

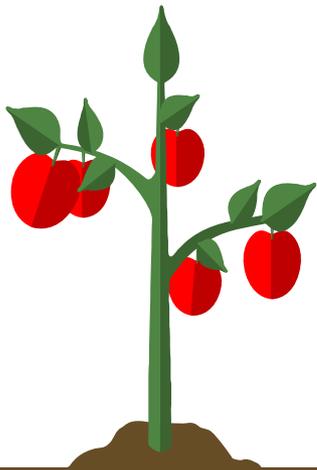


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# Checking Plant Health Through Normalized Difference Vegetation Index (**NDVI**) Using Mobile Phone

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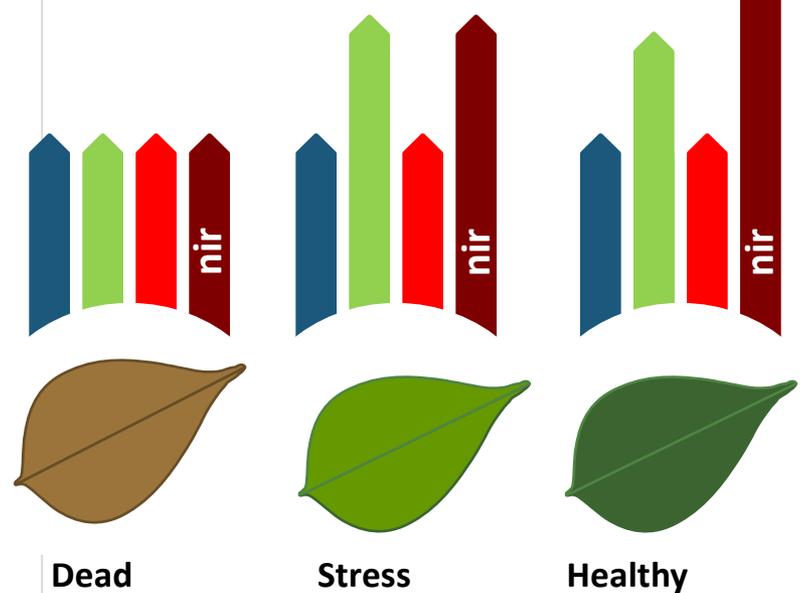
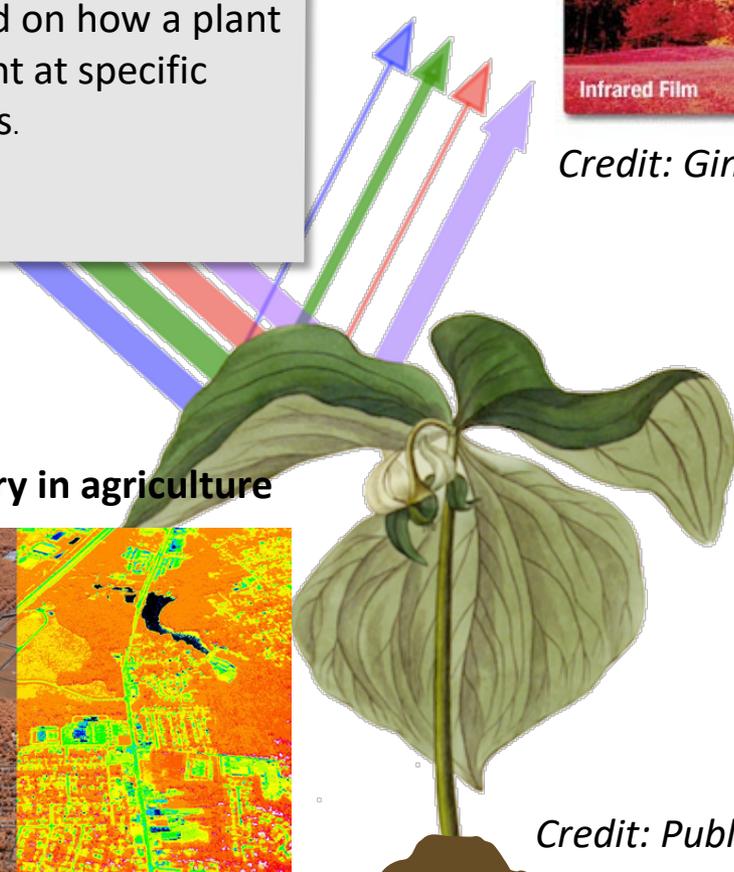
# What is NDVI?

## NOTES

NDVI is a measurement of plant based on how a plant reflects light at specific frequencies.



