



# SINGAPORE

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[www.womenwhocode.com/singapore](http://www.womenwhocode.com/singapore)

[facebook.com/groups/wwcodesingapore](https://facebook.com/groups/wwcodesingapore)

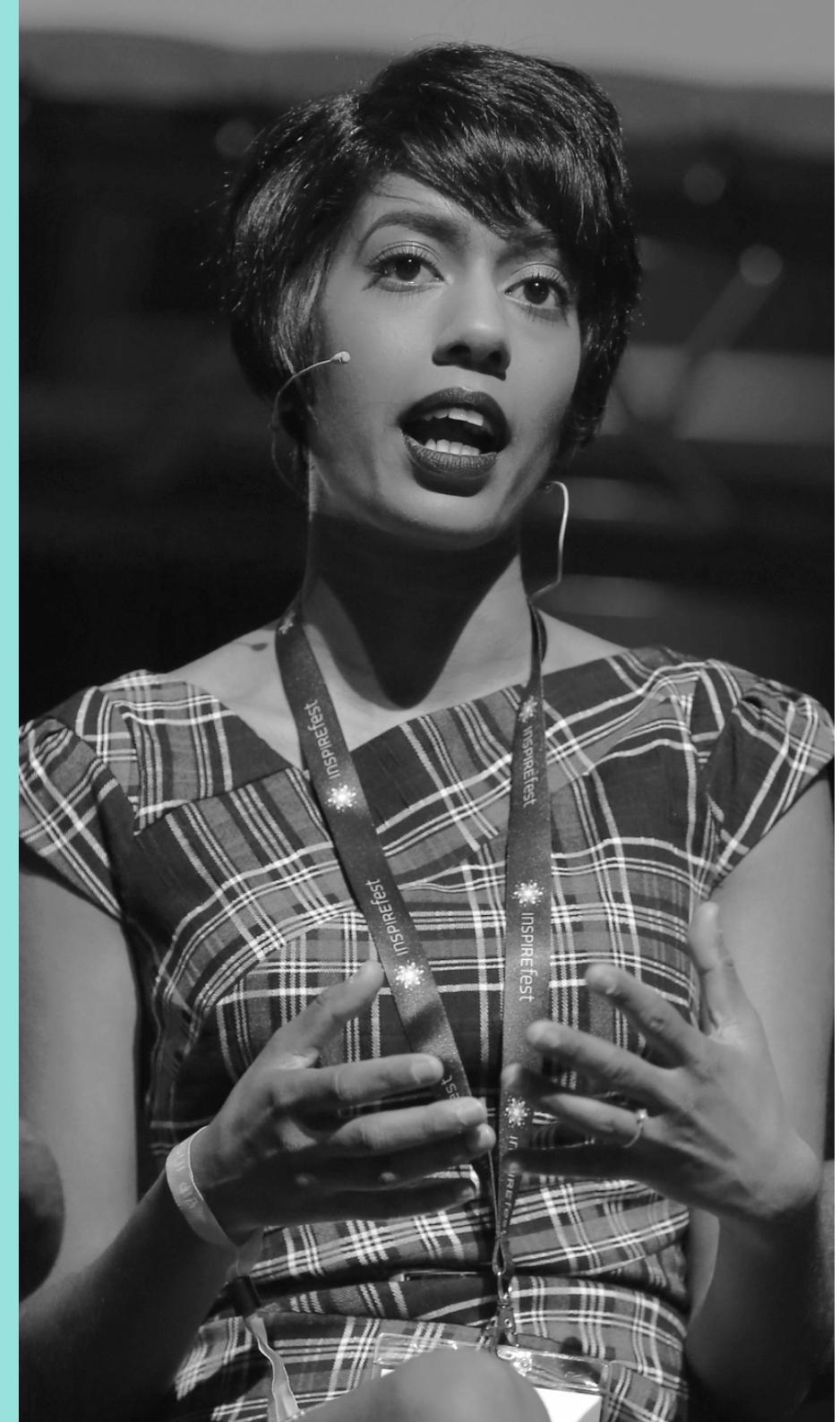
[wwcodesg.slack.com](https://wwcodesg.slack.com)

[wwcodesg mailing list](#)

# OUR MISSION

Inspiring women to  
excel in technology  
careers.

