

Hardware Devices for IM

CODING TOOLS CONTINUED

JAVASCRIPT

QUIRKY BEGINNINGS

CONSISTENT DEVELOPMENT THANKS TO WEB

POWERFUL LANGUAGE

VERSATILITY: LARGE NUMBER OF LIBRARIES,

PLATFORMS AND IMPLEMENTATIONS

SERVED ONLINE WITH CLIENT-BASED EXECUTION

RELATIVELY EASY TO LEARN

LOTS OF LEARNING RESOURCES

TRADE-OFFS

SPEED RELIES ON THE HOST BROWSER + HOST COMPUTER

FINDING GOOD LEARNING RESOURCES AND EXAMPLES

SYNTACTIC AND CONCEPTUAL QUIRKS

ONLINE TOOLS
(CLOUD COMPUTING SERVICES)
FOR EXPLORING MACHINE LEARNING TECHNIQUES

ML5.JS (LIBRARY)

BUILT ON TENSORFLOW.JS LIBRARY

PART OF PROCESSING AND P5.JS INITIATIVE

INTEGRATES WELL WITH P5.JS

SHIFFMAN'S VIDEO INTRO

(A BEGINNER'S GUIDE TO MACHINE LEARNING WITH ML5.JS)

OPEN SOURCE

RUNWAYML (CLOUD COMPUTING SERVICE)

INTEGRATION PROJECTS WITH CODING TOOLS TO GET STARTED:

JS, P5.JS, PROCESSING, OF, PURE DATA, MAX/MSP, TOUCHDESIGNER

SHIFFMAN'S VIDEO INTRO

(INTRODUCTION TO RUNWAY: MACHINE LEARNING FOR CREATORS)

COMMERCIAL BUT CAN BE USED FOR FREE

TEXT EDITORS AND IDE/PDE

SUBLIME TEXT 3

FAST

RELIABLE/STABLE

HIGH FUNCTIONALITY AND CUSTOMIZATION THROUGH PACKAGES

LARGE USER AND DEVELOPER COMMUNITY

PROPRIETARY, BUT CAN BE USED FOR FREE

ALTERNATIVES: ATOM, BRACKETS, NOTEPAD++

JUPYTER

LANGUAGE-AGNOSTIC NOTEBOOK SYSTEM

GOOD FOR SKETCHING AND LEARNING PYTHON AND SEVERAL OTHER PL

CODE::BLOCKS

C, C++ AND FORTRAN IDE

WITH MINGW COMPILER

Hardware Devices for IM

COMBINED WITH CODING TOOLS
ESSENTIAL FOR IM DESIGN

- **EXTEND INTERACTIVE INPUTS AND OUTPUTS OF FIXED COMPUTER SYSTEMS**
 - **HIGHLY CUSTOMIZABLE**
 - **RELATIVELY INEXPENSIVE AND EASY TO DEPLOY**
 - **LESS POWER DEMANDING THAN COMPUTER SYSTEMS**
 - **MOST REQUIRE UNDERSTANDING OF ELECTRONICS AND PHYSICS**
- **CONTROLLED PROGRAMMATICALLY SO REQUIRE PROCEDURAL FLUENCY**

TYPES

- HARDWARE I/O TRACKING DEVICES
- PHYSICAL COMPUTING KITS (MAKER CULTURE)
- SINGLE-BOARD, MICROCONTROLLERS AND SYSTEMS ON A CHIP

HARDWARE I/O TRACKING DEVICES

LEAP MOTION, NOW ULTRALEAP

HAND AND FINGER MOTION

2 IR CAMERAS + 3 IR LEDS, UP TO 1M, 200FPS

OK DEVELOPER COMMUNITY

INTEGRATES WITH UNITY VIA OCULUS RIFT (LEAP MOTION / DEVELOPERS)

GOOD FOR EXPERIMENTING WITH IM

PROPRIETARY (CORE CODE IS BLACK BOX)

CAN BE UNRELIABLE

KINECT (SINCE 2010, SEVERAL VERSIONS)

RGB CAMERAS, IR PROJECTORS AND DETECTORS

STRUCTURED LIGHT OR TIME OF FLIGHT CALCS

MICROPHONE ARRAY

REAL-TIME GESTURE AND SPEECH RECOGNITION AND

BODY SKELETAL DETECTION FOR UP TO FOUR PEOPLE

DEPTH RESOLUTION AND RANGE 1.5MM AT 50CM, APP. 5CM AT 5M, 9 TO 30HZ

KINECT AZURE (2019)

12 MP RGB CAM, 1 MP DEPTH CAM, ORIENTATIONS SENSOR

360-DEGREE SEVEN-MICROPHONE ARRAY

INTEL REALSENSE

FAMILY OF DEPTH AND MOTION DETECTION CAMERAS

VARIOUS TECHNOLOGIES, PRIMARILY STEREO IR

HIGHER RESOLUTION, CALIBRATION

OUTDOOR USE

UP TO 90FPS, UP TO 10M

LIBRARIES FOR CODING ENVIRONMENTS RELATIVELY SCARCE

PHYSICAL COMPUTING PLATFORMS

ARDUINO FAMILY

VERSATILITY, MANY ADD ON BOARDS

EASE OF USE

GOOD LEARNING RESOURCES

OFTEN OVERPRICED

CHINESE AND INDIAN ALTERNATIVES

SINGLE-BOARD, MICROCONTROLLERS AND SOCS

RASPBERRY PI

SEVERAL MODELS

CHEAP

LOTS OF RESOURCES AND PROJECTS

HACKABLE

CHEAPER/MORE POWERFUL ALTERNATIVES

INTEL EUCLID

STANDALONE COMPUTER WITH UBUNTU AND ROS

RS ZR 300 DEPTH CAM

MANY SENSORS:

GPS, PROXIMITY, INERTIAL (ACCELEROMETER), BAROMETRIC,

SEVERAL MICS

WIFI, BLUETOOTH

POWERFUL BUT EXPENSIVE (399USD)

DIFFERENT USAGE SCOPE THAN PI

IM HARDWARE DEVICES USAGE SCOPES

LEARNING IM

DEVELOPING IM PROJECTS

INTRO TO ROBOTICS

TRADE-OFFS (OF MAKER CULTURE)

CAN BE DIFFICULT TO NAVIGATE AND COSTLY IN TIME AND MONEY

GOOD USAGE SCENARIOS REQUIRE BROADER OVERVIEW

COMMERCIALY DRIVEN = CYNICAL IN DEVELOPED COUNTRIES

GENDER BIASED TO MALES IN MANY CULTURES

LEARNING RESOURCES

ONLINE AND BOOK MANUALS FOR INTERACTIVE MEDIA PROJECTS

MAKER BOOKS, VARIOUS APPLICATIONS

SOME INCLUDED IN CLASS NOTES