Credit: Ginger Butcher



Dead

Stress

Healthy

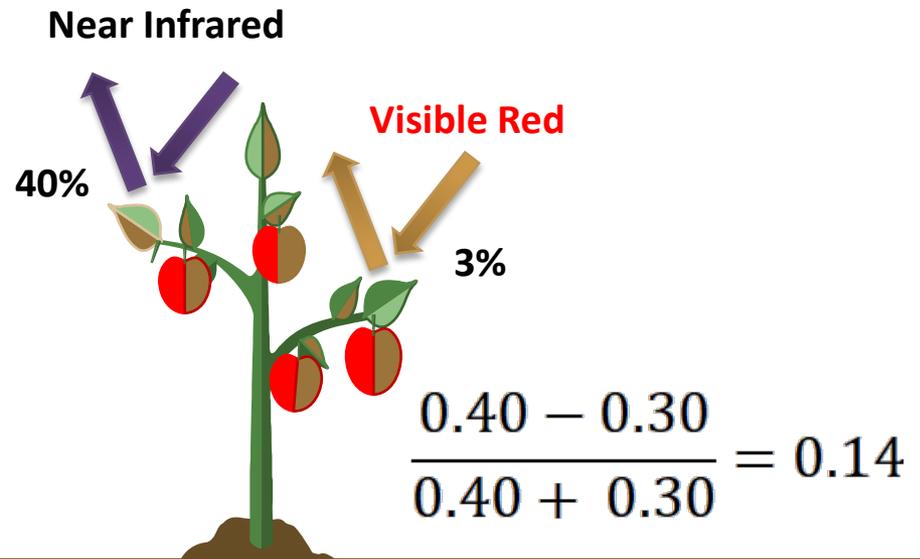
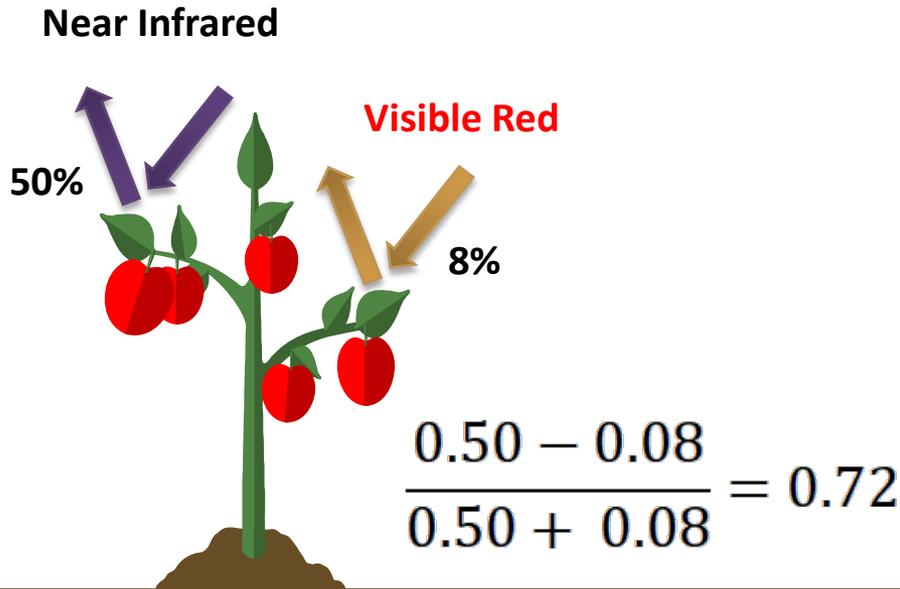
Credit: PublicLab

