IoT for Productive Tea Plantation

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- Main source of foreign exchange for Sri Lanka
- Contributing roughly $700 million annually
- World's fourth largest producer of tea
- Better - Humidity, cool temperatures, and rainfall of the country's central highlands

Ceylon Tea is a Gift to the world

Motivation

- Fungi Infection
- Impoverishment of soil fertility
- Decreasing organic matter contents
- Acidification
- Increases in toxic aluminum concentrations

Fungi Detection

Spread fast

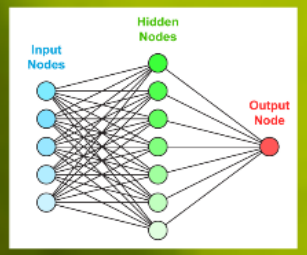
Absorb nutrition from plants

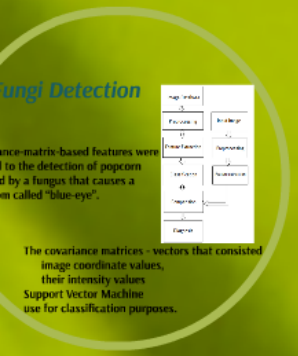
Now

- plated them and do bio chemical testing
  - need labs
  - costly
  - inefficient

Solution

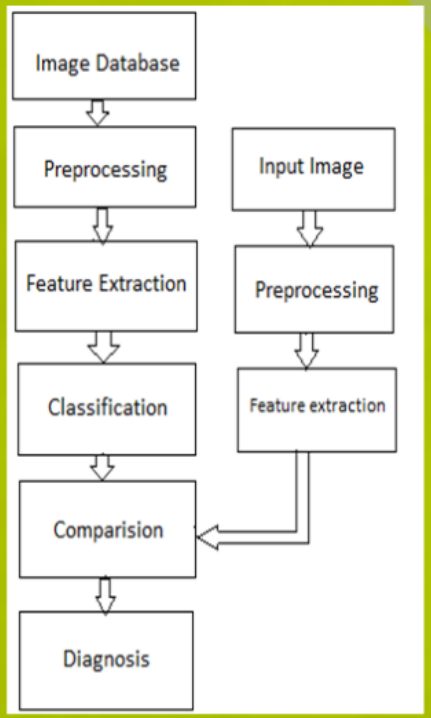
- Capture tea leave from a device
- Image processing - Support Vector Machine
- Artificial intelligence





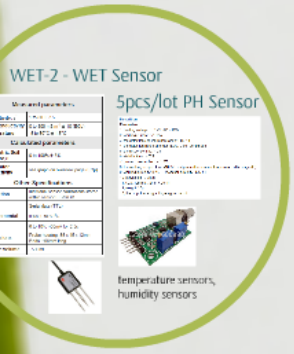
Fungi Detection

Covariance-matrix-based features were applied to the detection of popcorn infected by a fungus that causes a symptom called “blue-eye”.



The covariance matrices - vectors that consisted
image coordinate values,
their intensity values
Support Vector Machine
use for classification purposes.

Restoring Soil Fertility with Organic Fertilizers



- Wireless Sensor Network
- Devices powered by solar power
- Physical Security : Protect from laborers
- sensor -> database -> archive -> lab

Monitor -
Soil moisture
PH
%C
%N
%K
%P
%Ca
%Mg

Solution - Treat Plants after monitoring soil moisture, fungi effects and organic fertilizer effects

WET-2 - WET Sensor

Measured parameters	
Permittivity, $\varepsilon^{'}$	1 to 80 ± 2.5
Bulk conductivity	0 to 300 mS.m^{-1} ± 10 (ECb)
Temperature,	-5 to 50°C ± 1.5°C
Calculated parameters	
Volumetric Soil Moisture, θ	0 to 100% ± 3%
Pore water conductivity	see graph on overview page (ECp)
Other Specifications	
Calibration	Individual sensor calibrations stored within sensor EEPROM
Output	Serial data (TTL)
Environmental	IP68, 0 to 50°C
Power	6 to 10V, ~38mA for 2.5s
Dimensions	Probe housing: 55 x 45 x 12mm Rods: ~68mm long
Sample volume	~500ml

5pcs/lot PH Sensor

Descrition:

Parameters:

1, heating voltage: 5±0.2V (AC -· DC)
2, working current: 5-10mA
3, the detection concentration range: PH0-14
4, the detection range of temperature: 0-80 centigrade
5, the response time: ≤ 5S
6, stability time: ≤ 60S
7, power consumption: ≤ 0.5W
8, the working temperature: -10~50 centigrade (the nominal temperature 20 centigrade)
9, working humidity: 95%RH (nominal humidity 65%RH)
10, service life: 3 years
11, size: 42mm x 32mm x 20mm
12, weight: 25g
13, the output: analog voltage signal output

temperature sensors,
humidity sensors

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Thank You

Questions

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