WOMEN WHO  
**CODE**



**“DEAR WOMEN, WE NEED YOU”** -The Tech Industry

## **WHAT WE DO ...**

Organise technical events

Code Review (Newsletter)

#ApplaudHer

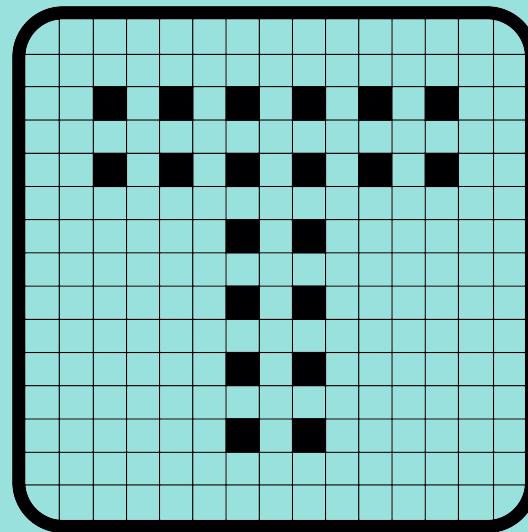
Scholarships

Conference Tickets

Job board



# THANK YOU TO OUR HOST



# TITANSOFT



<http://www.ku.ac.ae/uploads/145683509891.png>

CHOONG YUE LIN

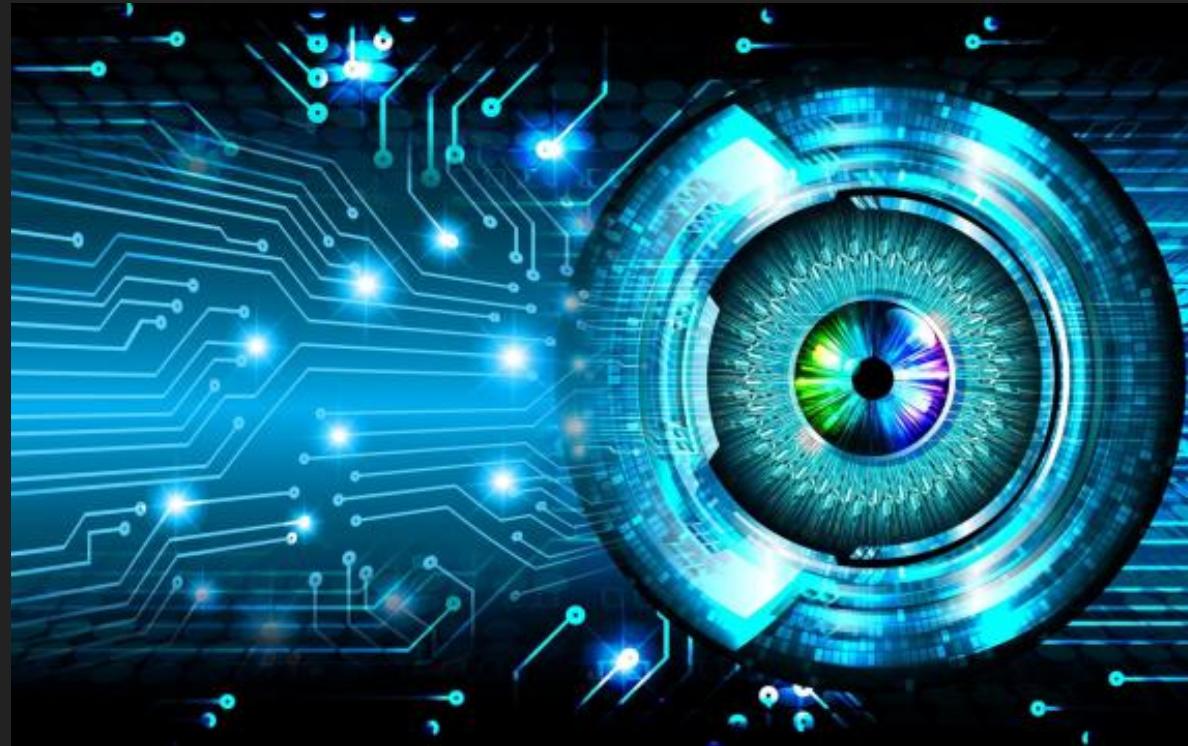
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IMAGE PROCESSING

