

# A Crash Course on SimpleCV

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# Overview

Quick Start!

What is SimpleCV?

What makes up SimpleCV?

SimpleCV

Getting Started

Second Section

# Get Started!

There are a lot of dependencies for SimpleCV and it is a bit tough for beginners. We've brought disks that are ready to go!

- ▶ Windows / Linux
  - ▶ Boot from USB drive.
  - ▶ Alternatively install VirtualBox and the image.
  - ▶ <https://www.virtualbox.org/>
- ▶ Macs
  - ▶ Newer macs are persnikety about booting from a USB drive.
  - ▶ Install virtual box and the ISO and go to town.
- ▶ When you get home install from SuperPack or preferably source libs.
  - ▶ take awhile and is not a perfect science.
  - ▶ <https://github.com/ingenuitas/SimpleCV>
  - ▶ If you want to contribute this is a great place to start.

# About the tutorial

- ▶ It will be a lot of live coding. I'll lead, you follow along.
- ▶ If you have a question feel free to interrupt.
- ▶ If you are having an issue raise a flag. Anthony will help you.

# What Makes Up SimpleCV?



# SimpleCV != OpenCV



- ▶ OpenCV is really busy, we help by wrapping python.
- ▶ We add lots of other fun stuff (OCR, Barcodes, etc.)
- ▶ We are not competing, we are complementing.
- ▶ Purposes are different. Python is great for prototyping. C++ great for embedded.

# Core Dependencies

- ▶ OpenCV Python Bindings
- ▶ Numpy
- ▶ SciPy
- ▶ SciKits Learn and Orange
- ▶ PyGame (this is going away)
- ▶ Python Imaging Library (PIL)
- ▶ ipython
- ▶ PIL (Python Imaging Library)

# Optional Dependencies

- ▶ Barcodes- Zebra Crossing ZXing
- ▶ Optical Character Recognition (OCR) - Tesseract
- ▶ Beautiful Soup
- ▶ Kinect Support - freenect
- ▶ Unit Tests - nose
- ▶ Web Stuff - flask / CherryPy
- ▶ Arduino - pyfirmata
- ▶ Many Many Many more.



This is why we put everything in a superpack / virtual box / bootable drive

- ▶ Just get to the core library functions.
- ▶ We encourage you to install the full library when you get home.
- ▶ Help is available if you need it.

## Getting Help after the tutorial.



- ▶ Primary Source: <http://help.simplecv.org/questions/>
- ▶ Documentation <http://www.simplecv.org/docs/>
- ▶ Tweet at us: @Simple\_CV
- ▶ Another Good Resource:  
<http://www.reddit.com/r/ComputerVision>

## On the Printed Page

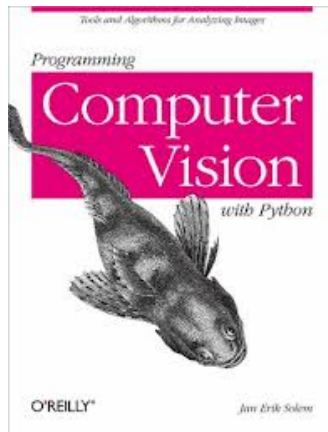
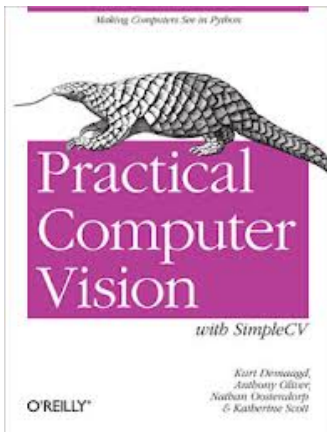


Figure: Two books about using Python for Computer Vision

## So why are we doing this?

- ▶ We are really nice people who believe in Python and Open Source.
- ▶ We are trying to disrupt industrial quality control systems.



