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Images Beyond RGB

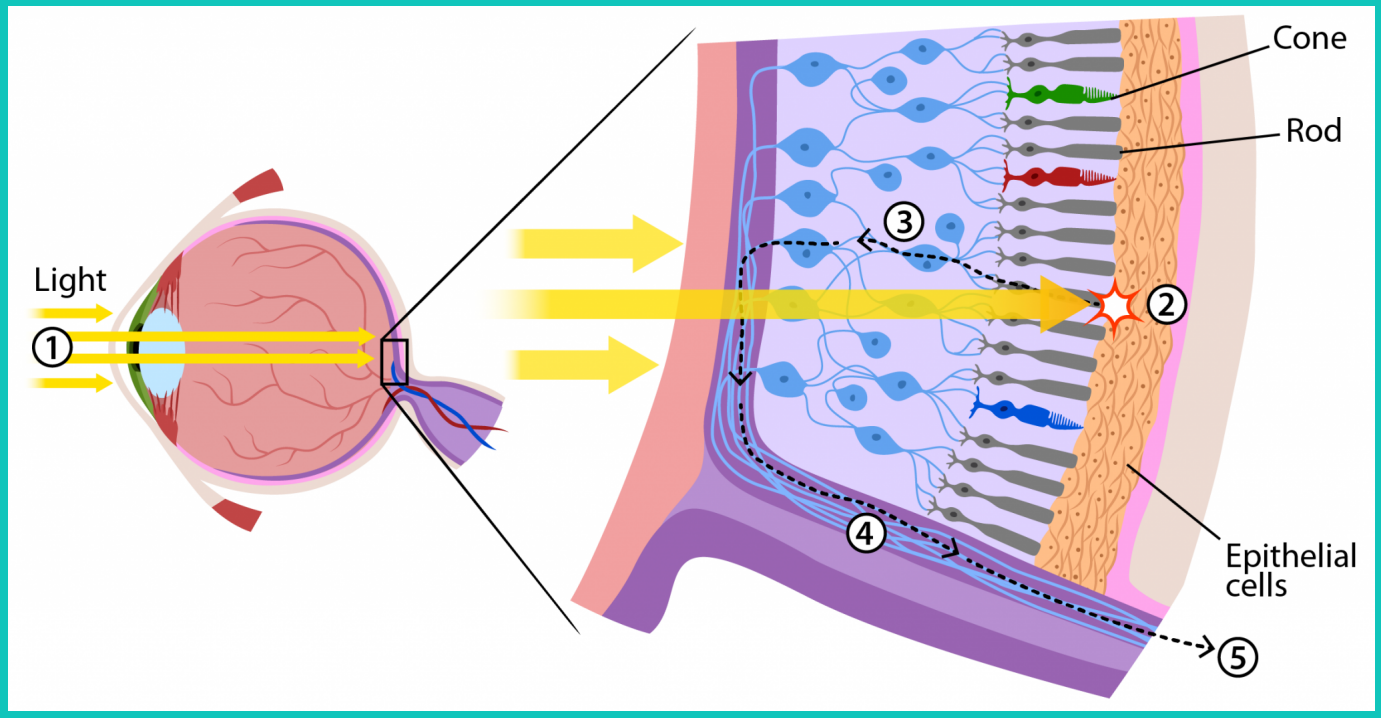
October 27, 2020

Images beyond RGB

OUTLINE

1. Introduce the field of Hyperspectral Images.
2. Demo data and pipeline
3. Next step: 'Computer vision' integration
4. Current Cool researches

How do we see color?

