

Introduction

Computer Vision (CSCI 4220U)

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<http://vclab.science.ontariotechu.ca>



A bit about me



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Important questions

- Will I get an A+ in this course?
- What is computer vision anyways?

Acknowledgments

These slides draw upon other computer vision courses. I would in particular like to thank S. Seitz, D. Forsyth, K. Derpanis, J. Hoiem, A. Efros, Criminisi and many others for making their material available for teaching and learning purposes.



Understand images and videos



Recover useful properties about the world from images and videos

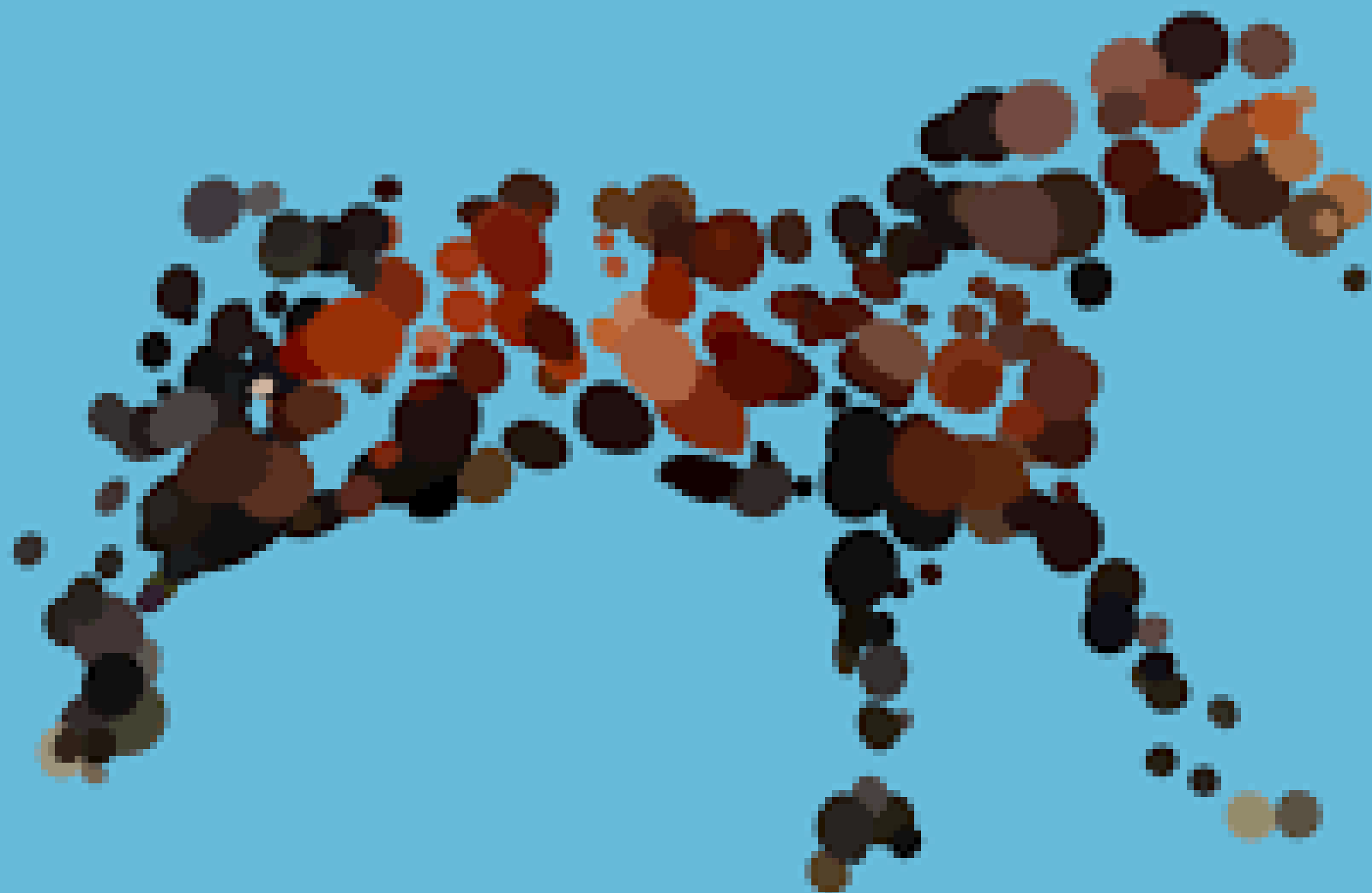
Computer vision is hard

- Visual cortex occupies nearly 50% of Macaque brain
- Greater fraction of human brain is devoted to vision (processing) than anything else



Cave of Altamira, near Santander, Spain.





MASSACHUSETTS INSTITUTE OF TECHNOLOGY
PROJECT MAC

Artificial Intelligence Group
Vision Memo. No. 100.

