

# 15-494/694: Cognitive Robotics

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Lecture 10: OpenCV

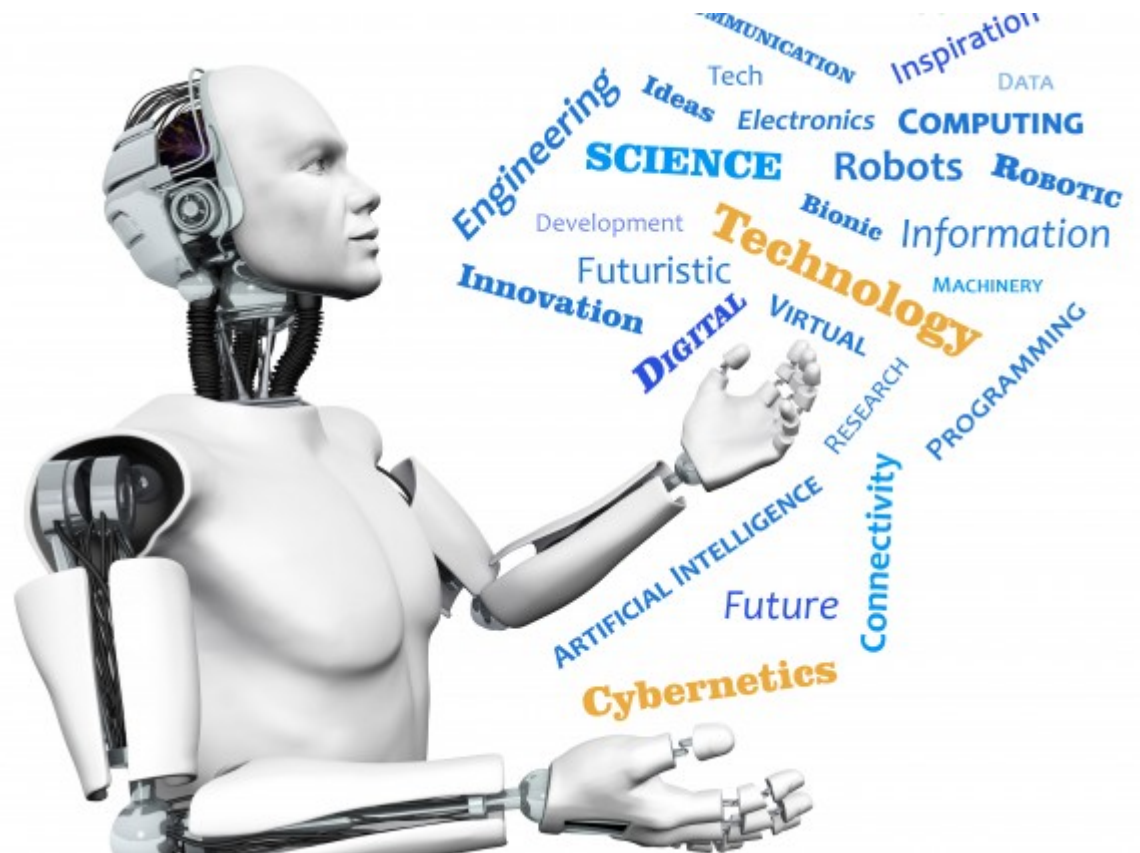
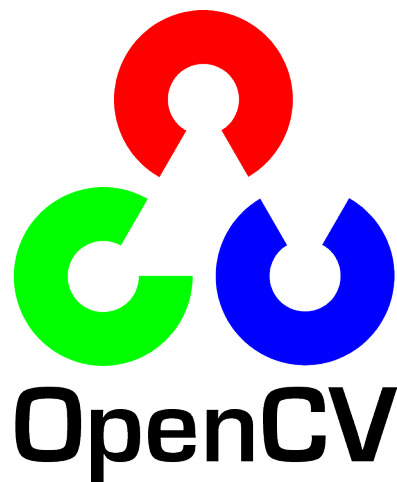


Image from <http://www.futuristgerd.com/2015/09/10>

# OpenCV

- Open source real-time computer vision library.
- Originally developed by Intel.
- Written in C++ and C.
- Includes support for GPU processing.



# Online Documentation

- Current version is OpenCV 4.5.1
- Documentation is at:  
<https://docs.opencv.org/4.5.1>
- OpenCV-Python tutorials linked from OpenCV.org.
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- Note: OpenCV images use BGR byte order instead of the conventional RGB.

# OpenCV in Python

- Python bindings allow you to call OpenCV library routines.
- Data is passed as numpy arrays.
- The OpenCV module is called “cv2”.
- cozmo-tools uses OpenCV to detect ArUco markers.

# CircleWatcher demo

- Built on StateMachineProgram.
- `user_image` method processes each camera frame.
- `user_annotate` method displays results in the camera viewer.

# Demos in cozmo-tools/examples

- CV\_Canny - Canny edge detector
- CV\_Contour - Find intensity contours
- CV\_GoodFeatures - Find interest points
- CV\_OpticalFlow - Track interest points
- CV\_Hough - Find lines