Getting Value from Artificial Intelligence in Ag

Dr. Matthew J. Smith, Microsoft

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@JungleTeuch

Also see my paper in *Animal Production Science* on "Getting Value from Artificial Intelligence in Agriculture

Increase profit, productivity

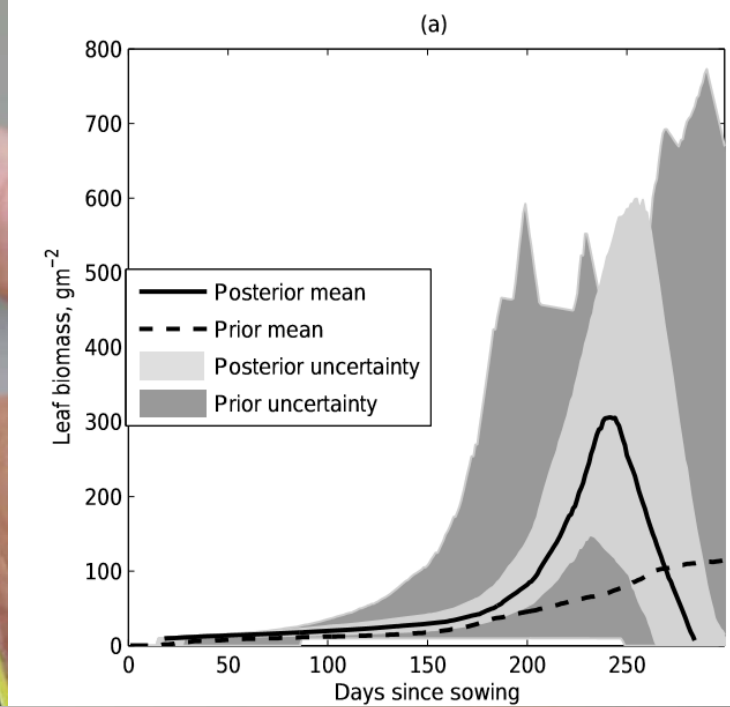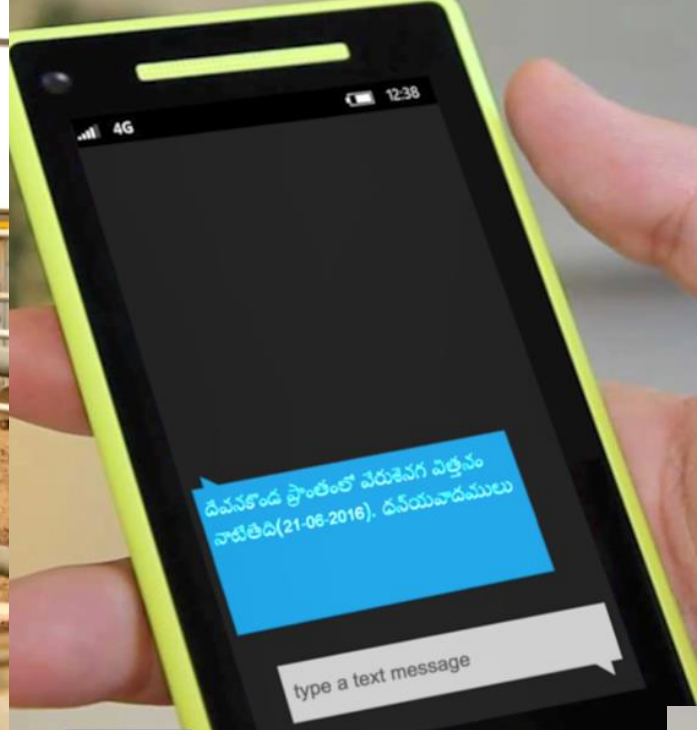Waste less produce, inputs

Save time, get more sleep

Increase sustainability

Have happier animals

Have happier employees

Identify better varieties

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What is Artificial Intelligence?

