

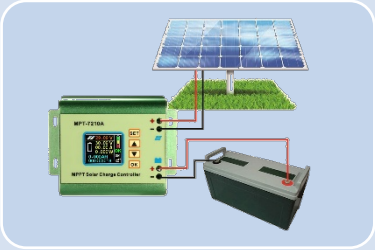
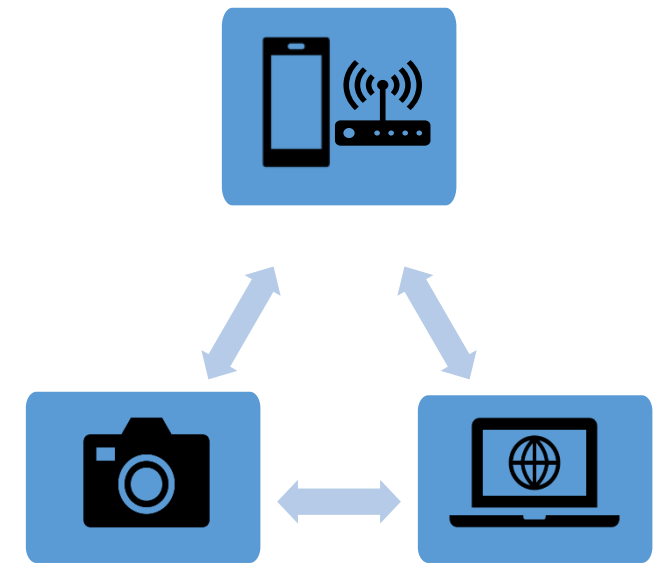
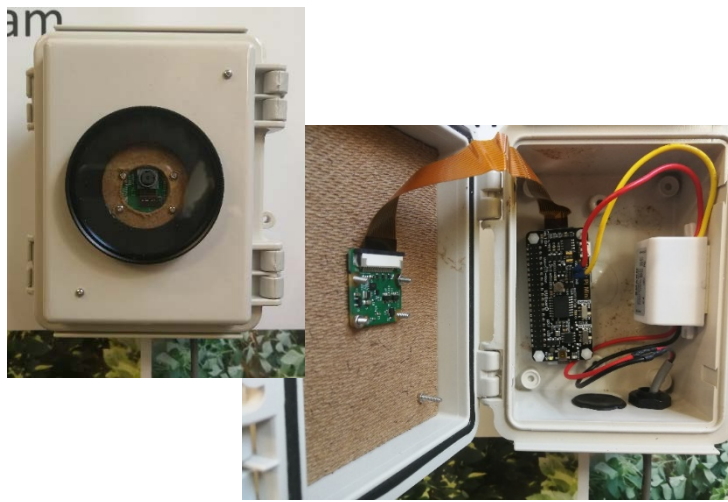
# Stress Cam

To find a On-Farm solution to detect Water stress in real-time and relate to other measurements on the field.