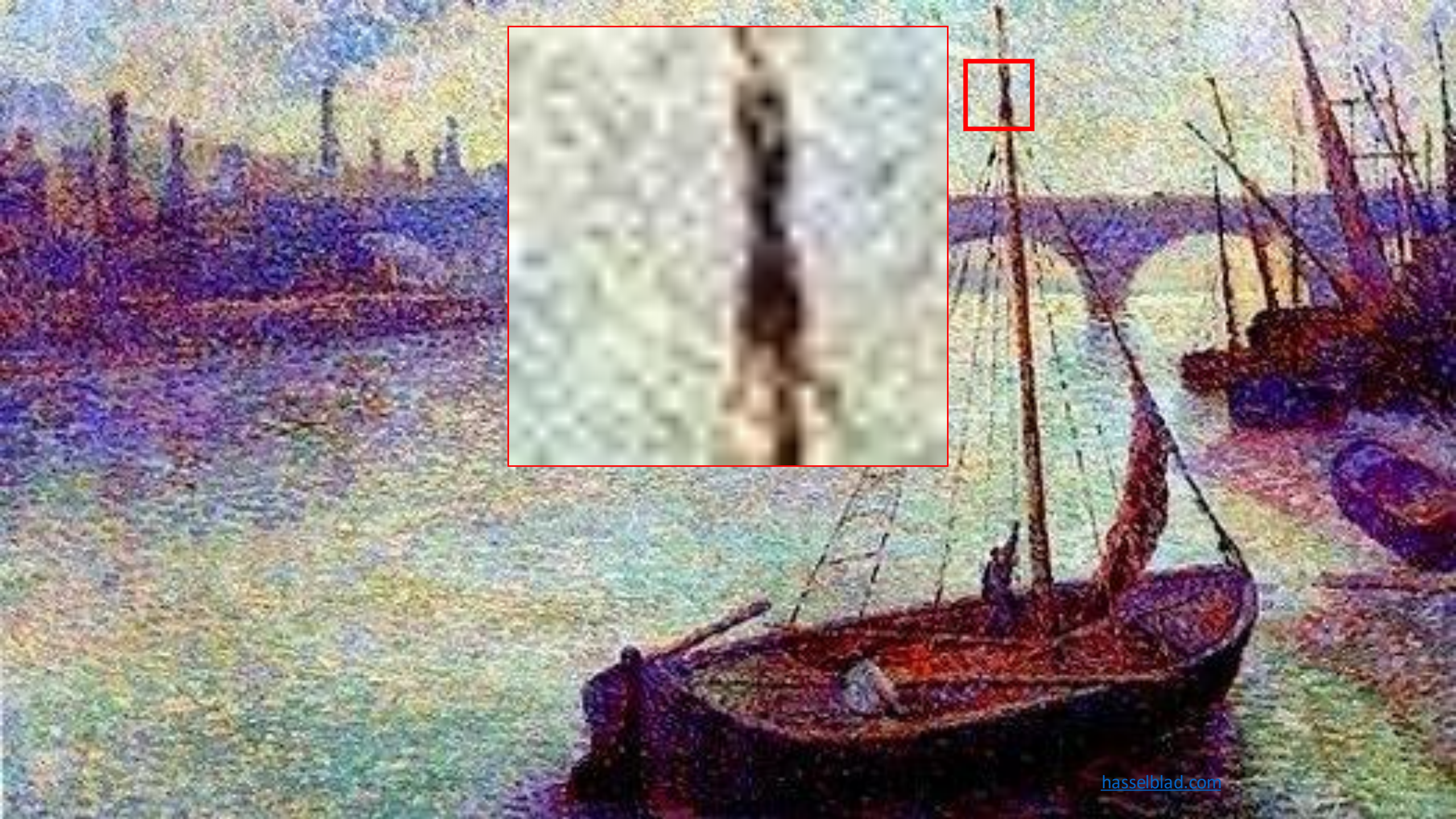
July 7, 1966

THE SUMMER VISION PROJECT

Seymour Papert

The summer vision project is an attempt to use our summer workers effectively in the construction of a significant part of a visual system. The particular task was chosen partly because it can be segmented into sub-problems which will allow individuals to work independently and yet participate in the construction of a system complex enough to be a real landmark in the development of "pattern recognition".





54	43	52	39	29	29	32	45	60	61
63	64	57	44	32	39	40	41	52	68
47	76	57	46	32	36	49	65	75	72
51	79	62	53	35	34	41	57	77	44
56	82	62	54	49	35	39	44	49	26
53	89	80	95	112	78	71	75	86	41
105	115	135	110	131	118	113	96	118	85
111	119	113	94	106	112	118	102	126	117
118	117	110	90	74	111	119	112	111	75
99	106	117	97	105	116	102	128	105	56
63	99	118	99	107	106	95	113	86	35
75	120	128	121	120	113	110	79	56	52



