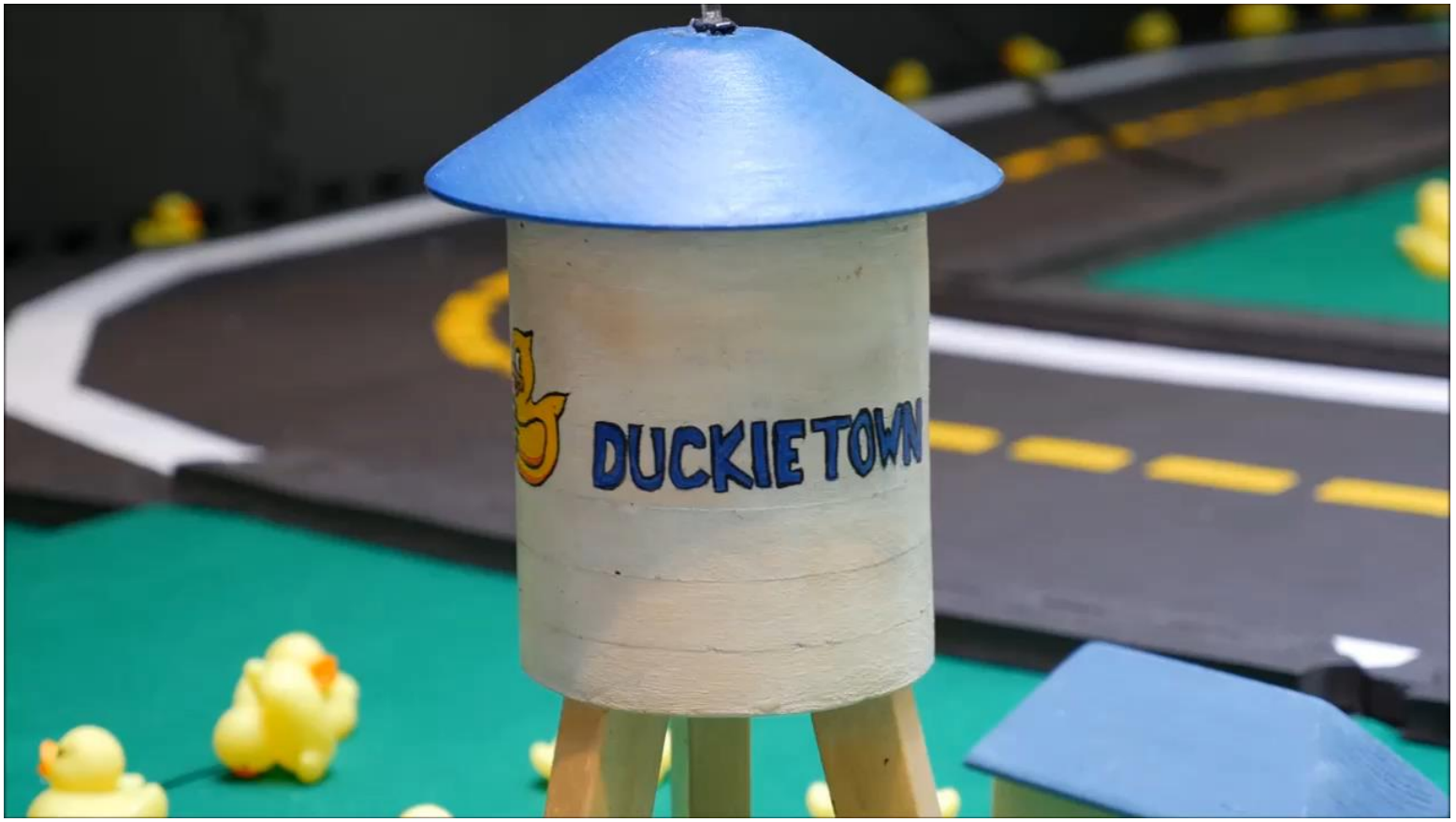
RAPIRO



https://www.youtube.com/watch?v=AQynsVZx5Pk

Duckietown (self-driving robot)