Anything where a machine does something smart in light of data inputs

Some code takes data, does some computation, and gives you some actionable information that is regarded as intelligent

Predicting TB / mastitis and why

Providing planting schedules

Notifying that cow is in heat

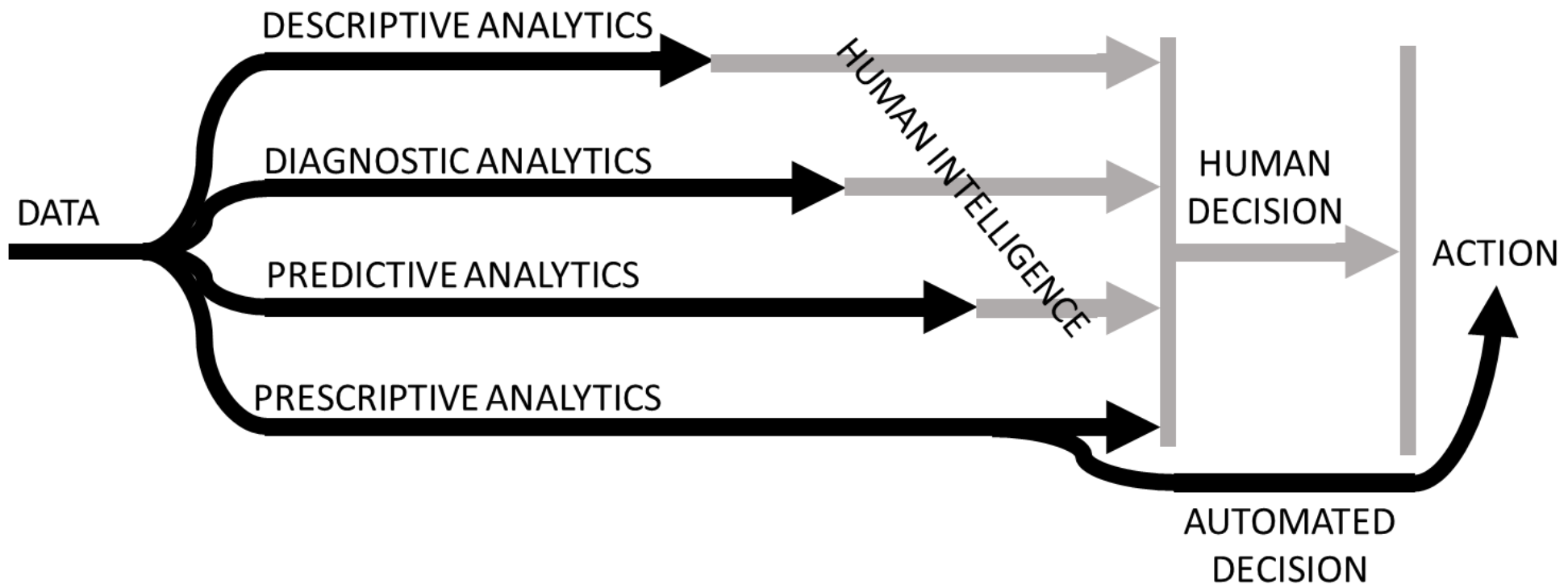Telling you "something's not right" in the cow shed e.g. intruder!

Recognising and signing in your workers
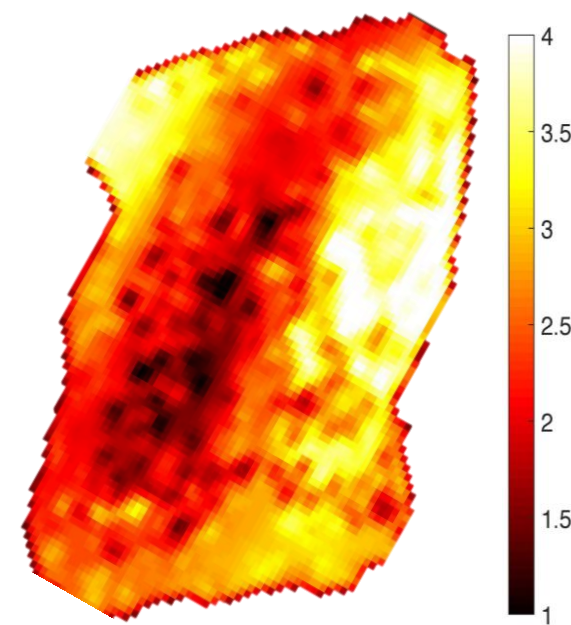
Saying what inputs to apply where and when