# COMPUTER VISION

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- ▶ Information from images / Analyzing and processing of images
- ▶ 3D models, camera position, object detection, recognitions, grouping & searching image content
- ▶ E.g. applications: medical imaging, security, autonomous vehicles



# HUMAN VISION

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- ▶ EYES - distance
  - ▶ Eye muscles
  - ▶ Stereo Vision
  - ▶ Parallax effect
- ▶ BRAIN
  - ▶ Pattern recognition
  - ▶ Reading / interpreting
  - ▶ Object identification



<http://www.snapoholic.com/images/brain-vision-front.jpg>

# APPLICATIONS OF COMPUTER VISION & MACHINE VISION

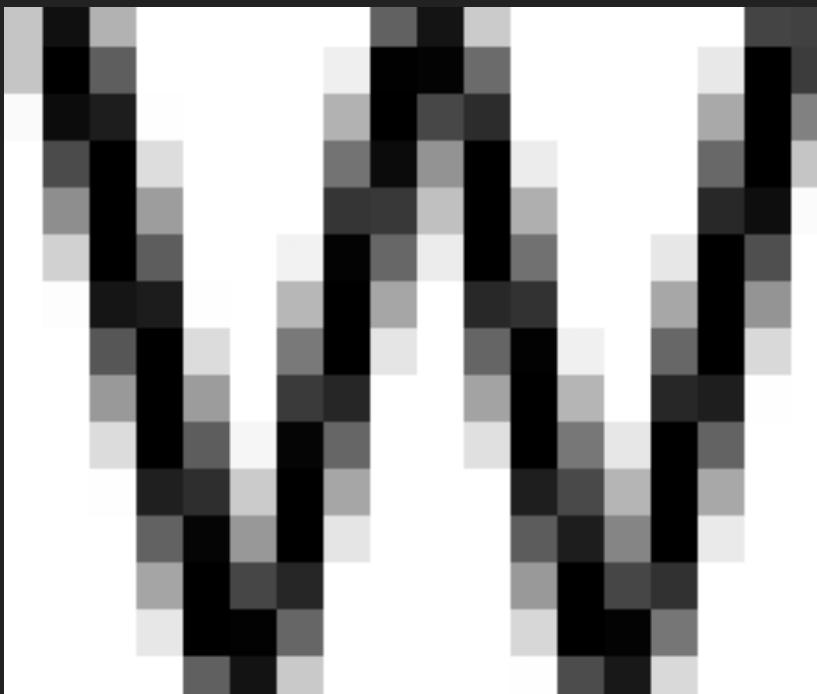
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- ▶ Object detection
- ▶ Image classification
- ▶ Tracking objects
- ▶ Activity and gesture detection
- ▶ Monitoring
- ▶ Remote/virtual image recreation/ generation
- ▶ 3D/4D visualisation
- ▶ Data analysis