## What makes up SimpleCV?

## Early Prototypes

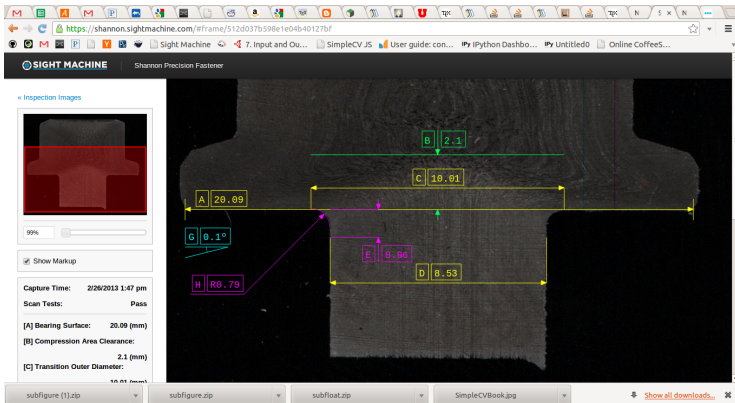


Figure: Early Customer - Industrial Fastener Morphology and Metallurgy

# Early Prototypes

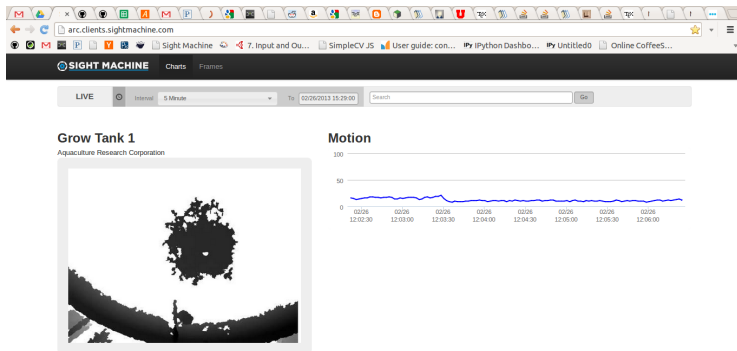
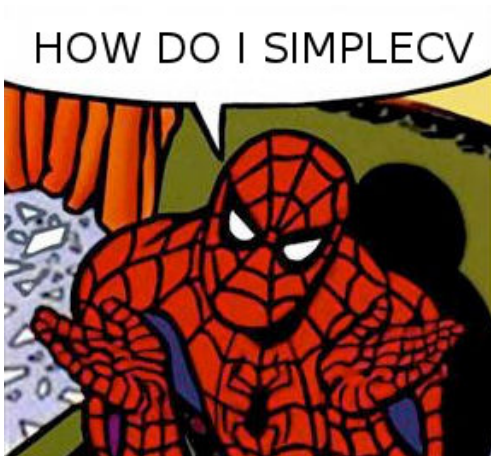


Figure: Early Customer - Aquaponics Research Facility

# How do I SimpleCV?



# Where do I write my code?

So how do I SimpleCV?

- ▶ In a python file, just like any other library.
- ▶ In a command line REPL like iPython.
- ▶ In the browser using iPython Notebooks (we'll use this today).

We really like iPython. It is kinda like using Matlab without the \$ 5000 per seat license cost.



## How does fit into a work flow?

At SightMachine we roughly use these three tools for different parts of our workflow.

Tool	Uses
iPython REPL	Prototypes, Sanity Checks, Etc
iPython Web Notebook	Testing and Development
Python Files	Deployment Code