## Satellite imagery in agriculture



# NDVI Calculation

$$NDVI = \frac{NearIR - Red}{NearIR + Red}$$



-1 - 0  
Dead Plant

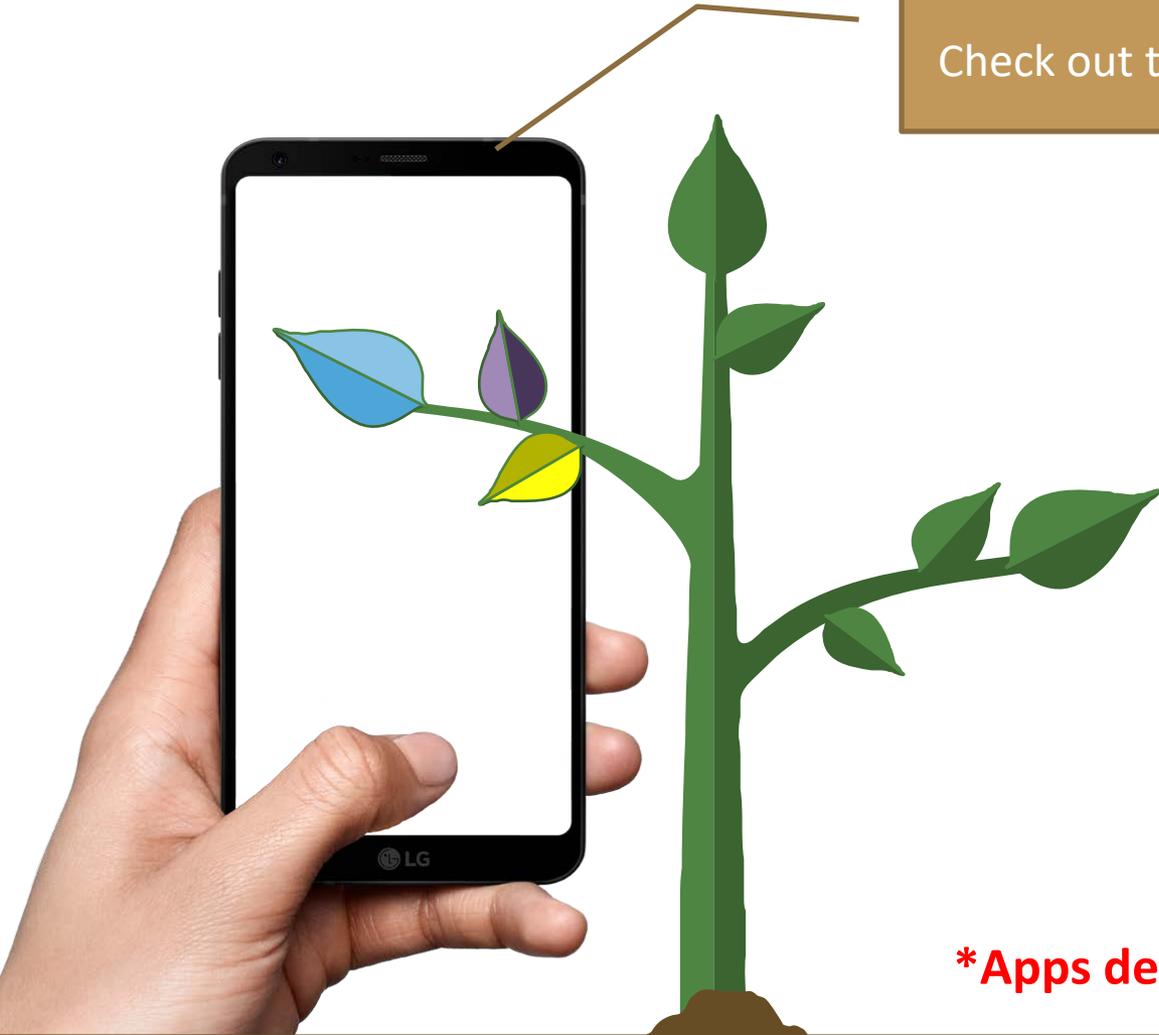
0 - 0.33  
Unhealthy

0.33 - 0.66  
Healthy

0.66 - 1  
Very Healthy

# MOBILE SET-UP

Check out the NIR Filter in mobile phone



## Visible light Filter

Polyvinyl chloride sheet

## Red and Blue Filter

Rosco Fire # 19

Rosco True Blue # 2007

Rosco # 87

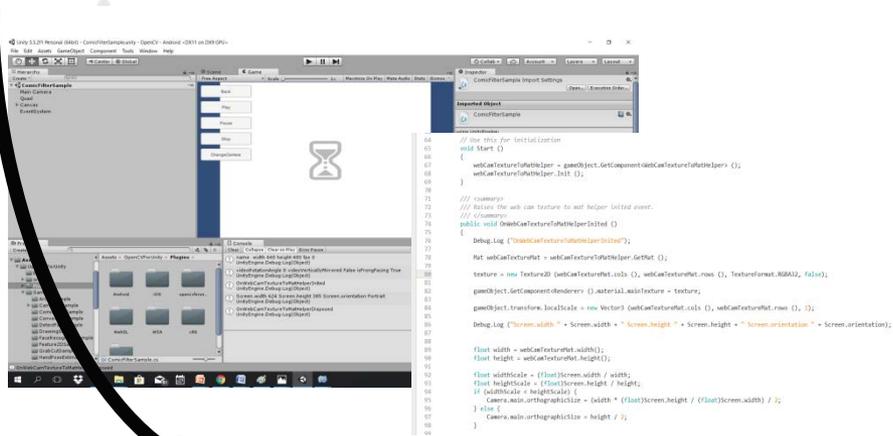
**\*Apps development : Unity and OpenCV**