# DIGITAL REPRESENTATION OF IMAGE

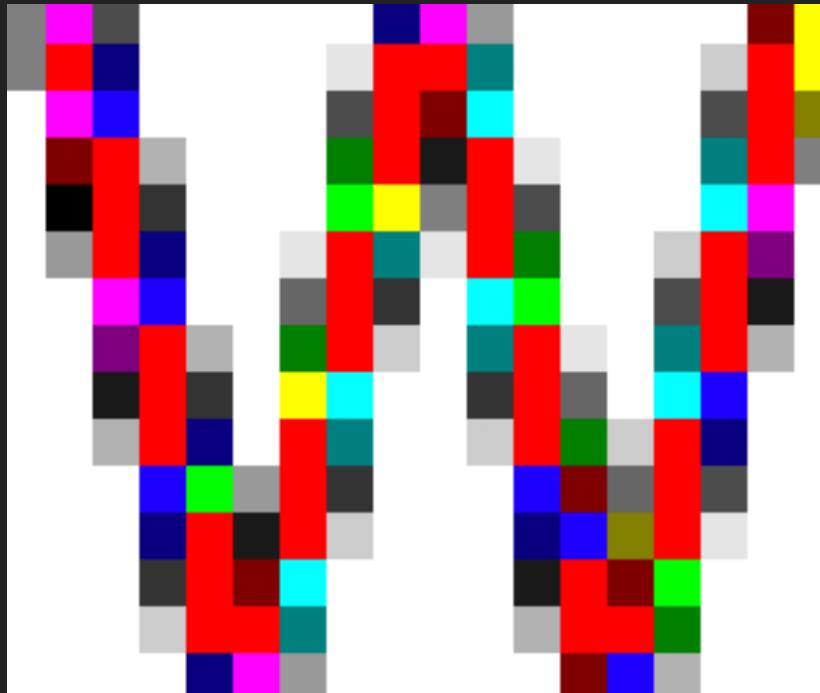
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# DIGITAL REPRESENTATION OF IMAGE

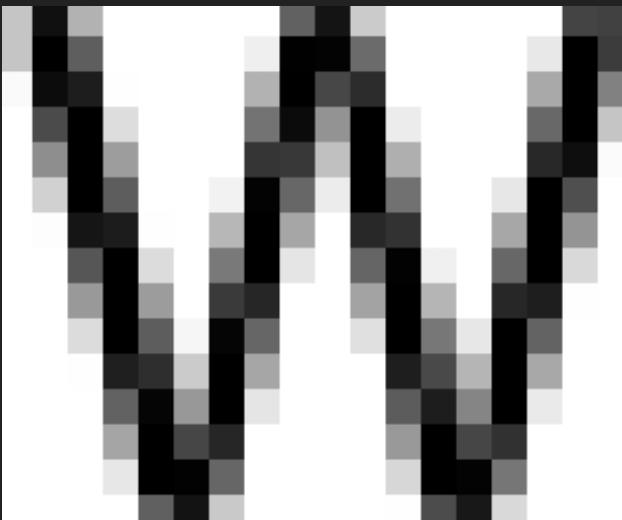
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# INVERT IMAGE

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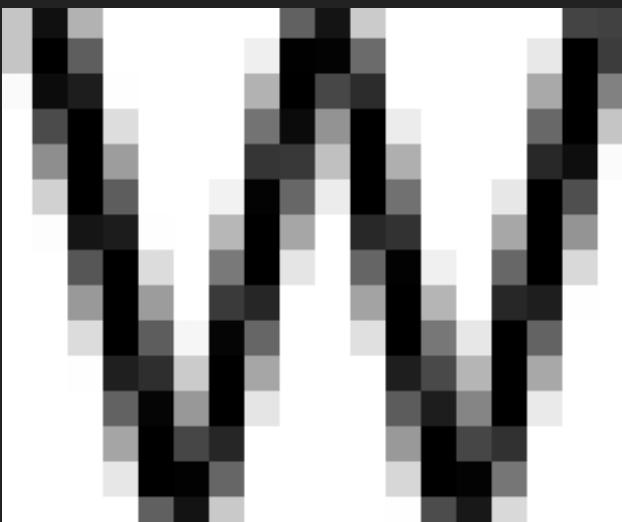


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# INVERT IMAGE - NEIGHBOURING