Table: SimpleCV Workflow

# SimpleCV Hello World as a Script

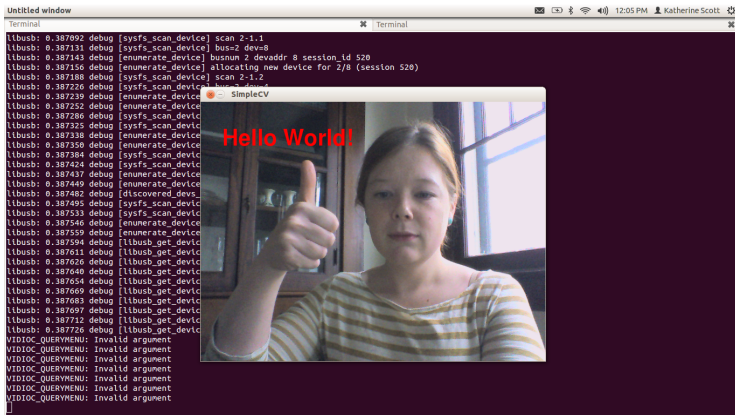
## Example (HelloWorld.py)

```
1  from SimpleCV import Image, Display, Color, Camera
2  cam = Camera(0) #Get the first camera
3  disp = Display((640,480)) # Create a 640x480 Display
4  while( disp.isNotDone() ):
5      img = cam.getImage() # get an image
6      # write text at 40,40 font_size 60pts, color is red
7      img.drawText("Hello World!",40,40,
8                  fontsize=60,color=Color.RED )
9      img.save(disp) # show it
10
```

## Getting Started

# How do I run Hello World?

- ▶ Run the py file with *python HelloWorld.py* in the command.
- ▶ Close it by pressing *esc* or *ctrl - c*



# Let's repeat it in SimpleCV iPython REPL

## Example (In the SimpleCV shell)

```
SimpleCV:1> img = Image('lenna')
SimpleCV:2> img.show()
SimpleCV:2: <SimpleCV.Display Object resolution:((512, 512)),
           Image Resolution: (512, 512)
           at memory location: (0x594a5f0)>
SimpleCV:3>
```

## Paragraphs of Text

Sed iaculis dapibus gravida. Morbi sed tortor erat, nec interdum arcu. Sed id lorem lectus. Quisque viverra augue id sem ornare non aliquam nibh tristique. Aenean in ligula nisl. Nulla sed tellus ipsum. Donec vestibulum ligula non lorem vulputate fermentum accumsan neque mollis.

Sed diam enim, sagittis nec condimentum sit amet, ullamcorper sit amet libero. Aliquam vel dui orci, a porta odio. Nullam id suscipit ipsum. Aenean lobortis commodo sem, ut commodo leo gravida vitae. Pellentesque vehicula ante iaculis arcu pretium rutrum eget sit amet purus. Integer ornare nulla quis neque ultrices lobortis. Vestibulum ultrices tincidunt libero, quis commodo erat ullamcorper id.

# Bullet Points

- ▶ Lorem ipsum dolor sit amet, consectetur adipiscing elit
- ▶ Aliquam blandit faucibus nisi, sit amet dapibus enim tempus eu
- ▶ Nulla commodo, erat quis gravida posuere, elit lacus lobortis est, quis porttitor odio mauris at libero
- ▶ Nam cursus est eget velit posuere pellentesque
- ▶ Vestibulum faucibus velit a augue condimentum quis convallis nulla gravida

# Multiple Columns

## Heading

1. Statement
2. Explanation
3. Example

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer lectus nisl, ultricies in feugiat rutrum, porttitor sit amet augue. Aliquam ut tortor mauris. Sed volutpat ante purus, quis accumsan dolor.

# Table

Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table: Table caption



# Theorem

Theorem (Mass–energy equivalence)

$$E = mc^2$$

# Verbatim

## Example (Theorem Slide Code)

```
def doStuff(a,b,c=[1,2,3]):  
    a = 5  
    b = a  
    c.reverse()  
  
derp = [1,2,3,4]  
for i in derp:  
    doStuff()  
    pass  
print derp
```

# Verbatim

Example (Theorem Slide Code)

$$E = mc^2$$

# Figure

Uncomment the code on this slide to include your own image from the same directory as the template .TeX file.

# Citation

An example of the `\cite` command to cite within the presentation:

This statement requires citation [Smith, 2012].

# References



John Smith (2012)

Title of the publication

*Journal Name* 12(3), 45 – 678.

# The End