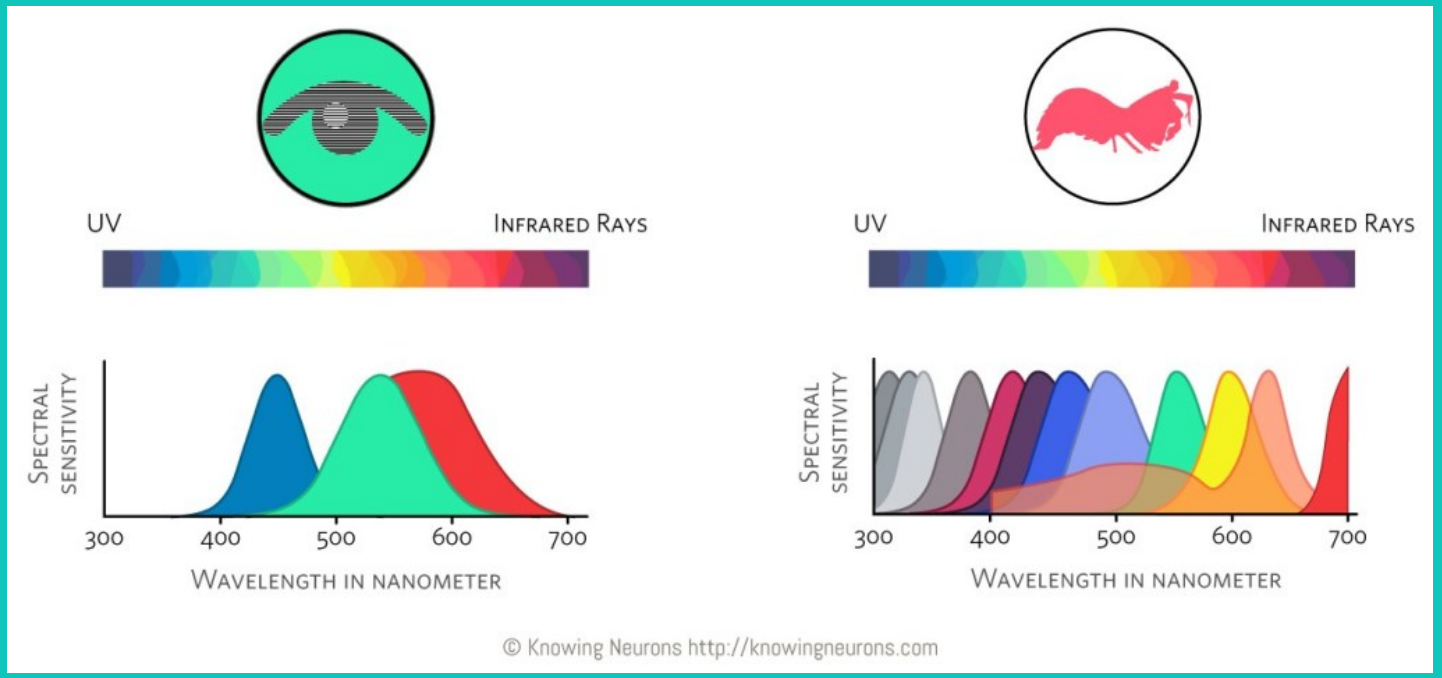


Reference : https://askabiologist.asu.edu/rods-and-cones

Learning from Nature

Reference : The Most Amazing Animal Eyes | The Peacock Mantis Shrimp | Love Nature
:https://www.youtube.com/watch?v=eGuZifKr0h4