Images are highly complex functions of several variables





Slide credit: K. Derpanis

3D Lego Terracotta Army

Leon Keer, Ruben Poncia, Remko van Schaik and Peter Westerink



Slide credit: K. Derpanis

Slide credit: K. Derpanis



Slide credit: K. Derpanis





Slide credit: K. Derpanis



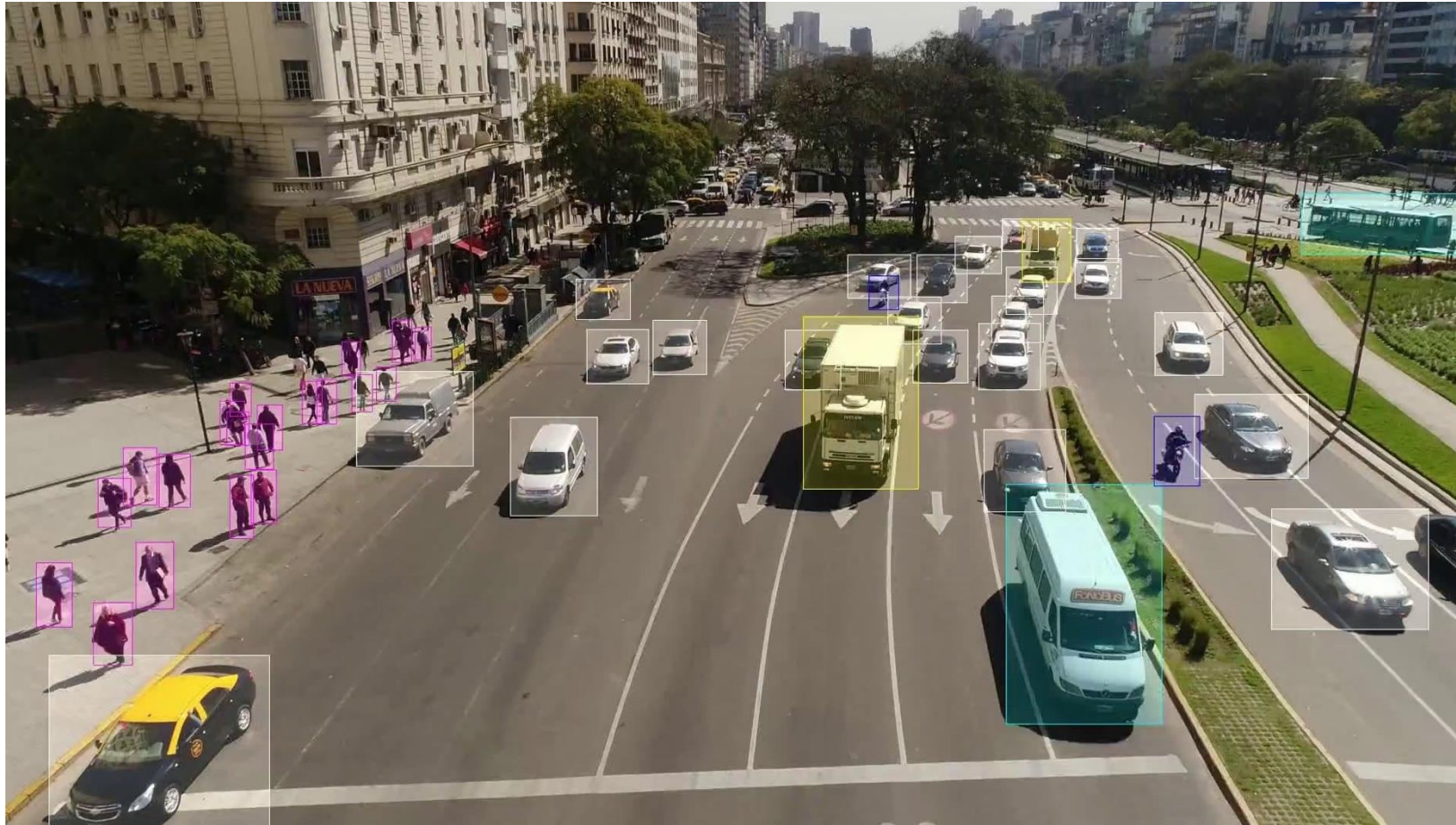
Slide credit: K. Derpanis





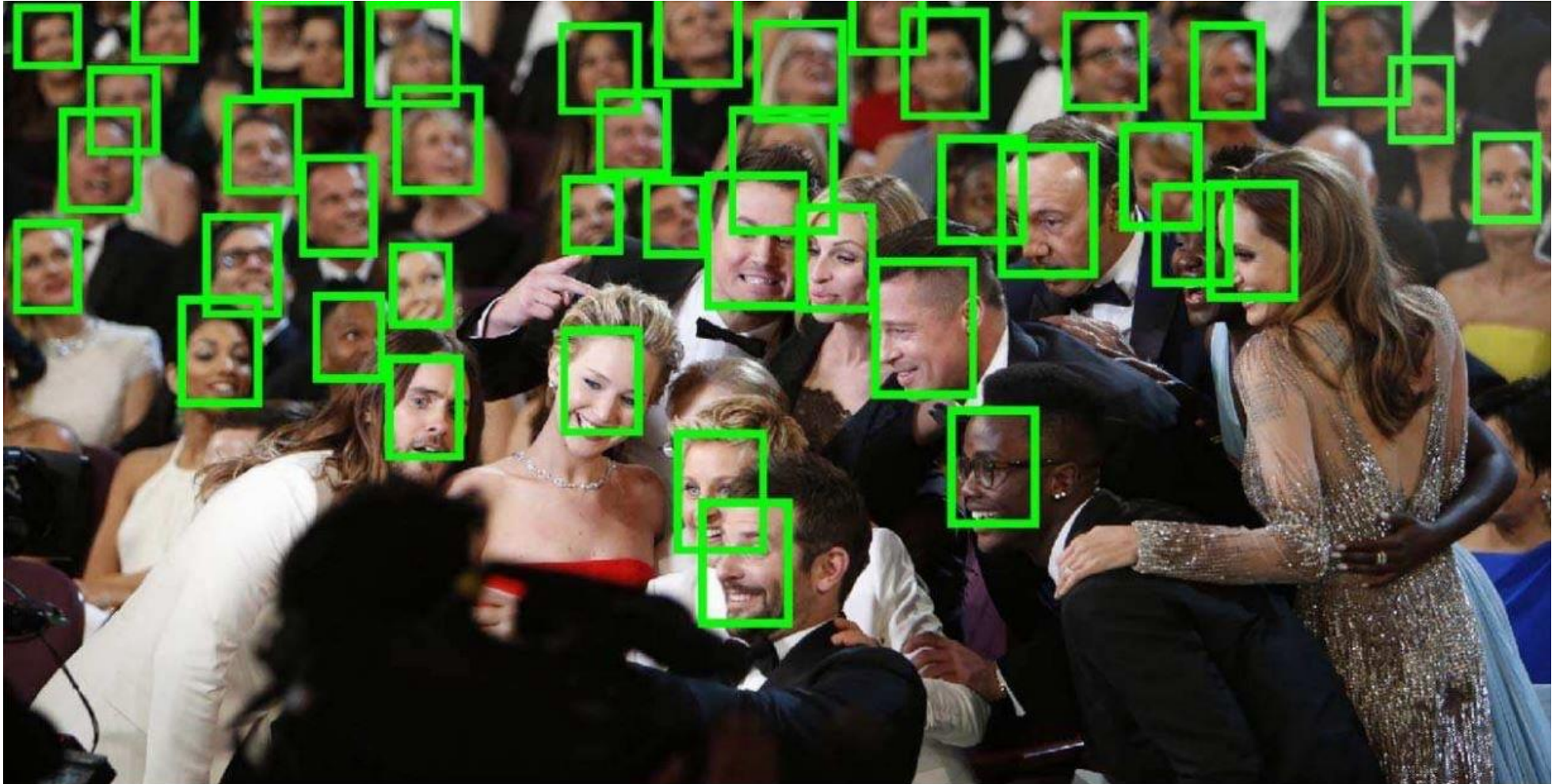


Traffic analysis