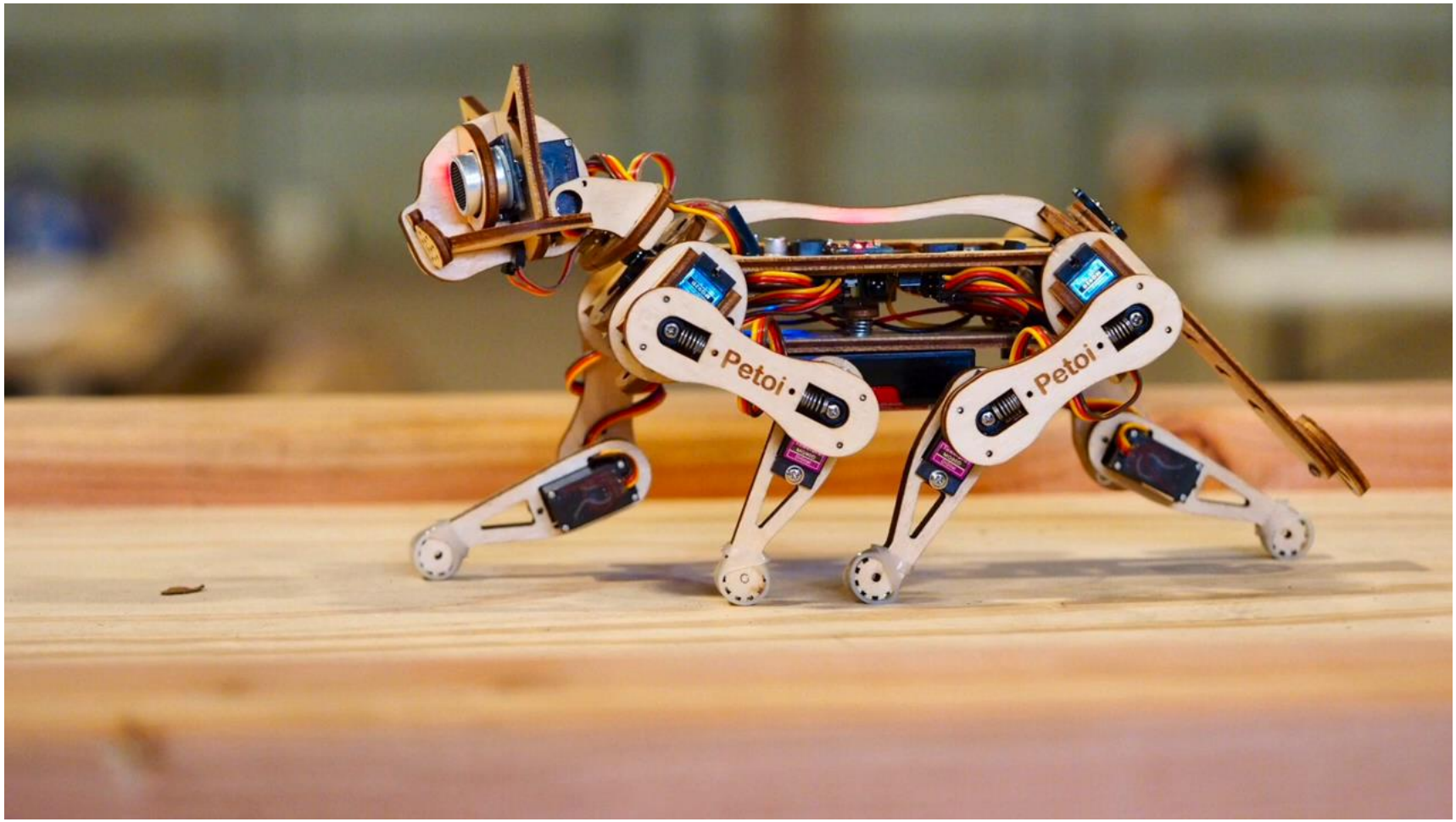
- An Open-Source MIT Class & Computer-Vision Self-Driving Robot for Raspberry Pi