*Keywords: open source, computer vision, machine learning, edge computing.*

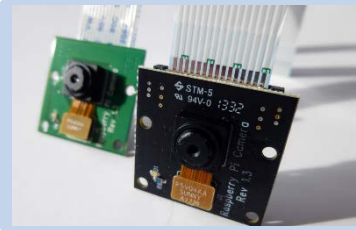


# StressCam V 1.0



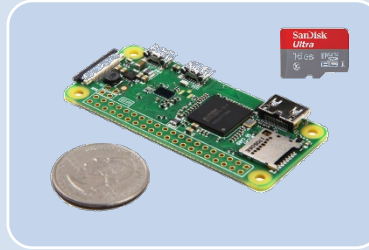
## Power Requirements

- Solar Panel
- Regulator
- Battery



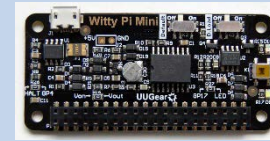
## Camera

- Raspberry Pi Camera 8MPx
- RGB, IR, Stereo, WAL



## Process and acquire images

- Raspberry Pi Zero Wireless

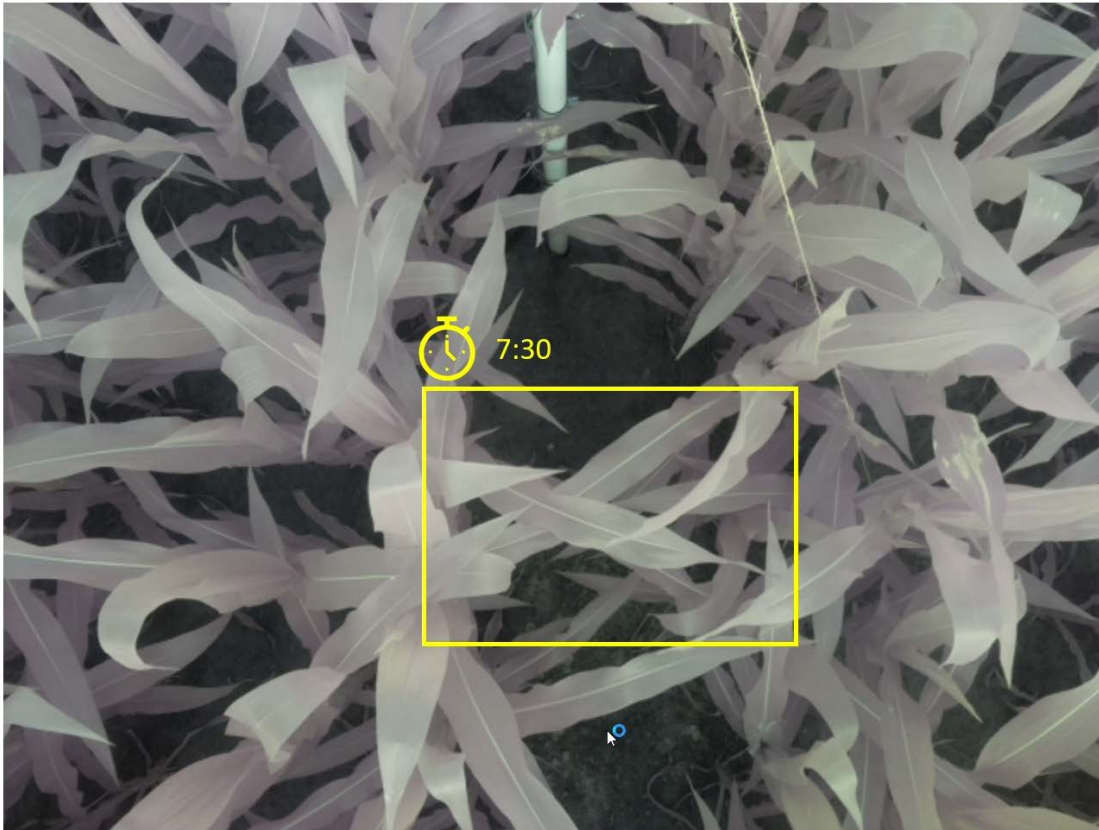


## Turn on/off Automatically

- Witty Pi mini.
- Power management





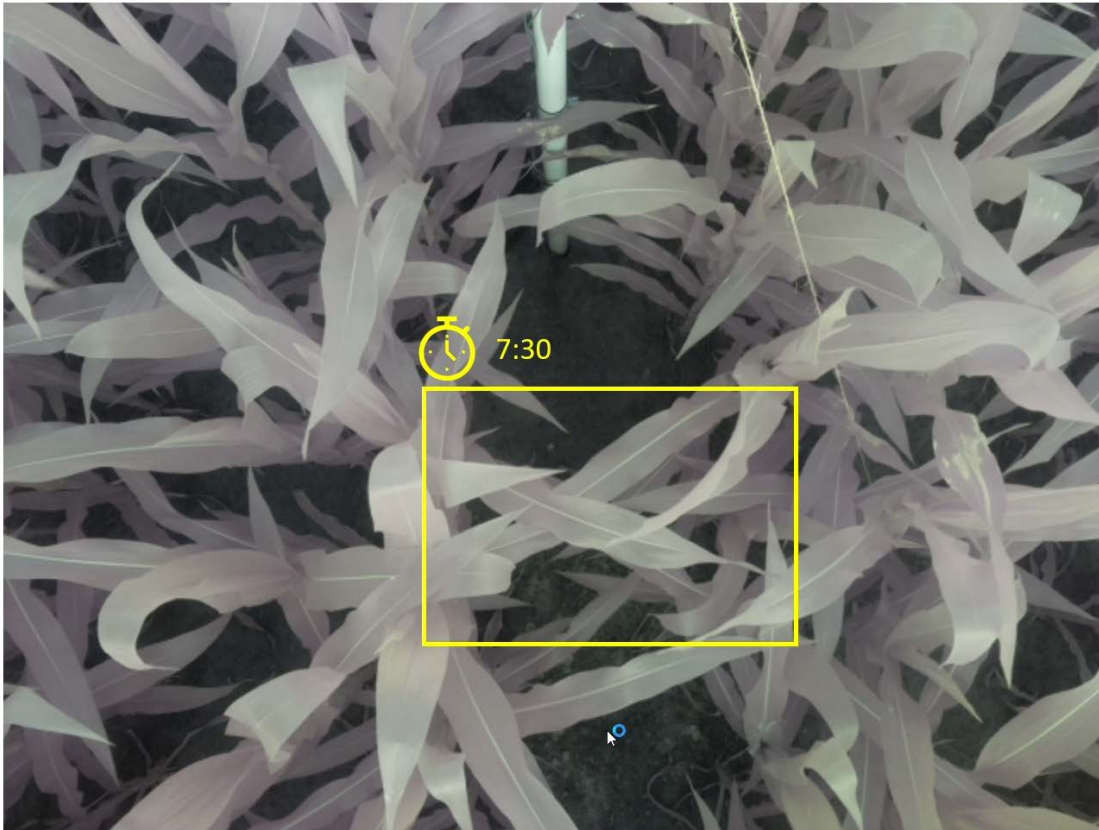


20 cameras installed – 30% Hardware problems  
Problems to access information from the field