Credit: augmentedstartups.com

Face analysis



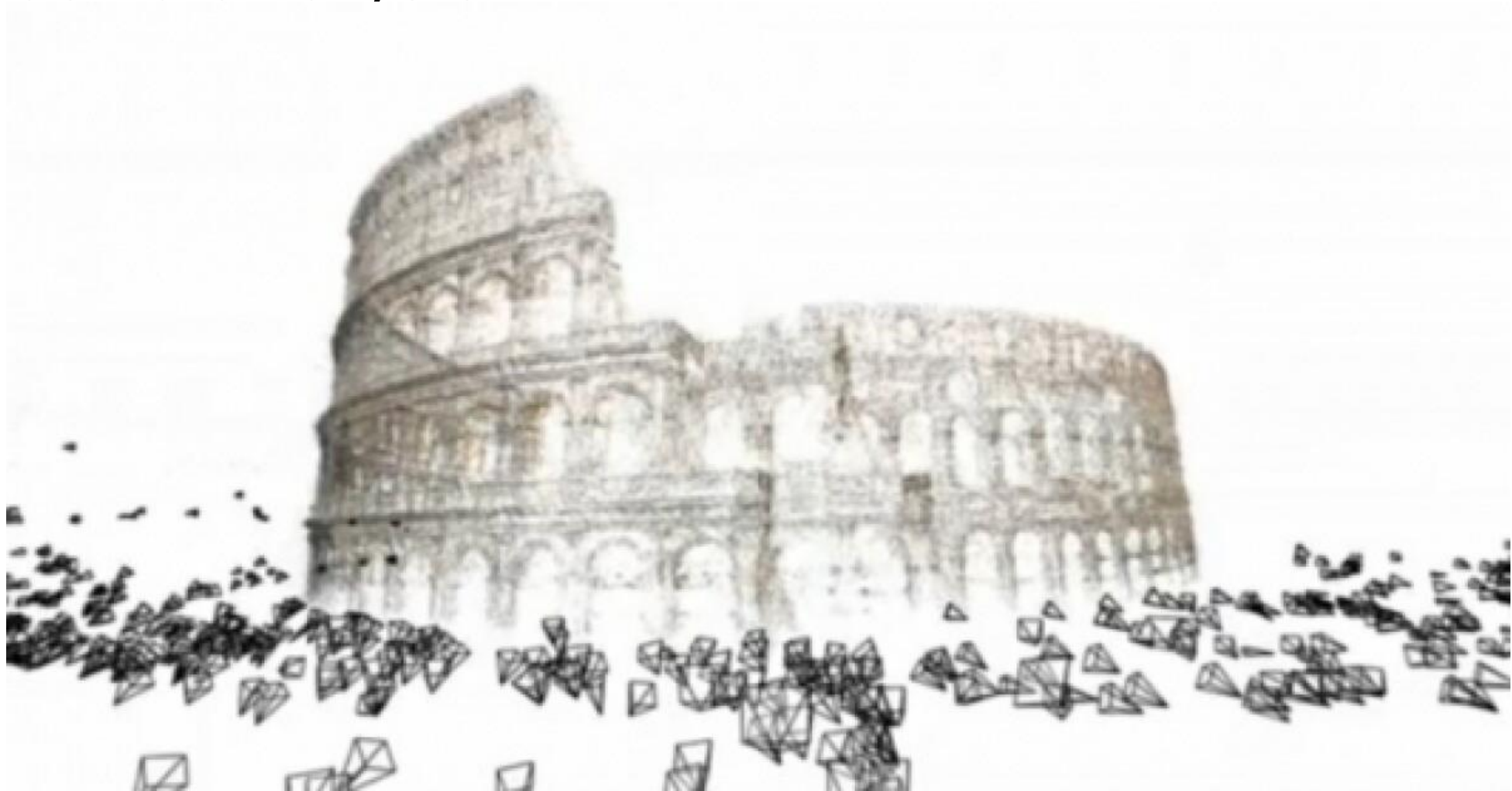
Credit: viso.ai

Human pose and activity analysis



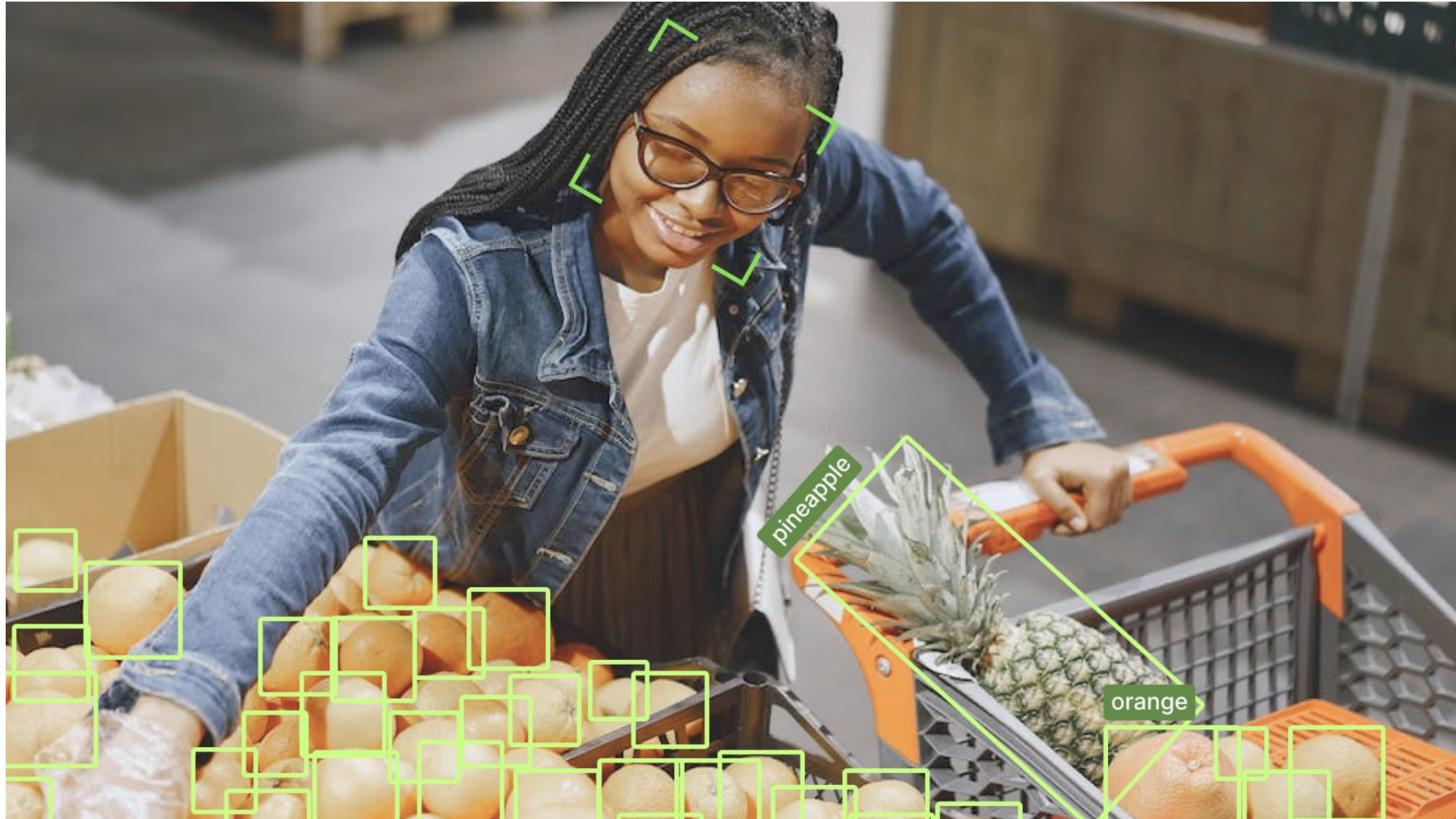
Credit: analyticsvidhya.com

3D scene analysis



Credit: newatlas.com

Retail



Credit: augmentedretails.com

Biometrics

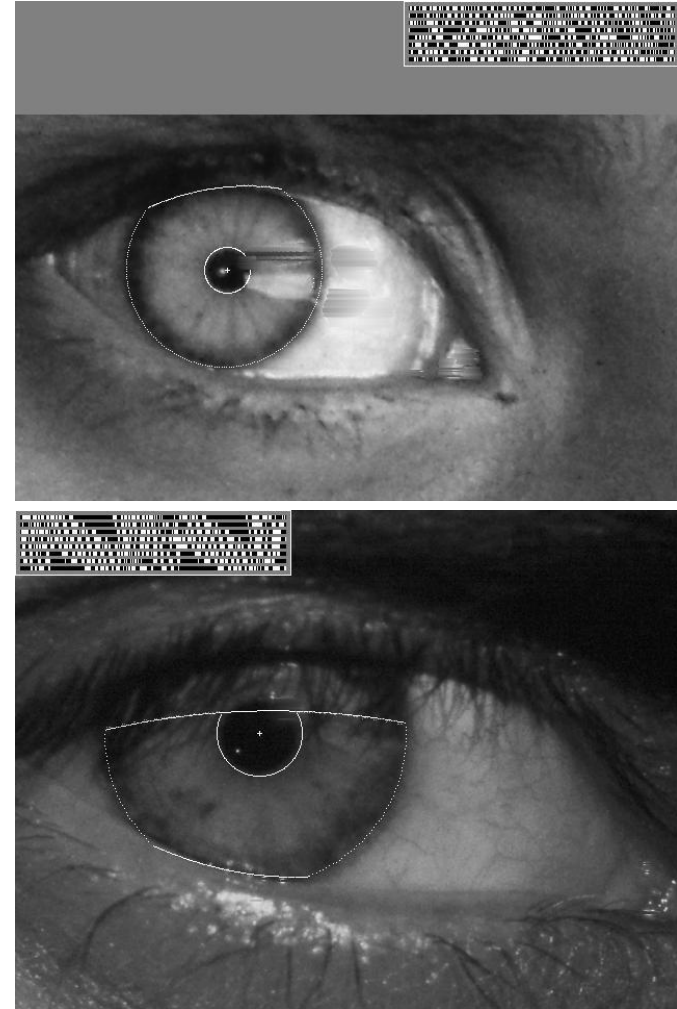


Credit: biometricupdate.com

Biometrics



Credit: nationalgeographic.com



Special effects