NIR image

Red image

NDVI image

Color map table



```
64 // the this for initial location
65 void Start ()
66 {
67     webCameraTextureToWebCamper = gameObject.GetComponent<WebCameraTextureToWebCamper> ();
68     webCameraTextureToWebCamper.Init ();
69 }
70
71 // comments
72 // since the web cam texture to not trigger the event.
73 // comments
74 public void OnWebCameraTextureToWebCamperInit ()
75 {
76     Debug.Log ("OnWebCameraTextureToWebCamperInit");
77 }
78
79 int webCameraTextureToWebCamperGetNet ();
80
81 int webCameraTextureToWebCamperGetNet ()
82 {
83     texture = new Texture2D (webCameraTextureToWebCamper.GetNet (), TextureFormat.RGBA32, false);
84     gameObject.GetComponent<WebCamper> ().material.mainTexture = texture;
85     gameObject.GetComponent<WebCamper> ().material.mainTexture = texture;
86     Debug.Log ("Screen.width = " + Screen.width + " Screen.height = " + Screen.height + " Screen.orientation = " + Screen.orientation);
87
88     float width = webCameraTextureToWebCamper.GetNet ();
89     float height = webCameraTextureToWebCamper.GetNet ();
90
91     float widthScale = (float)Screen.width / width;
92     float heightScale = (float)Screen.height / height;
93     if (widthScale < heightScale) {
94         Camera.main.orthographicSize = (width * (float)Screen.height / (float)Screen.width) / 2;
95     } else {
96         Camera.main.orthographicSize = height / 2;
97     }
98 }
```

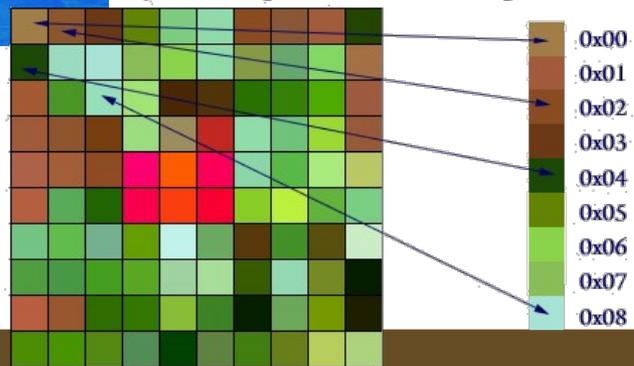
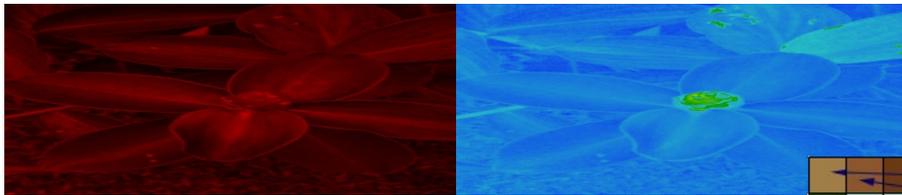
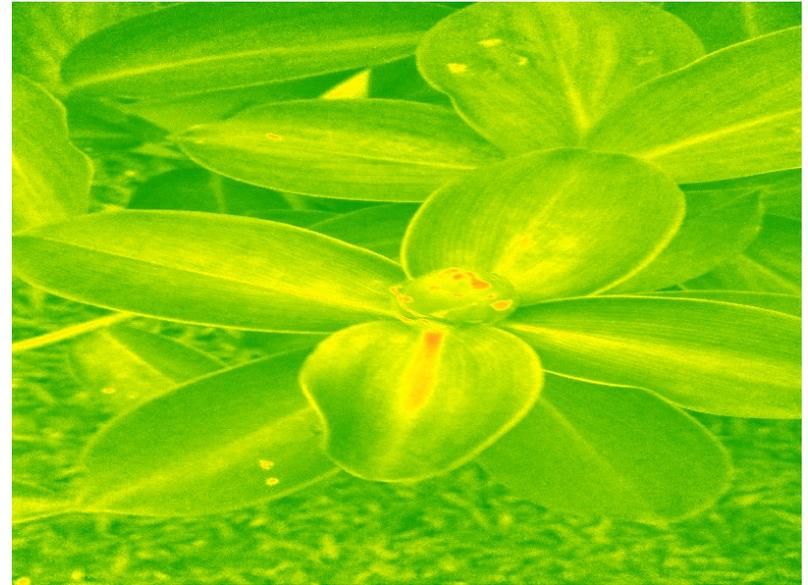
Health analysis

