
Smart Agriculture

Overview

Agriculture is seeing rapid adoption of Artificial Intelligence (AI) and Machine Learning (ML) both in terms of agricultural products and in-field farming techniques. Huge volumes of data get generated every day in both structured and unstructured format. These relate to data on historical weather pattern, soil reports, new research, rainfall, pest infestation, images from Drones and cameras and so on.That is why the huge boom in modernising the agriculture is easier to control and manipulate in order to have optimised results.

FUTURE FARMS

SURVEY DRONES

Aerial drones survey the fields, mapping weeds, yield and soil variation. This enables precise application of inputs, mapping spread of pernicious weed blackgrass could increasing Wheat yields by 2-5%.

FLEET OF AGRIBOTS

A herd of specialised agribots tend to crops, weeding, fertilising and harvesting. Robots capable of microdot application of fertiliser reduce fertiliser cost by 99.9%.

FARMING DATA

The farm generates vast quantities of rich and varied data. This is stored in the cloud. Data can be used as digital evidence reducing time spent completing grant applications or carrying out farm inspections

TEXTING COWS

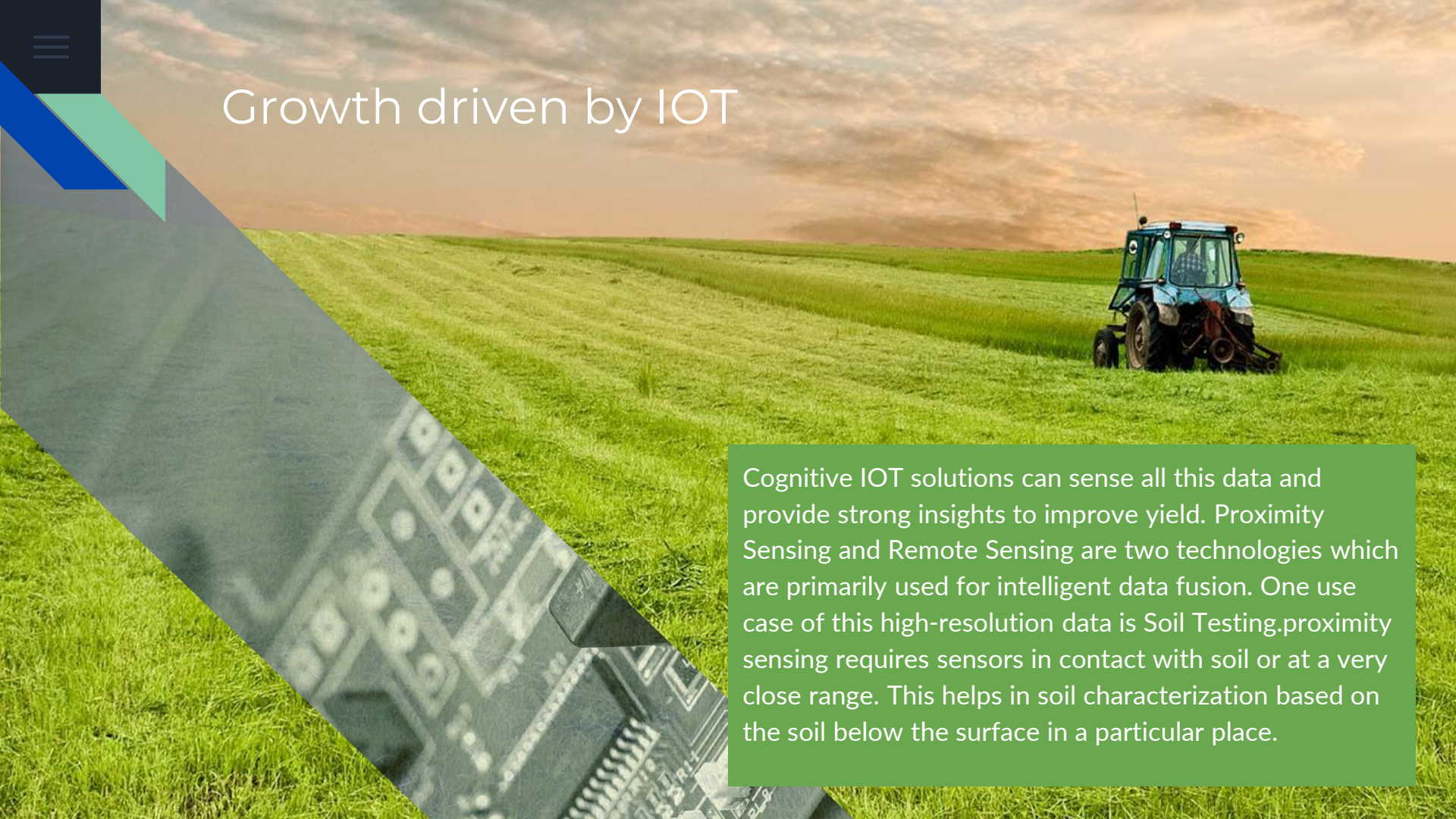
Sensors attached to livestock allowing monitoring of animal health and wellbeing. They can send texts to alert farmers when a cow goes into labour or develops infection increasing herd survival and increasing milk yields by 10%.