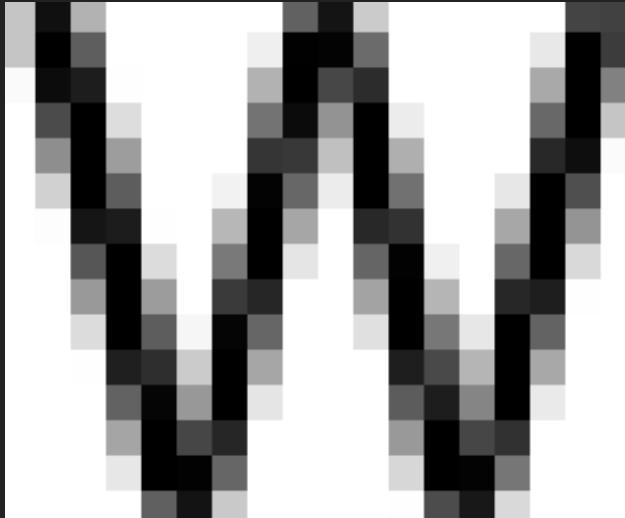
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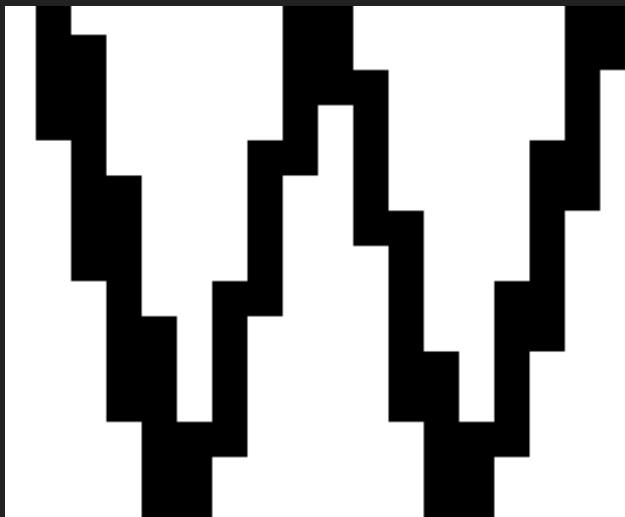
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# THRESHOLDING

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# VIDEO IMAGE PROCESSING - MULTIPLE IMAGES

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- ▶ Image averaging - rounding up to reduce noise
- ▶ Image subtraction
  - ▶ to detect changes
  - ▶ To enhance data

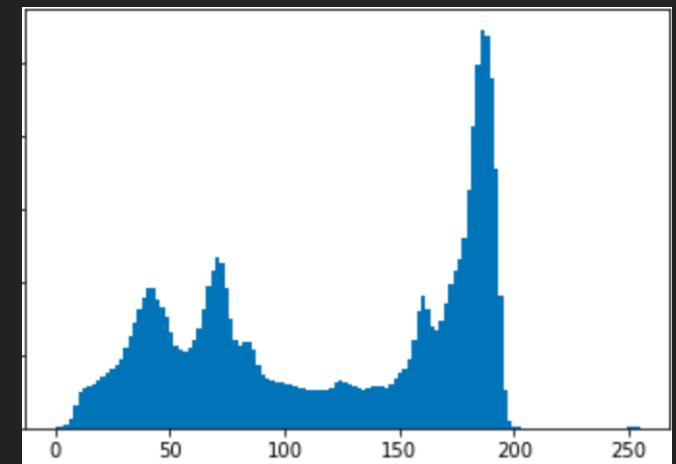
# CONVOLUTION - SPATIAL TRANSFORMATION

- ▶ Stretching / Bending etc.
- ▶ Masking / filter

# COUNTOURS

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- ▶ Identify Region of Interest (ROI)
- ▶ Edge detection
- ▶ Identify objects
- ▶ Binary discretisation - Counting



# IMAGE ENHANCEMENT

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- ▶ Thresholding to increase contrast between bright and darker levels
- ▶ Predefined background using mask
- ▶ Compression of dynamic range - enhance a range of brightness level
- ▶ Histogram Equalization
- ▶ Histogram Specification to enhance specific grey levels
- ▶ Local enhancement