Predicting what to grow based on what end-consumers are like

How to think about getting value from Artificial Intelligence

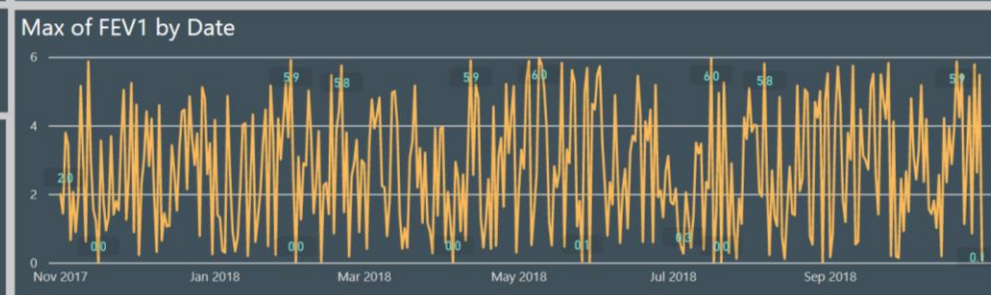It's all about doing something with data

200M Images, 20TB
Land cover mapping for the whole of US in
10+ minutes

Land Cover Classification

No patient is selected
Patient Name

Date
Last   1   Select
No filters applied
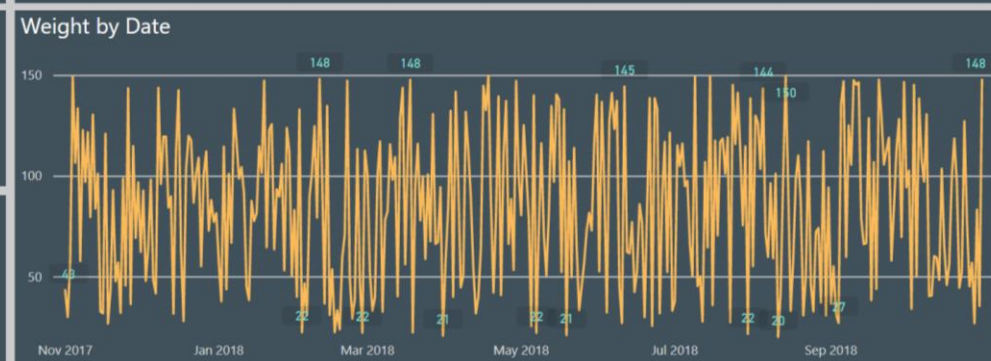
Id
☐ 9b0e5b33-4940-4ad6-aa71-c2c0c8831479
☐ f9b3d8ea-9d57-43f5-92b5-1647ff9d5cd9