SMART TRACTORS

GPS controlled steering and optimised route planning reduces soil erosion, saving fuel costs by 10%.

www.nesta.org.uk/precision-agriculture

Growth driven by IOT



Cognitive IOT solutions can sense all this data and provide strong insights to improve yield. Proximity Sensing and Remote Sensing are two technologies which are primarily used for intelligent data fusion. One use case of this high-resolution data is Soil Testing.proximity sensing requires sensors in contact with soil or at a very close range. This helps in soil characterization based on the soil below the surface in a particular place.

Some Numbers On Precision Farming

Digital Farming figures

It is estimated that, with new technologies, **Internet of Things** (IoT) has the potential to help increase agricultural productivity by **70%** by **2050**. (FAO)

70-80% of the new farm equipment sold today has a precision agriculture component. (CEMA)

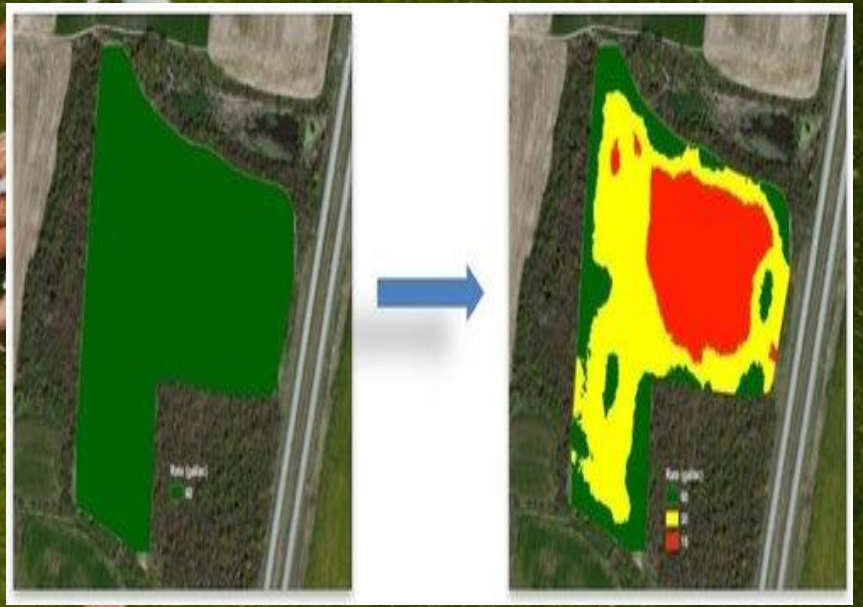
76% of UK farmers cited "improved accuracy" as a reason for using precision farming technologies. (DEFRA 2013)

There will be **27 billion** connected devices in 2024; 225 million will be used in agriculture. (Machina Research)

90% of all crop losses are due to weather. This crop damage could be reduced by **25%** using predictive weather modelling and precision agriculture techniques. (IBM Research)

Importance of Drones

High-resolution cameras in drones collect precision field images which can be passed through convolution neural network to identify areas with weeds, which crops need water, plant stress level in mid- growth stage. In terms of infected plants, by scanning crops in both RGB and near-infrared light, it is possible to generate multispectral images using drone devices. With this, it is possible to specify which plants have been infected including their location in a vast field to apply remedies, instantly.