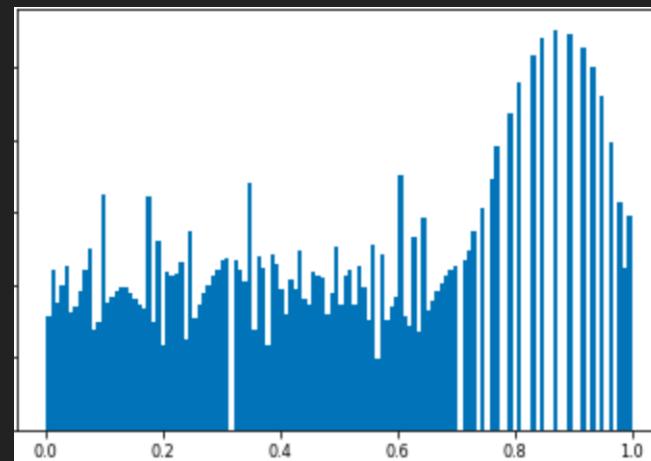
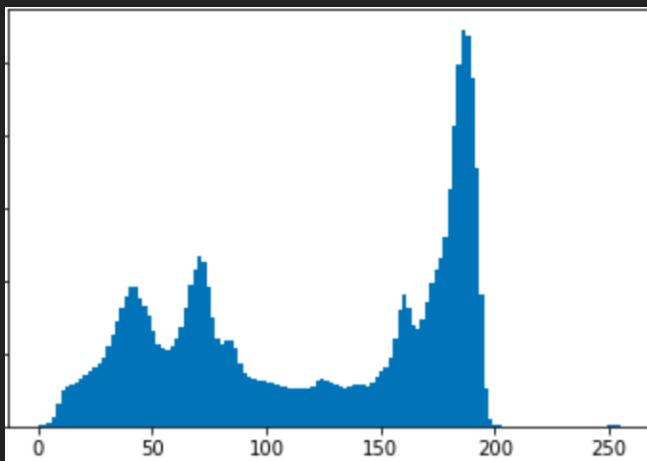
[http://grasigner.com/sites/default/files/samplework/Hair\\_Masking.jpg](http://grasigner.com/sites/default/files/samplework/Hair_Masking.jpg)



[http://grasigner.com/sites/default/files/samplework/Channel\\_Masking.jpg](http://grasigner.com/sites/default/files/samplework/Channel_Masking.jpg)

# HISTOGRAM EQUALISATION

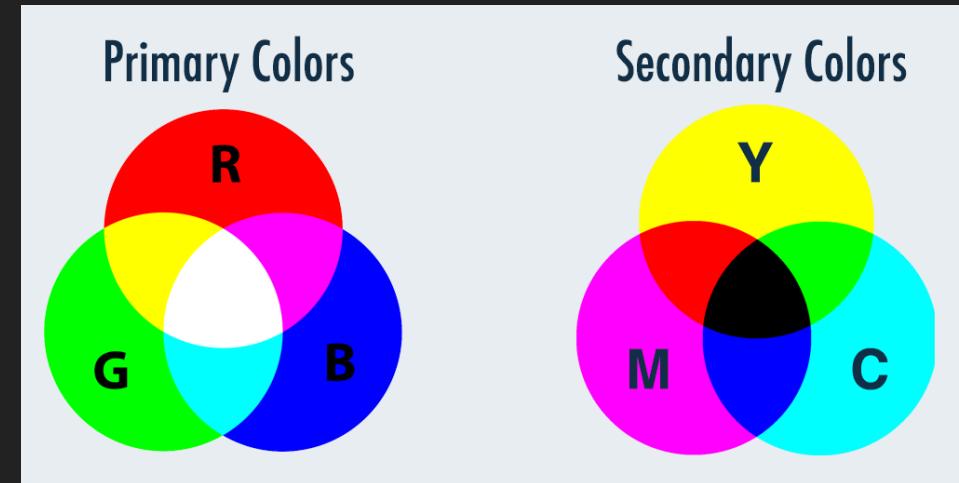
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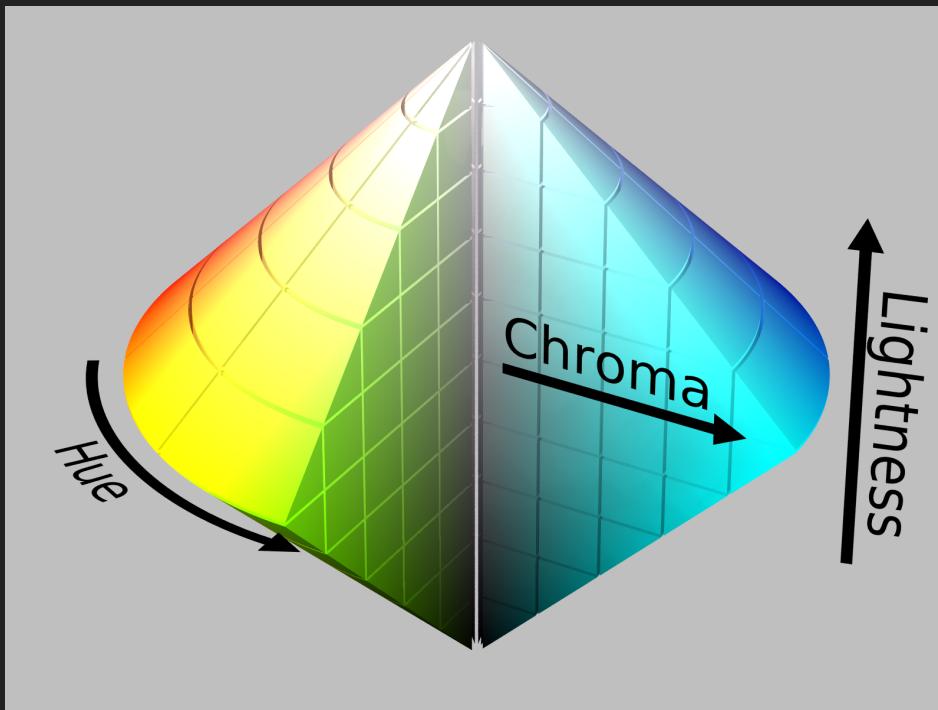
# COLOURS

