RASPBERRY PI MINI WORKSHOP
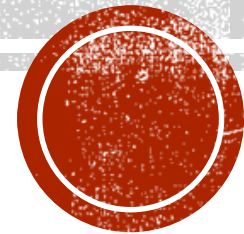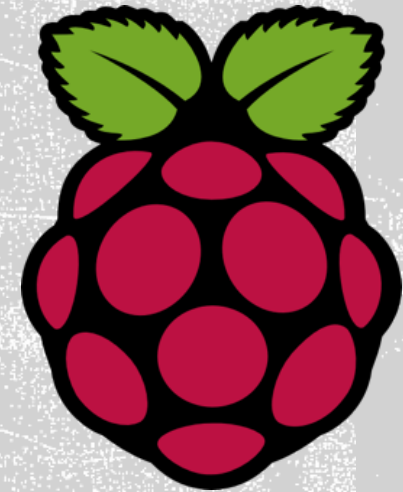
Dr. Roozbeh Rajabi

Qom University of Technology

15 October 2019

www.roozbehrajabi.net

CONTENTS

- Raspberry PI
- Specification
- Prerequisites
- Demo Projects

RASPBERRY PI: INTRODUCTION

- RASPBERRY PI FOUNDATION

- UK REGISTERED CHARITY 1129409

- works to put the power of computing and digital making into the hands of people all over the world

RASPBERRY PI: INTRODUCTION

- Types: Raspberry PI 3 Model B

RASPBERRY PI: INTRODUCTION

- Other Types: Raspberry PI Zero W

RASPBERRY PI: INTRODUCTION

- **Types: Raspberry PI 3 Model B: Specification**
- Quad Core 1.2GHz Broadcom BCM2837 64bit CPU
- 1GB RAM
- BCM43438 wireless LAN and Bluetooth Low Energy (BLE) on board
- 100 Base Ethernet
- 40-pin extended GPIO
- 4 USB 2 ports
- 4 Pole stereo output and composite video port
- Full size HDMI
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- Micro SD port for loading your operating system and storing data
- Upgraded switched Micro USB power source up to 2.5A

RASPBERRY PI: PREREQUISITES

- Operating System:
  - NOOBS
  - RASPBIAN

- Programming Language:
  - Python

- Hardware:
  - Raspberry PI Board
  - Micro USB Power (5 V, 2.1 A)
  - SD RAM
  - Mouse & Keyboard
  - HDMI Display
  - OR
  - LAN Cable & PC or LAPTOP

RASPBERRY PI: DEMO PROJECT

- Blinking LED using GPIO
  - Bread Board
  - LED

Raspberry Pi Model A and B physical pin numbers
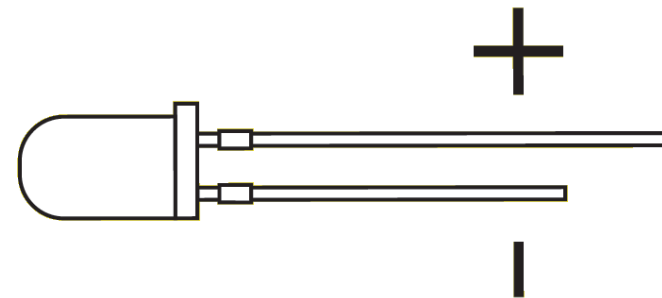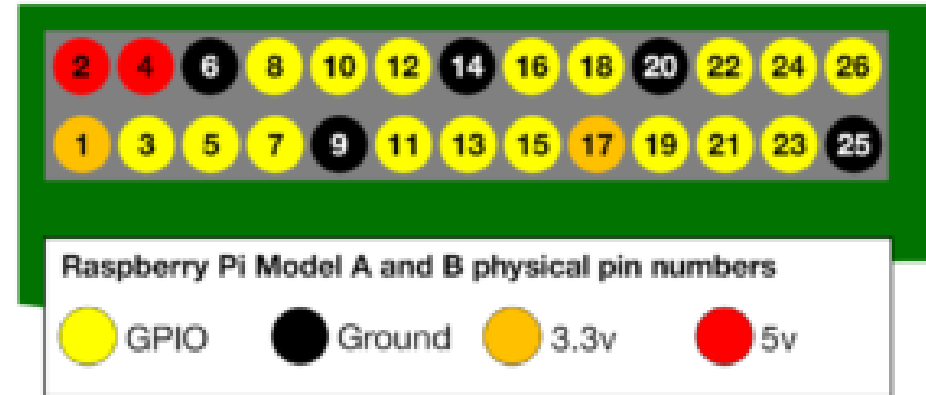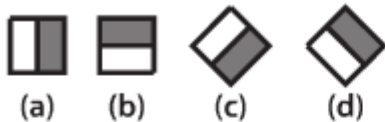
RASPBERRY PI: DEMO PROJECT

- Using Raspberry PI Camera
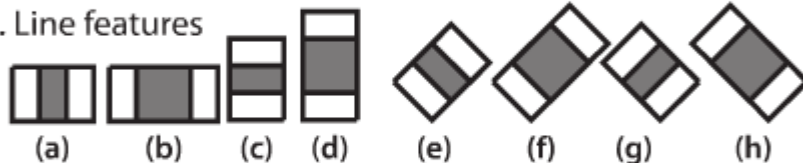 - Raspberry PI Camera

RASPBERRY PI: DEMO PROJECT

- Face Detection
  - Machine Learning
  - AI

- OpenCV Library
  - Classifier
  - Haar Cascade Classifiers

1. Edge features

(a) (b) (c) (d)

2. Line features

(a) (b) (c) (d) (e) (f) (g) (h)

3. Center-surround features

(a) (b)

Image subregion → f_1 → Not Face
Face ↓
f_2 → Not Face
Face ↓
f_3 → Not Face
⋮
f_N → Not Face
Face ↓
Face

Not Face