Sandhill – Summer 2019  
70 days – 6 am – 9 pm  
16 soybean genotypes  
40.000 images > 15 GB  
~3.000 images annotated  
Dataset cleaned to train in validate models





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Problems to access information from the field



Sandhill – Summer 2019  
70 days – 6 am – 9 pm  
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~3.000 images annotated  
Dataset cleaned to train in validate models





0 – No wilting



1 - Leaflets folding inward at secondary pulvinus, no turgor loss in leaflets or petioles



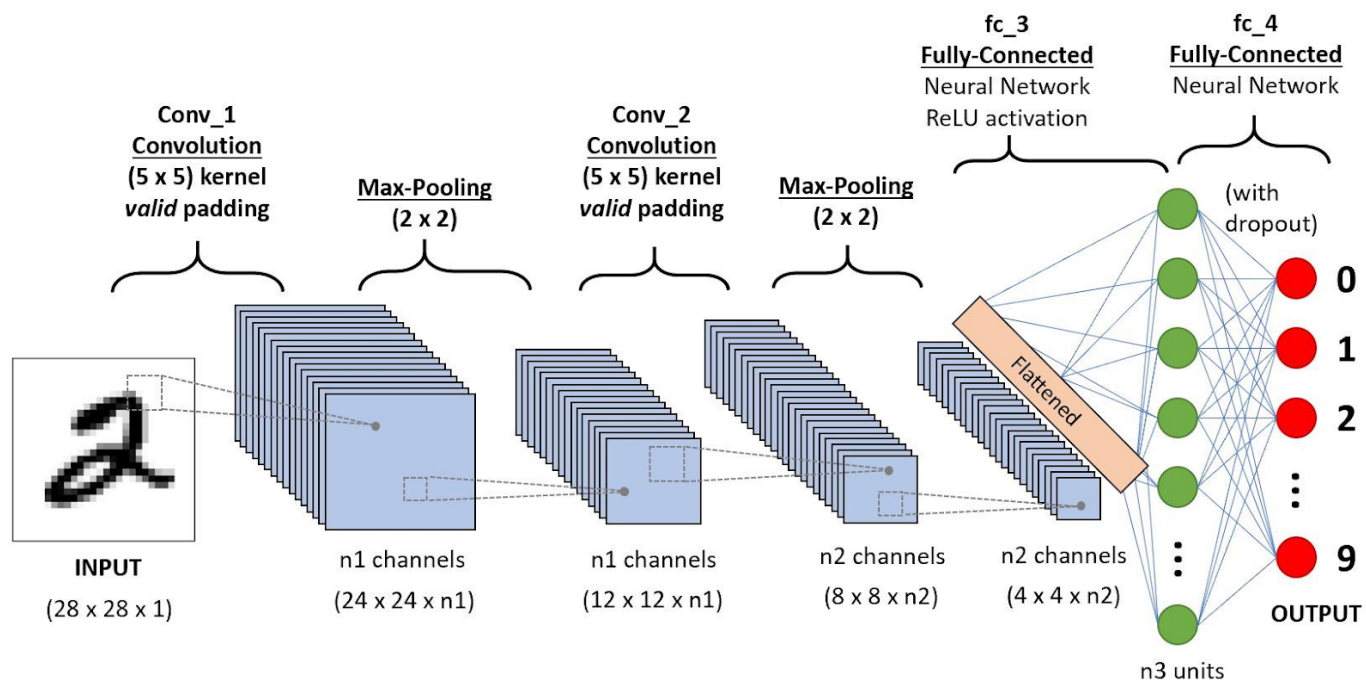
2 - Slight leaflet or petiole turgor loss in upper canopy