Credit: nationalgeographic.com

Sports

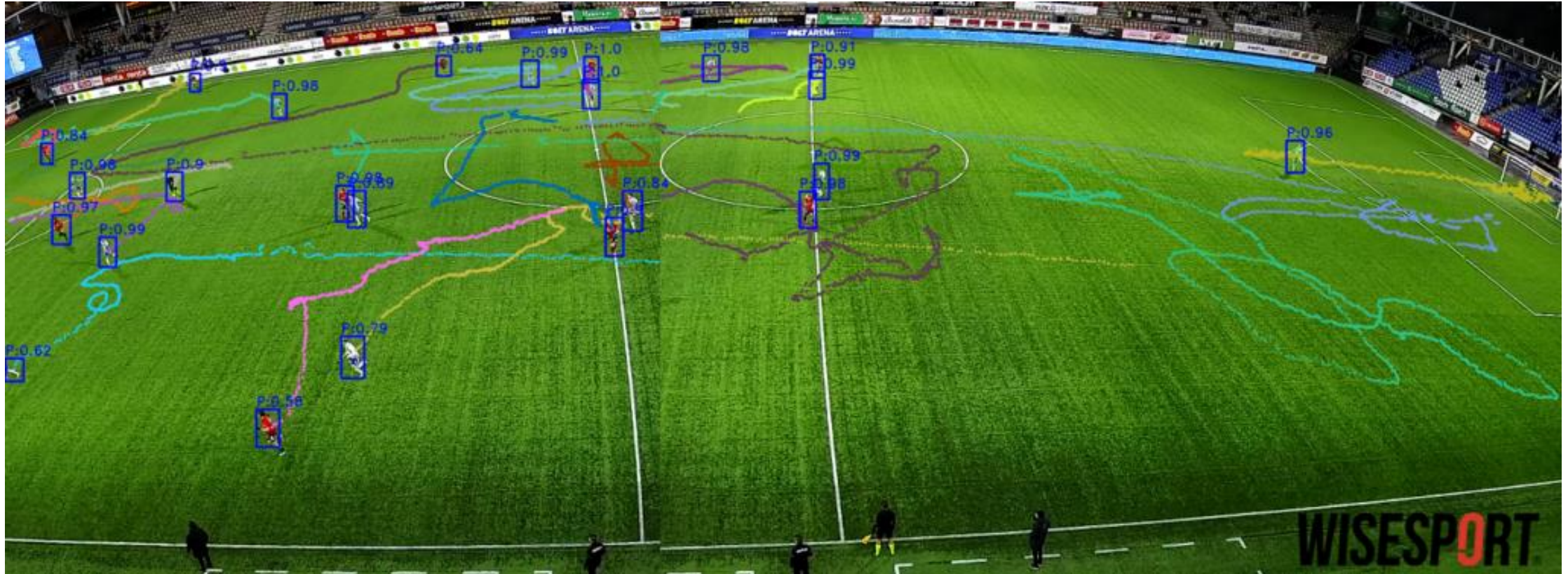


Credit: ox.ac.uk



Credit: Pokemon Go

Sports



Credit: wisesports.com

Mapping and Navigation

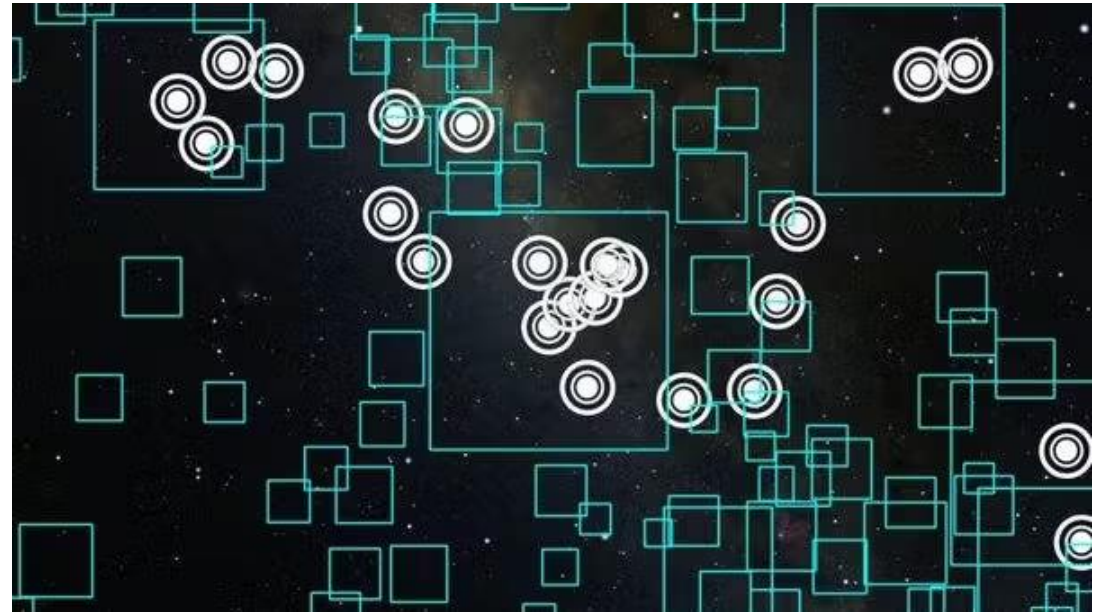


Credit: rd.com

Space exploration



Credit: zbigatron.com



Credit: Hackster.io

Industrial robots



Credit: labellerr.com

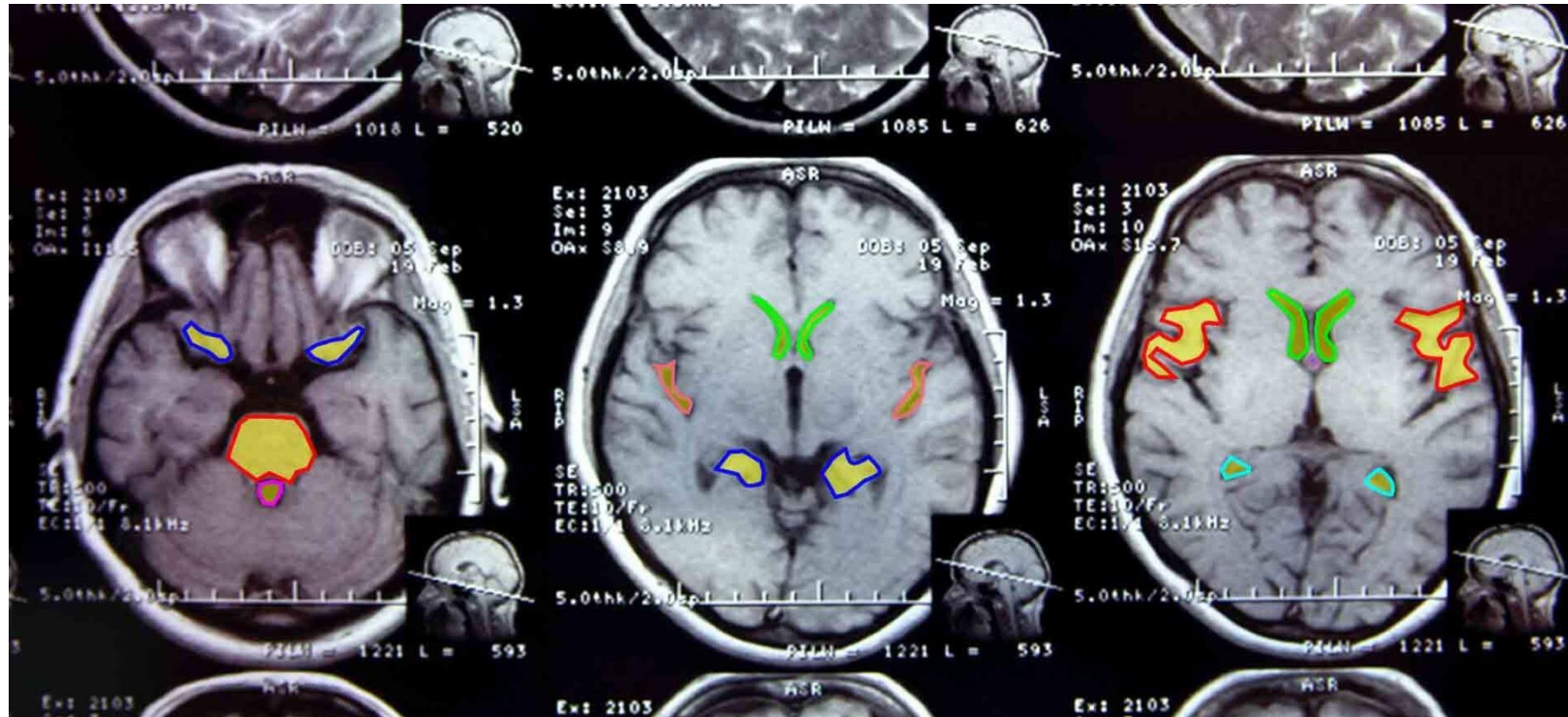
Robots



Credit: labellerr.com