Learning from Nature

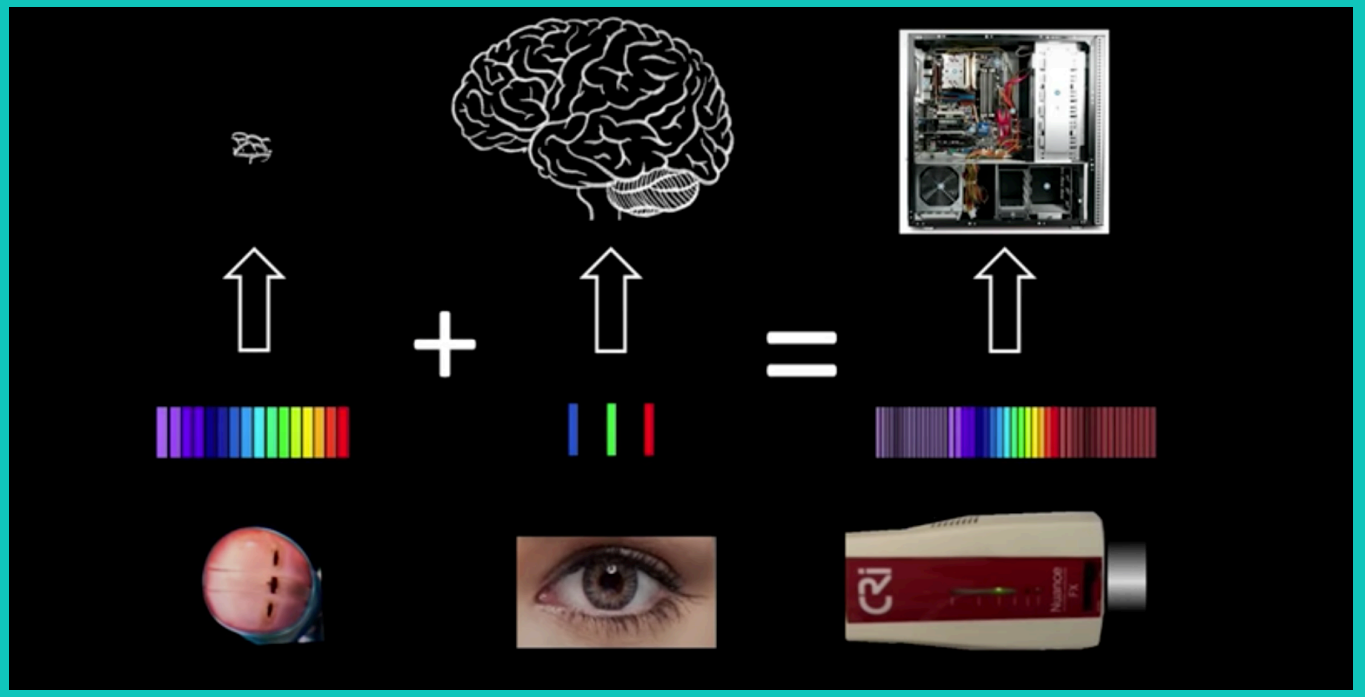


Reference :

https://knowingneurons.com/2016/06/22/colorful-mantis-shrimp/

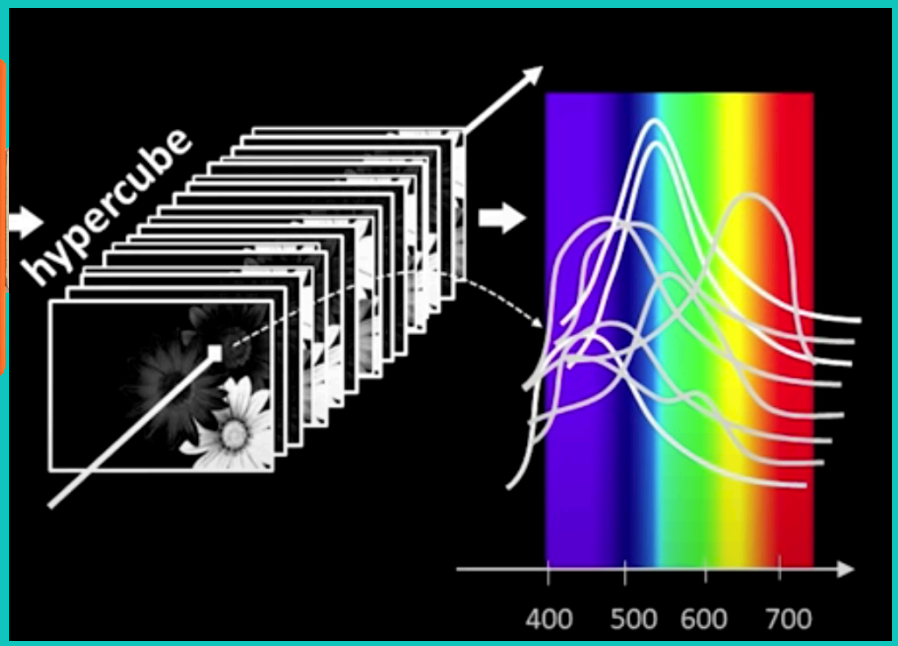
https://d.newsweek.com/en/full/1228350/brain-stock.jpg