3 - Slight leaflet or petiole turgor loss in upper canopy



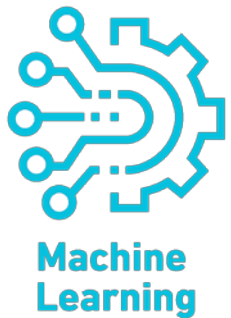
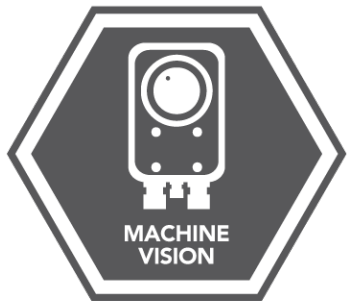
4 - Severe turgor loss throughout canopy



Deep Learning Algorithm

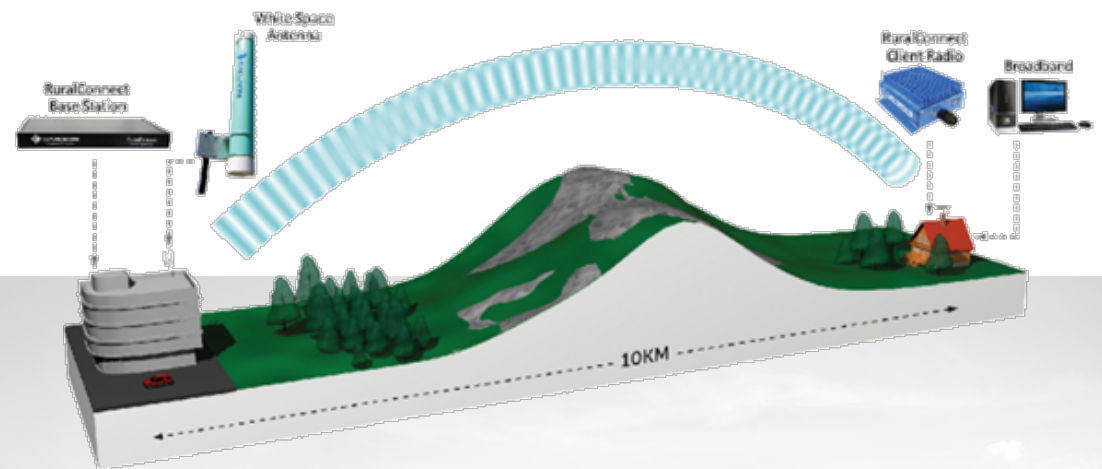
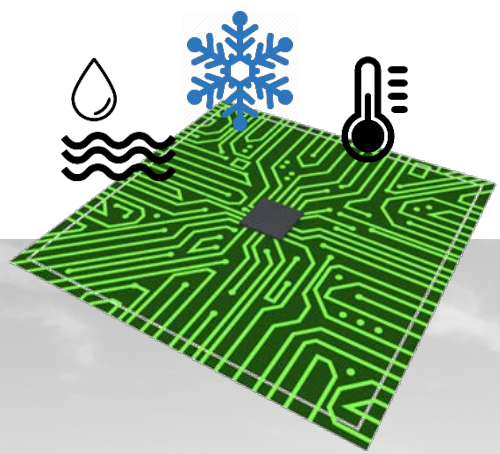
9 levels of water stress  
 5 levels found  
 ECE Neural network Course  
 ➤ 120 students deploy ML  
 ➤ 80 % accuracy