5.99L
Best FEV1

115bpm
Average Heart Rate

Max of FEV1 by Date

4801kCal
Average Calories

5
Average Wellbeing Score

5
Average of Cough score

Weight by Date

What I think we'll see over the next 10 years: see my paper
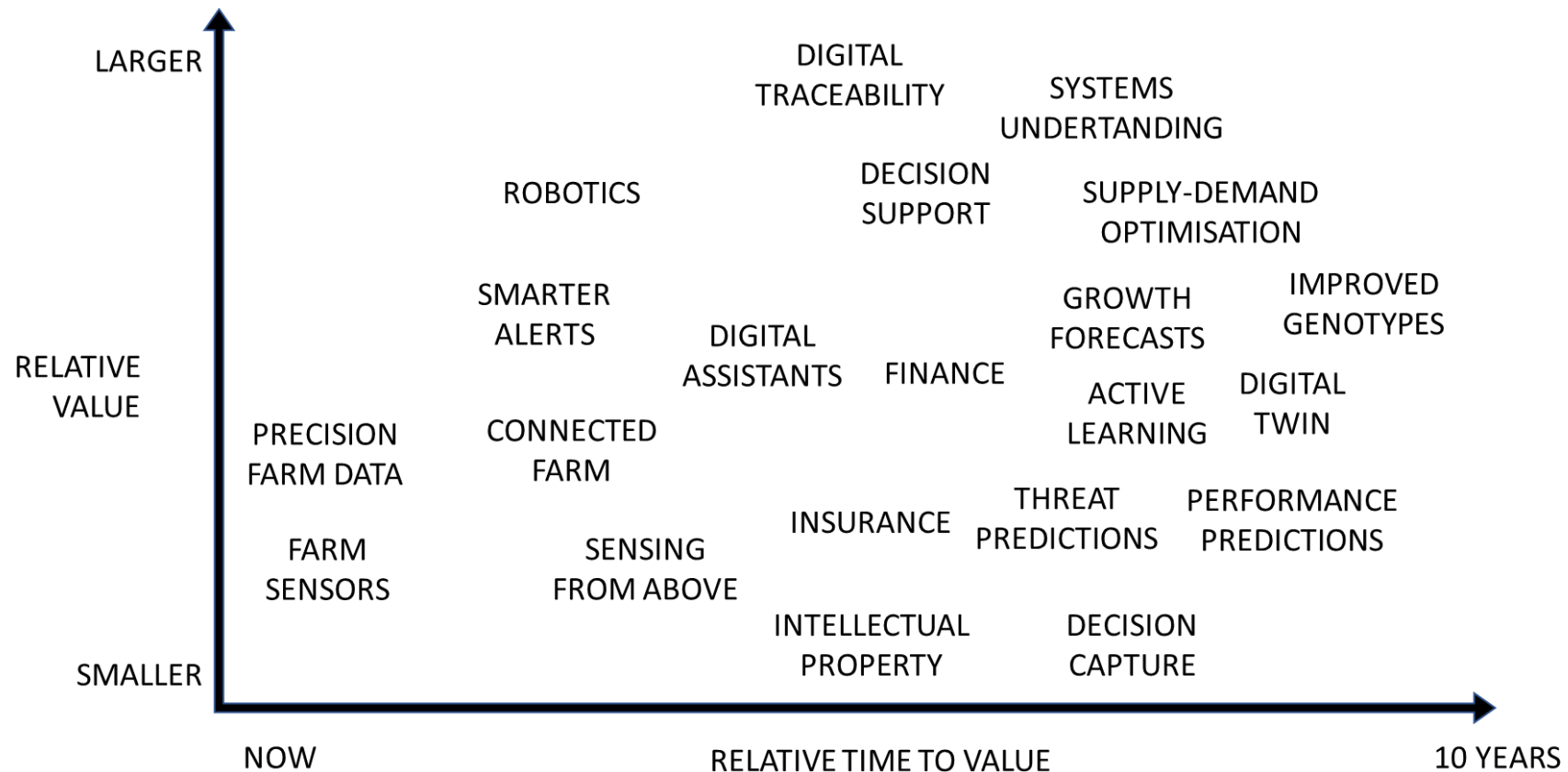
Things we need to focus on now