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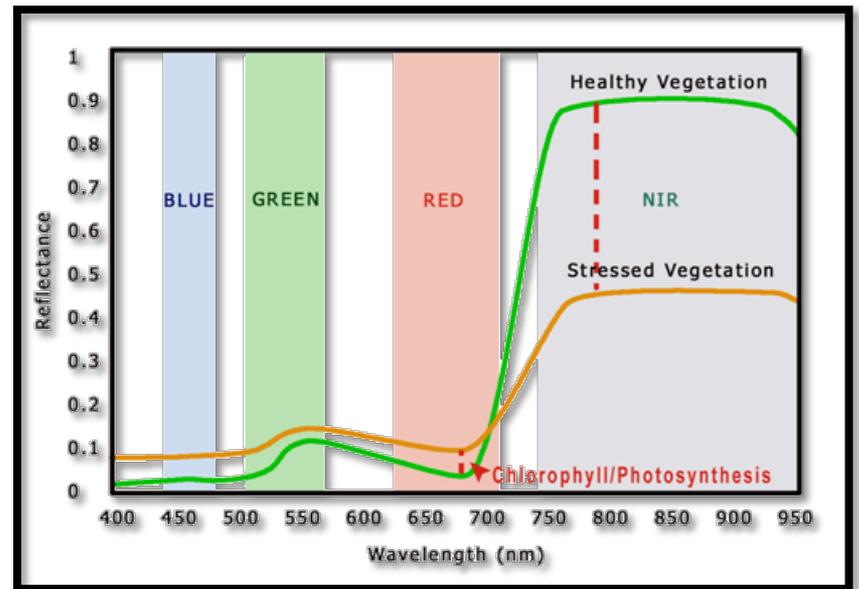
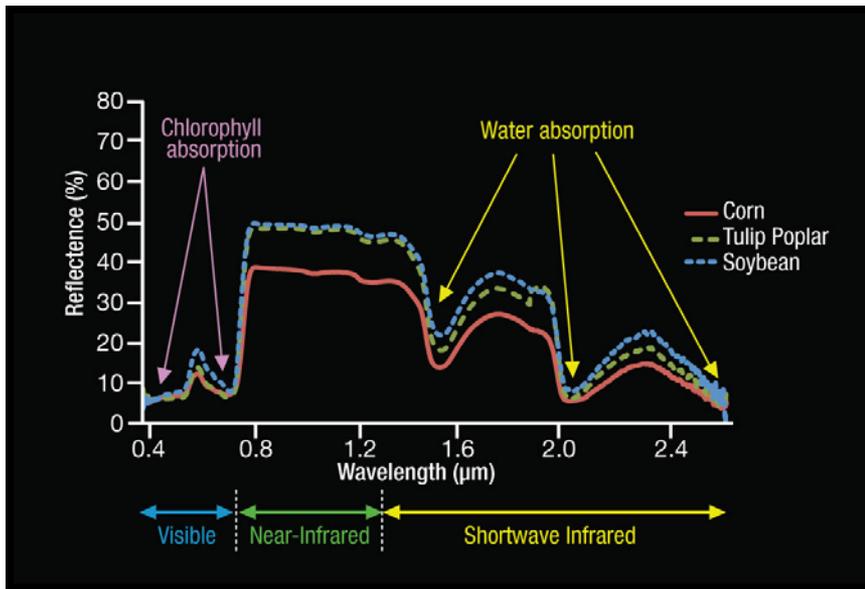


**\*Apps development : Unity and OpenCV**

# Preliminary Result



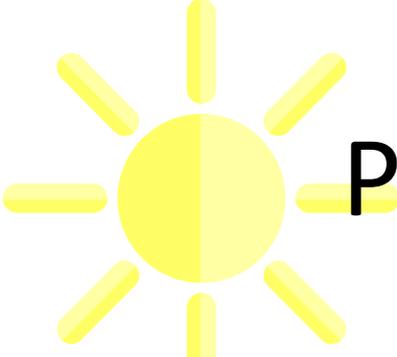
# More findings



Credit: Eric Brown de Colstoun

Next: Plant health analysis algorithm





# POTENTIAL APPLICATION

- Input for smart agriculture
- Low cost and doable multiple mobile applications



Seed for collaboration



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TerimaKasih | *Thank You*

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