Importance of Image Insight For Insurance policies

Image Based Insight Generation

Diseases and Catastrophies Identification

Detecting the disease and stress level based on image insights .Easier Insurance reports as the experts will gain more visibility over farmers reclamations.

Crop readiness identification

Images of different crops under white/UV-A light are captured to determine how ripe the green fruits are. Farmers can create different levels of readiness based on the crop/fruit category

Field Management

Using high-definition images from drones or copters, real-time estimates can be made during cultivation period by creating a field map and identifying areas where crops require water, fertilizer or pesticides.

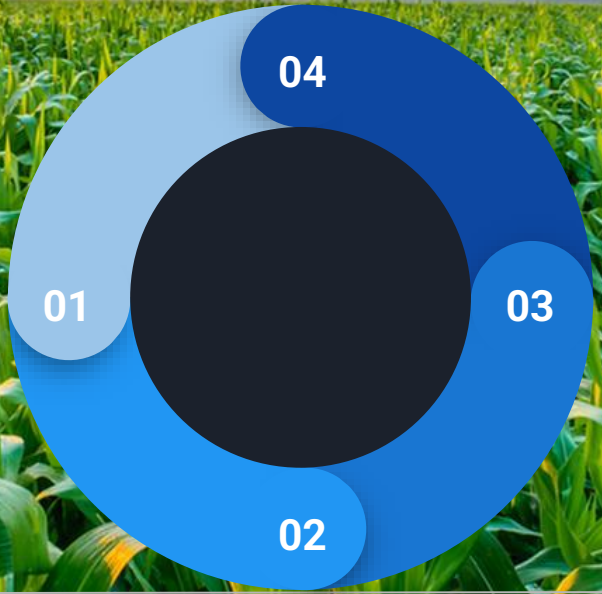
Plant Stress Identification

Identification

Early disease,bacterial spots

Classification

No stress,Moderate stress,high stress



