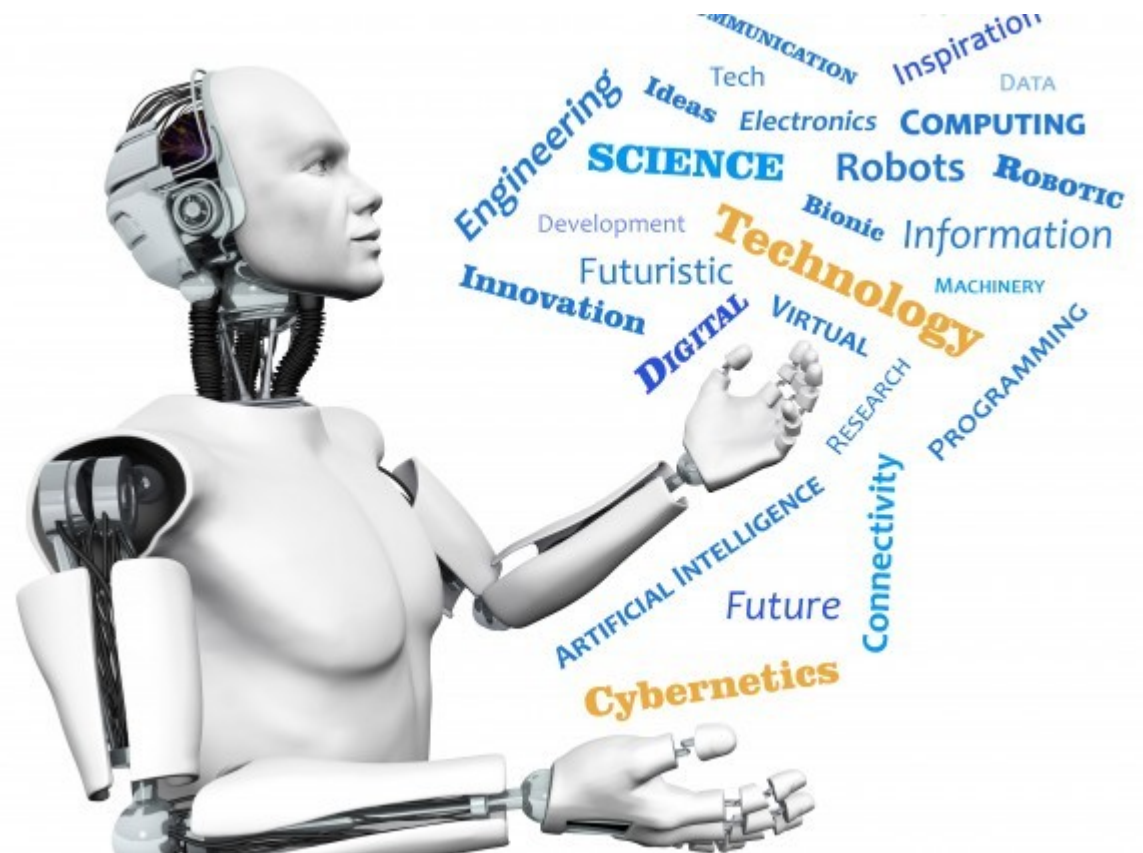


# 15-494/694: Cognitive Robotics

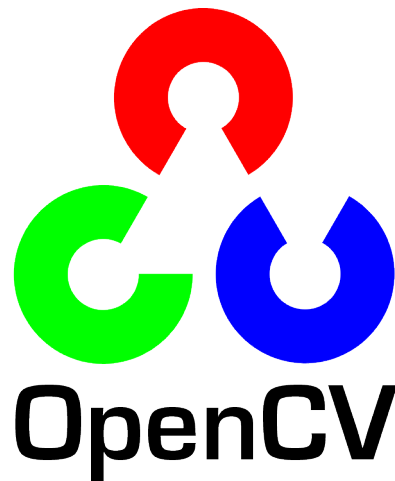
Dave Touretzky

Lecture 10: OpenCV



# 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 3.4.0
- Documentation is at:
  - <https://docs.opencv.org/3.4.0>
- OpenCV-Python tutorials linked from OpenCV.org.
- 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
- CV\_Contour
- CV\_GoodFeatures
- CV\_OpticalFlow
- CV\_Hough