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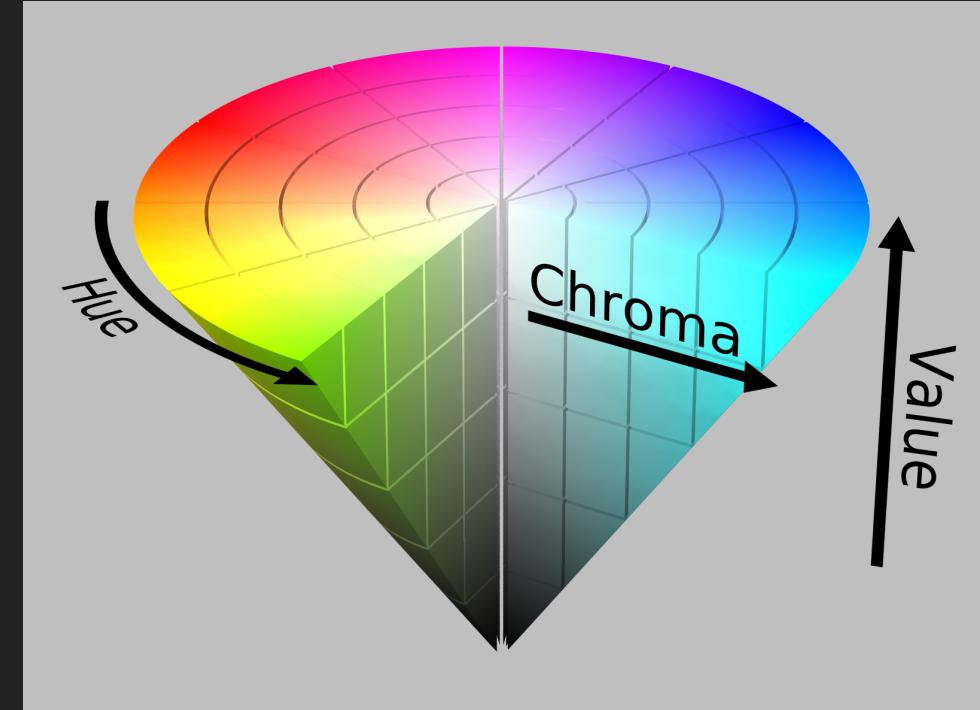
- ▶ RGB - Red , Green , Blue
- ▶ CYMK - Cyan Yellow Magenta Black
- ▶ HSL - Hue Saturation Level
- ▶ HSV - Hue Saturation Value