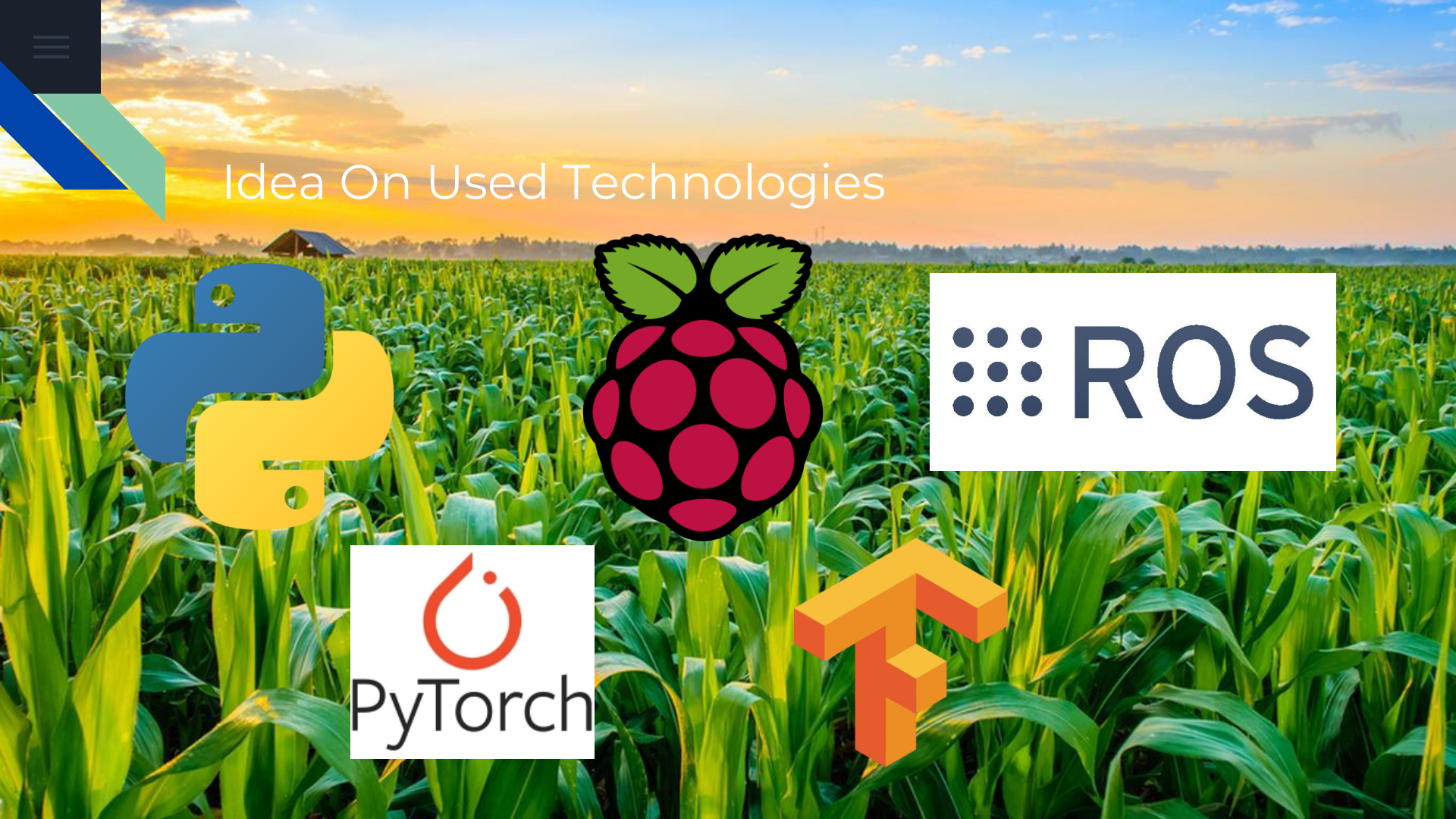
Prediction

Early stress prediction using weather data and stress severity

Quantification

Percentage of stress

Idea On Used Technologies

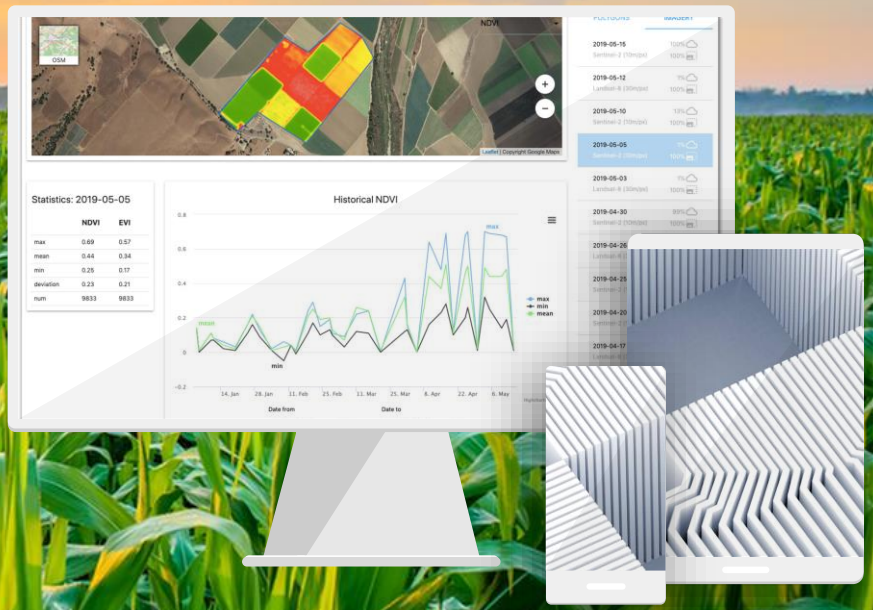


Deployment

colab

Flask

R



Limitations

01 A major problem with UAVs is battery and flight time limitations.Currently, lithium-ion batteries. Are used Their capacity is larger than that of conventional batteries. However, the larger the capacity, the heavier the weight

02 Data availability,where in most cases the data must be collected now because this field is kind of new especially in tunisia and the types of crops are different from area to area.

03 Legislations are currently being worked were drones could be used for research purposes and agriculture especially were it accounts for nearly 10% of the tunisian GDP.


Thank you for your attention!