

Intro to Computer Vision: Hackpack

September 14, 2021 / 5:00 PM - 6:00 PM ET

Description

Ever wonder how a computer “sees”? How are we confident self driving cars have an accurate understanding of the real world? How do we generate panoramas? Learn basic concepts in computer vision, how the field has progressed, and how to use the emerging out-of-the-box technologies. Learn how to apply an existing object detection model, Detectron2, to your hackathon project.

Learning Outcomes

This is what you will walk away from the workshop able to do:

- Understand basic computer vision motivations
- Understand traditional versus deep learning computer vision approaches
- Apply existing object detection technologies to a hackathon project

We will NOT

- Design and train a neural network or machine learning model
 - This takes too much time for a hackathon, let alone a workshop!
- Implement traditional solutions to cv problems

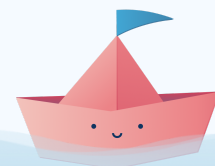
Prerequisite Knowledge

To get the most out of this workshop, knowledge in Python and Jupyter Notebook/Google Colab is helpful but optional

Pre-Workshop Checklist

Before the workshop, please make sure you complete the following items:

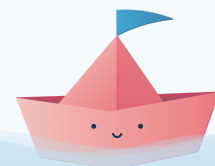
- Optional: Be comfortable with python



- Optional: Own a google/gmail account to access [Google CoLab](#)
- Very optional: Install your code editor of choice (VSCode, IntelliJ IDEA, Atom, and Sublime are all good options)
- Very Optional: Install [jupyter notebook](#), [pytorch](#), and [detectron2](#)
- Get ready to learn!

Timeline (1 hour)

Time	Module	Description
10 min	What is computer vision?	How do we see? What do computers see?
10 min	Computer Vision Problems	Filtering, panoramas, structure-from-motion, stereo & disparity, segmentation
5 min	Traditional Solutions	M a t h. Reliable real world geometry is your best friend.
5 min	Deep Learning Solutions	What is a machine learning model? Loss functions, improvements on deterministic problems, classification, generative art.
15 min	Detectron2 Example	Briefly discuss jupyter notebook, CoLab. Go through detectron2 CoLab example.
5 min	How do I put it all together?	Ways to integrate Detectron2 or other models into a hackathon project
2 min	Further Reading	Going over more resources in hacker pack
10 min	Q&A	



Workshop Lead Contact

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Additional Resources

Hack the North Resources

[Hack the North 2021 Event Schedule](#)

Check this out to stay up-to-date on activities, workshops, and other key happenings this weekend.

Workshop-Specific Resources

[Slides & Code](#)

Notebook in repo and hosted on CoLab here.

Detectron2

[Repo](#)

[Advanced CoLab tutorial](#)

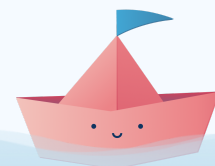
from authors. They go into detail how you can use Detectron2 as the basis for a new model to be trained.

Other Ready-To-Use Models

[Browse papers alongside pretrained models](#)

The workshop notebook pytorch loading example will come in handy.

Computer Vision Courses



Resource description

UWaterloo: [CS484](#), prereqs (AMATH 242/CS 371 or CS 370) and STAT 230 or STAT 240. Strong linear algebra background will be valuable.

[Udacity](#)

[Coursera](#)

Interesting Papers

There's a great [reddit thread](#) with tons of papers I am also slowly getting through!

There are also lists on Github:

- terryum's "[Awesome Deep Learning Papers](#)"
- Floodsong's "[Deep Learning Papers Reading Roadmap](#)"