<http://blog.visme.co/wp-content/uploads/2017/01/How-to-Choose-the-Right-Color-Scheme-for-Your-Infographic-Design-6.png>



[https://upload.wikimedia.org/wikipedia/commons/b/b3/HSL\\_color\\_solid\\_dblcone\\_chroma\\_gray.png](https://upload.wikimedia.org/wikipedia/commons/b/b3/HSL_color_solid_dblcone_chroma_gray.png)



[https://upload.wikimedia.org/wikipedia/commons/0/00/HSV\\_color\\_solid\\_cone\\_chroma\\_gray.png](https://upload.wikimedia.org/wikipedia/commons/0/00/HSV_color_solid_cone_chroma_gray.png)

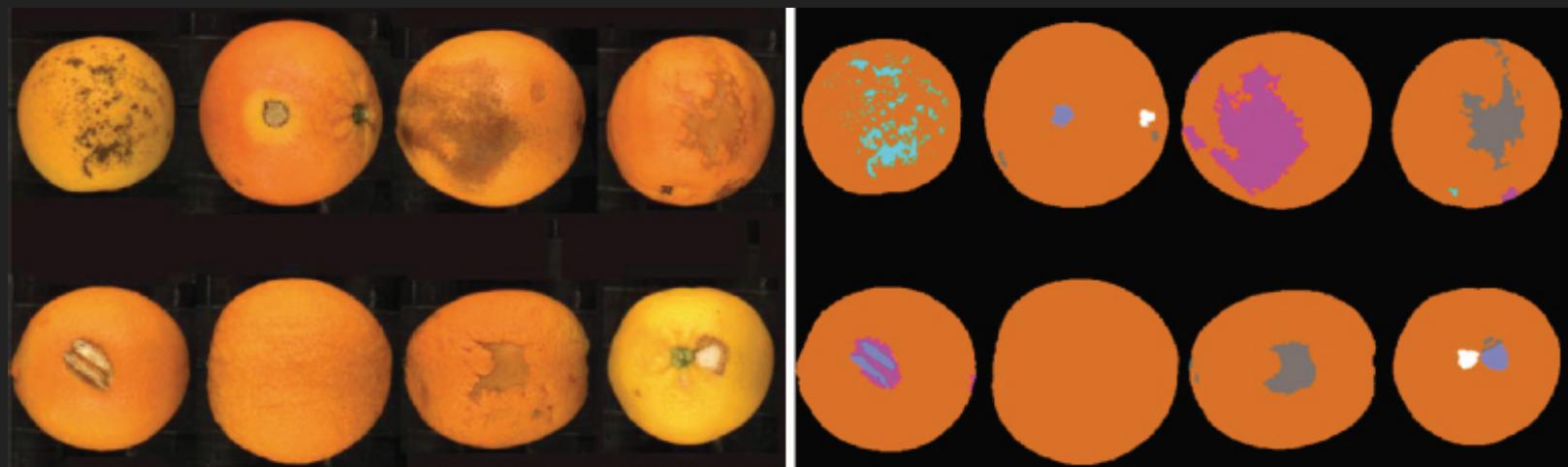
# SORTING BY COLOUR

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<https://en.unitec-group.com/images/inglese/vegetables-sorting-grading-cherry-tomatoes-1.jpg>

<http://www.scielo.br/img/revistas/bjft/v16n4/a02fig04.jpg>



Thank you 😊

[yuelin@womenwhocode.com](mailto:yuelin@womenwhocode.com)

WOMEN WHO  
code

**Coming soon ...**

Our next event:

## **Python Workshop: Image Processing**

Monthly session:

## **Social Coding Monday**

[wwcodesg.slack.com](#)

[wwcodesg mailing list](#)

[workshop assistant volunteer](#)