# Next steps



Electrical and  
Computer Engineering

College of Agriculture  
and Life Sciences



IoT Hardware



Connectivity



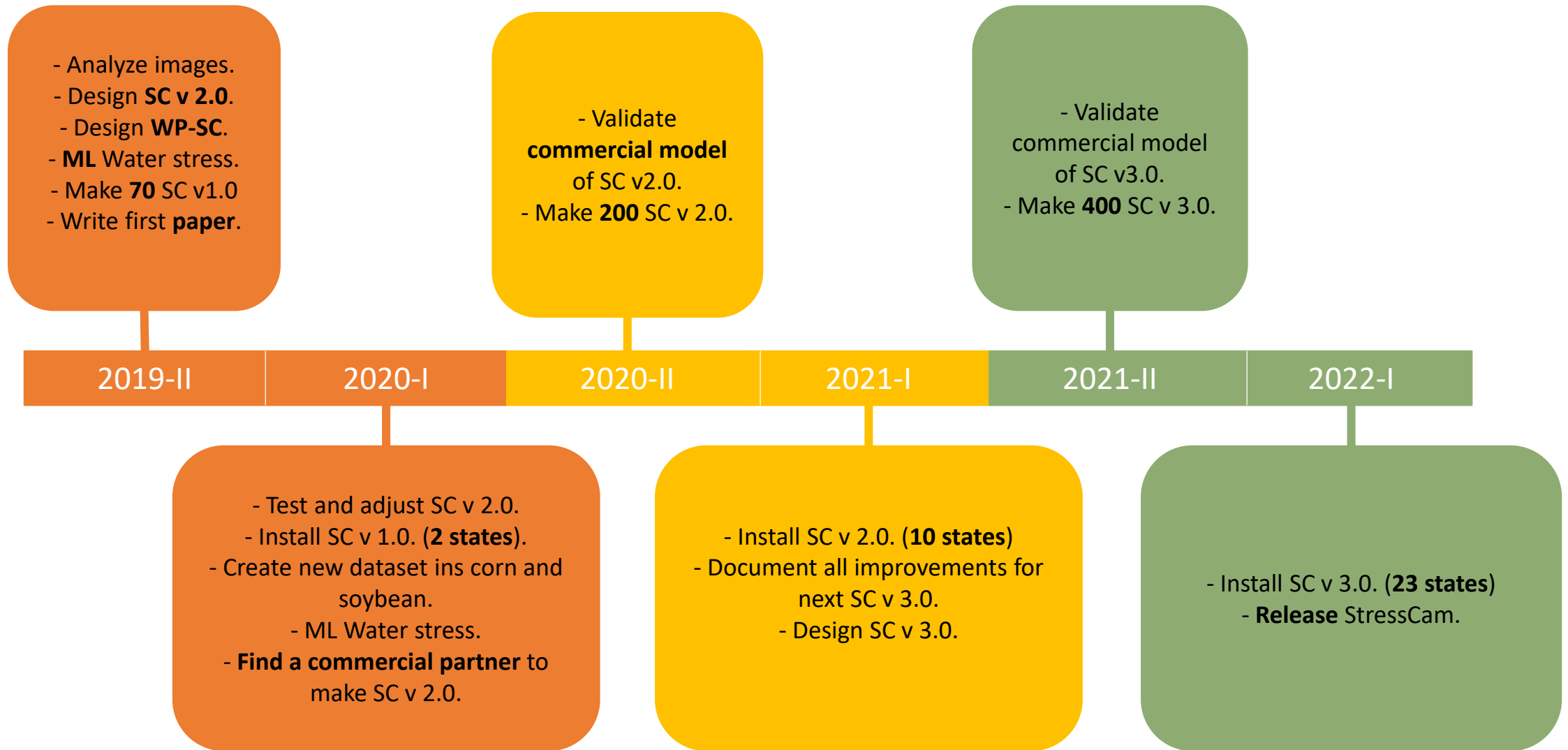
IoT Device Cloud



IoT Apps



# Timeline







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Thank you