Hyperspectral Imagery is about bridging them



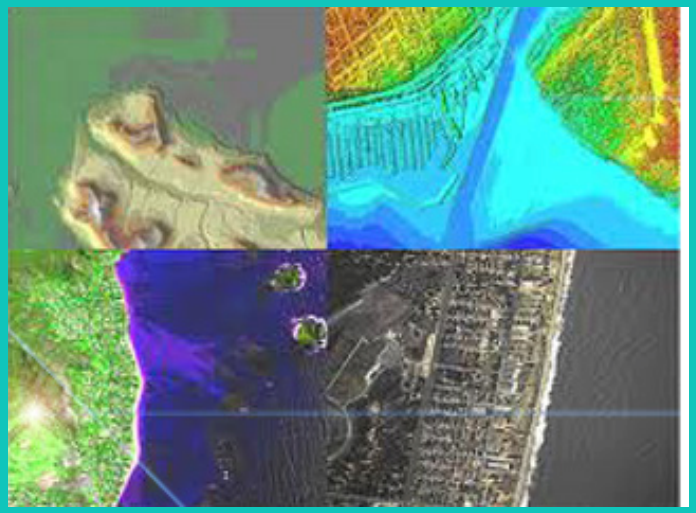
Reference : Hyperspectral Imaging: Beyond Limitations of Human Color Vision | Dr. Narine Sarvazyan | TEDxYSMU (https://www.youtube.com/watch?v=mJyJYf1Sztw)

Hyperspectral Image acquisition



Reference : Hyperspectral Imaging: Beyond Limitations of Human Color Vision | Dr. Narine Sarvazyan | TEDxYSMU (https://www.youtube.com/watch?v=mJyJYf1Sztw)

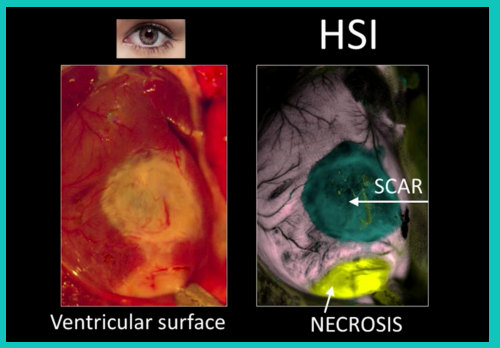
Hyperspectral Image Applications

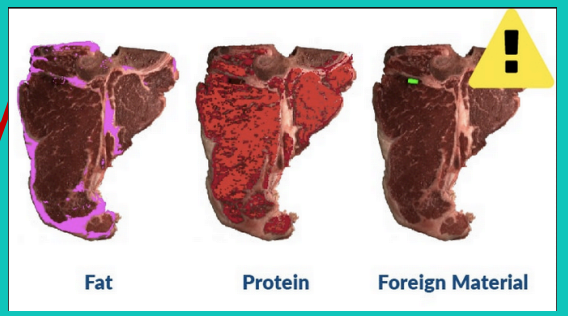


Remote Sensing

1. Mining
2. Medicine,
3. Food Quality

List goes on





Reference : Photo by USGS on Unsplash

Reference : Hyperspectral Imaging: Beyond Limitations of Human Color Vision | Dr. Narine Sarvazyan | TEDxYSMU (https://www.youtube.com/watch?v=mJyJYf1Sztw)

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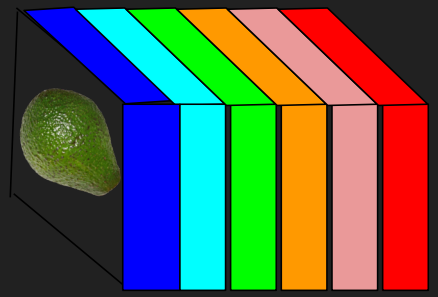
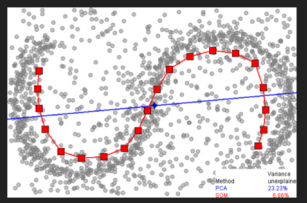
Demo using Open Source Dataset