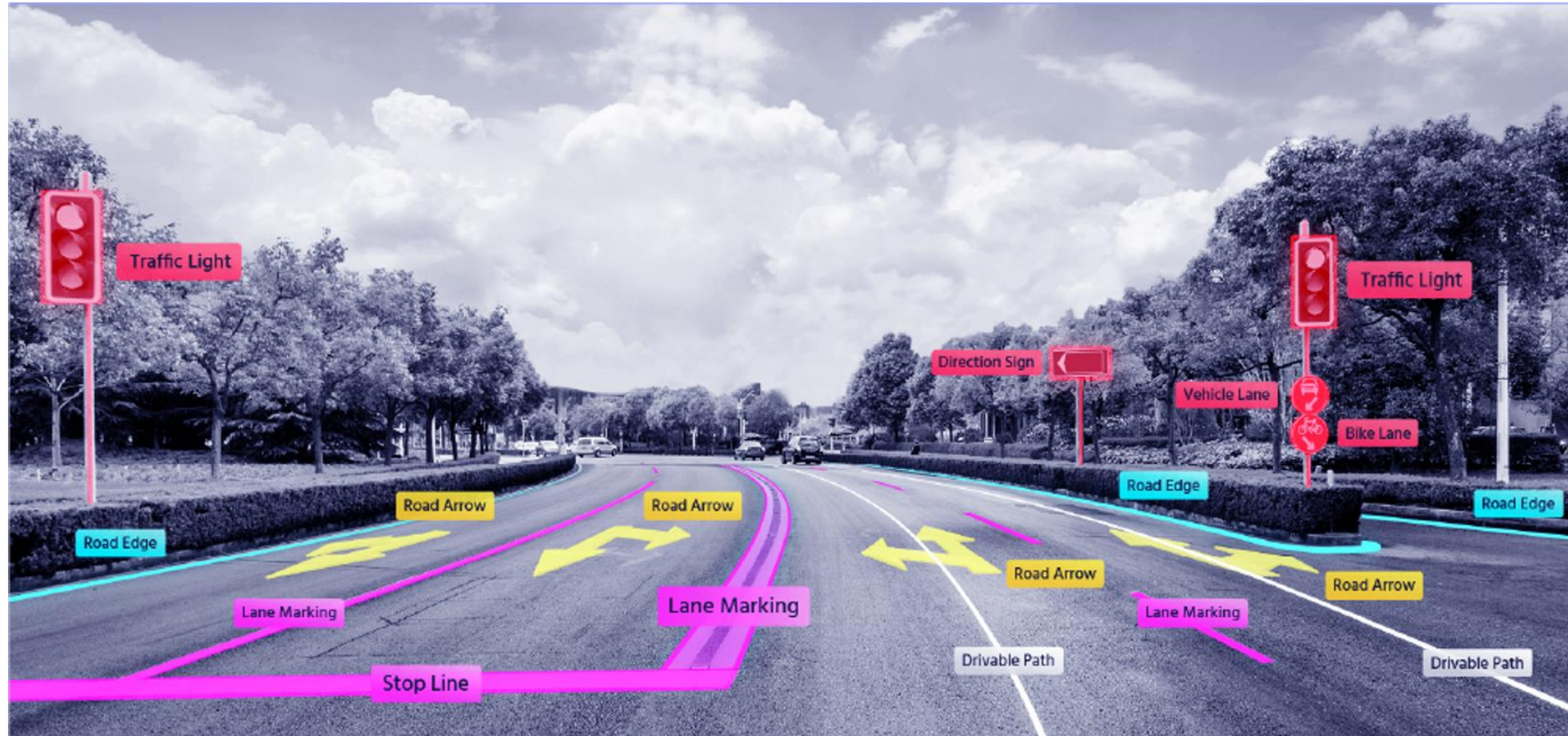


Medical imaging



Credit: bitrefine.com

Self-driving cars



Credit: mobileye.com

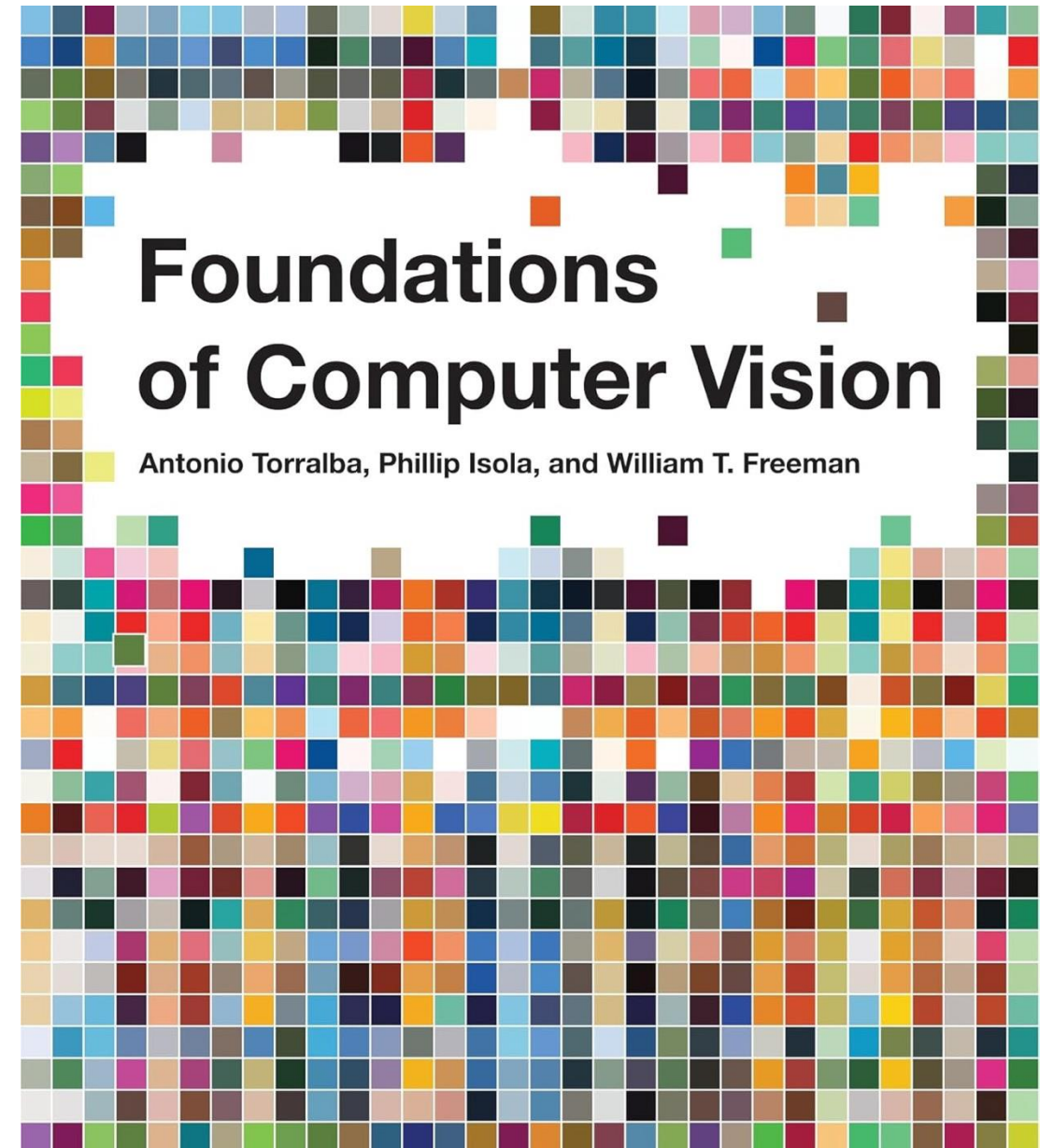
Course website

<https://csundergrad.science.uoit.ca/courses/csci4220u/latest/>

Textbook (Required)

Available at

<https://visionbook.mit.edu/>



Course outline and syllabus

- Syllabus

<https://csundergrad.science.uoit.ca/courses/csci4220u/latest/syllabus/syllabus.pdf>

- Tentative Schedule and grading considerations

<https://csundergrad.science.uoit.ca/courses/csci4220u/latest/>

- Notes

<https://csundergrad.science.uoit.ca/courses/cv-notes/>

How do I get an A+ in this course?

From ChatGPT

- Understand the Course Objectives
- Stay Consistent with Coursework
- Master the Theoretical Concepts
- Hands-on Practice
- Stay Updated
- Seek Feedback
- Form Study Groups
- Utilize Resources
- Manage Your Time
- Prepare for Exams
- Work on Projects with Passion
- Engage Beyond the Classroom

Lastly, always maintain a positive and curious mindset. Be proactive in your learning and seek opportunities to apply what you've learned. Remember, the ultimate goal is not just the A+ grade but gaining a deep understanding of computational photography and its applications.

Check course webpage often

<https://csundergrad.science.uoit.ca/courses/csci4220u/latest/>