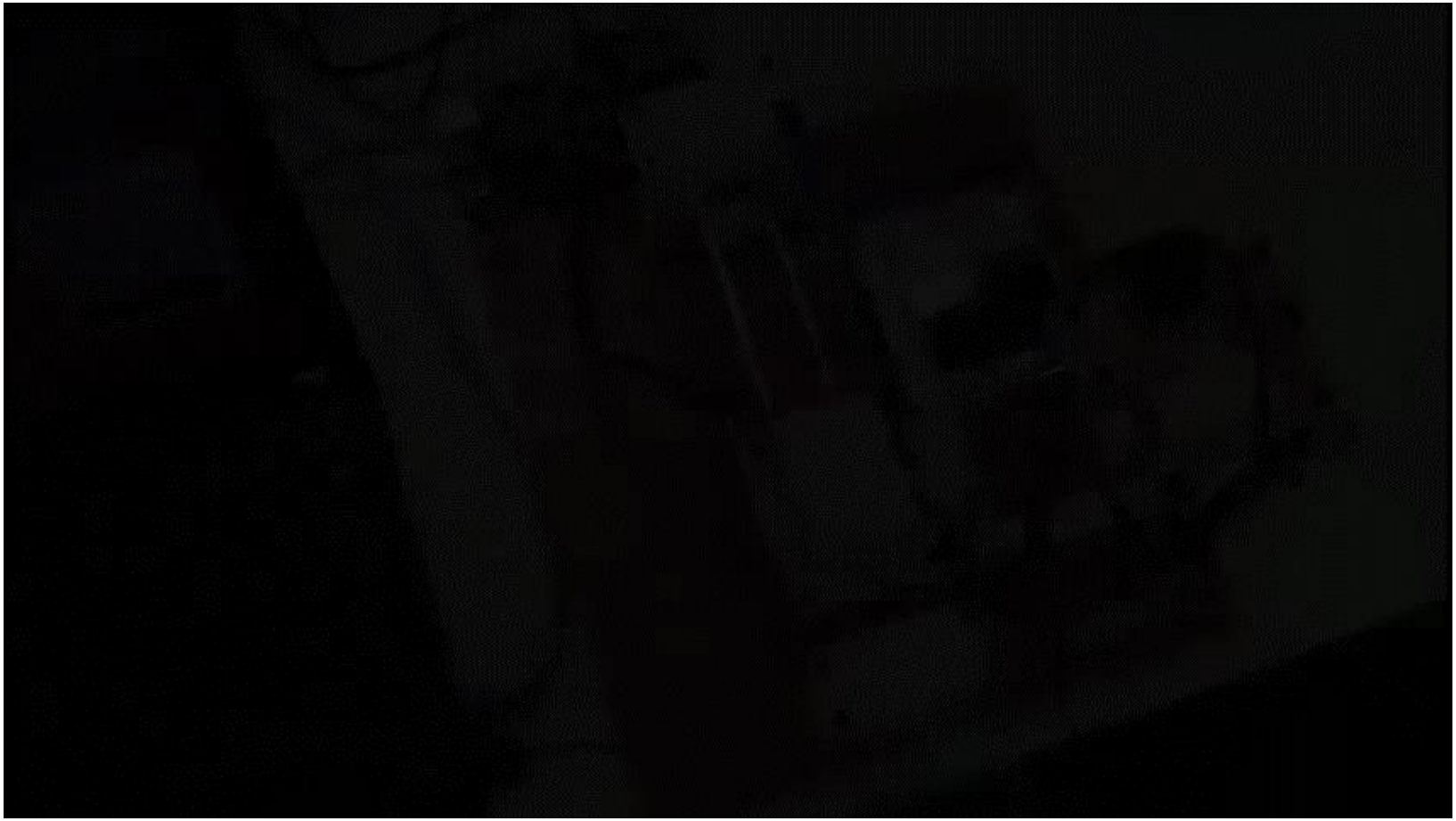
https://blog.adafruit.com/2016/05/25/duckietown-is-an-open-source-mit-class-computer-vision-self-driving-robot-for-raspberrypi/

Nybble (PI cat)

- https://www.youtube.com/watch?v=g7_ODr_3DTc



Puzzle and Dragon robot



http://www.nicovideo.jp/watch/sm28160788