Computer vision Integration

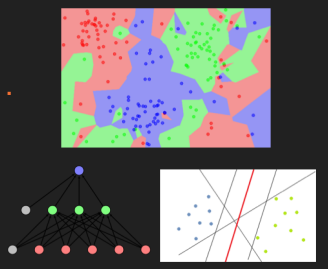


Labelled hyperspectral images

Data cleaning & Preprocessing



Dimensionality reduction (PCA), and feature extraction

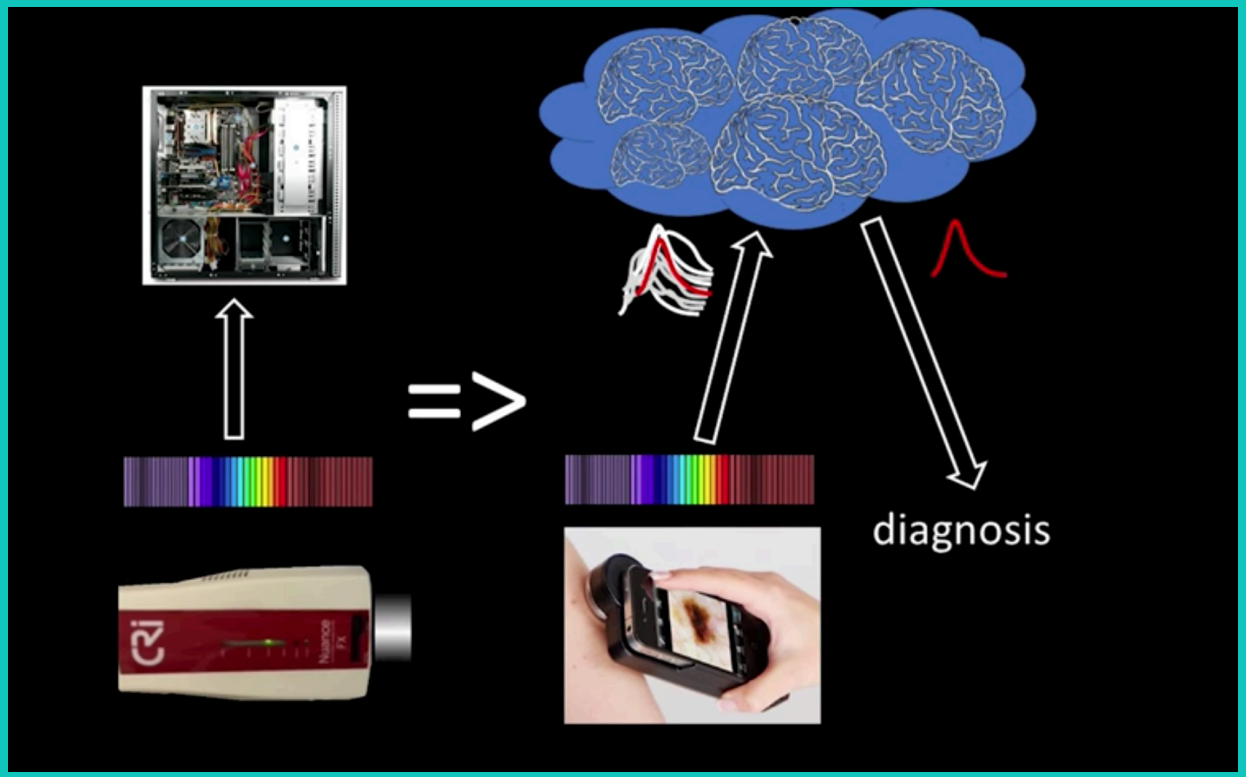


Training different models (GridSearch and cross validation)

Report generated from different models (ML-related measures & time scores)

Demo : Demo Code

Cloud Processing ☺ Yesss!



Reference : Hyperspectral Imaging: Beyond Limitations of Human Color Vision | Dr. Narine Sarvazyan | TEDxYSMU (https://www.youtube.com/watch?v=mJyJYf1Sztw)

More Applications

Reference : Hyperspectral Imaging: Beyond Limitations of Human Color Vision | Dr. Narine Sarvazyan | TEDxYSMU (https://www.youtube.com/watch?v=mJyJYf1Sztw)

Thank you so much for tuning in ☺

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