The UK Data economy

- Modern production systems and supply chains DEPEND on data supply chains
- Our data supply chains need to be sustainable, efficient, fair trade
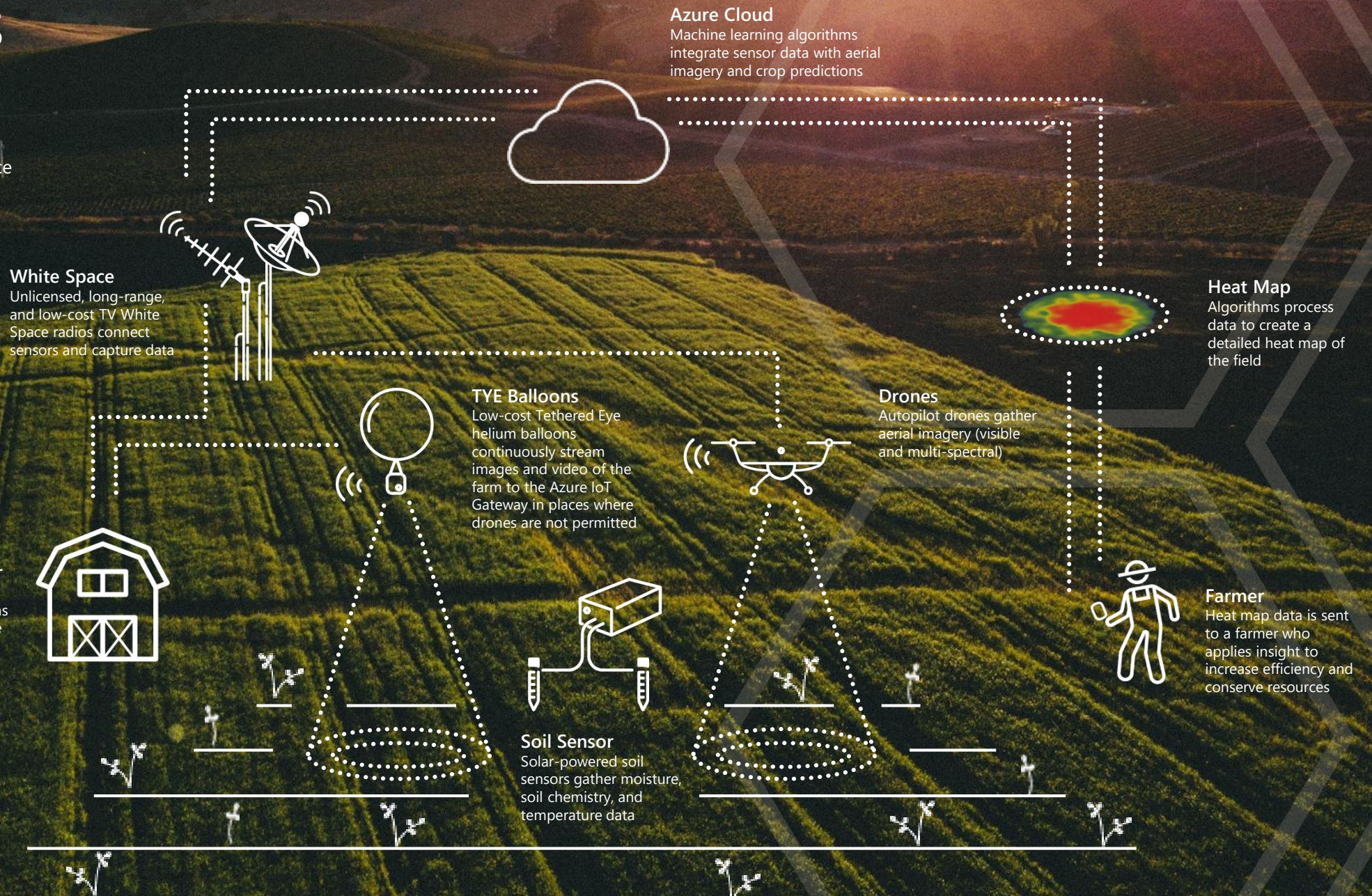- We need a UK AI for Ag action plan
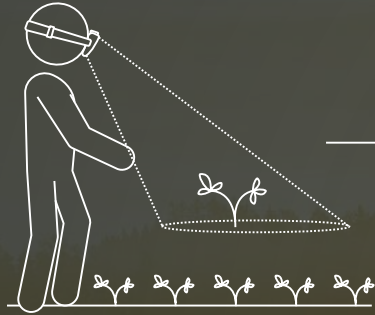
Keep it simple stupid

Training

FarmBeats

FarmBeats provides farmers with access to Microsoft Cloud and AI technologies, enabling data-driven decisions to improve agricultural yield, lower overall costs, and reduce the environmental impact of agricultural production

Azure Cloud
Machine learning algorithms integrate sensor data with aerial imagery and crop predictions

White Space
Unlicensed, long-range, and low-cost TV White Space radios connect sensors and capture data

Heat Map
Algorithms process data to create a detailed heat map of the field

TYE Balloons
Low-cost Tethered Eye helium balloons continuously stream images and video of the farm to the Azure IoT Gateway in places where drones are not permitted

Drones
Autopilot drones gather aerial imagery (visible and multi-spectral)

Local Farm Computer
Windows 10 IoT-based Azure IoT Gateway performs computations and AI at the FarmBeats Edge in the farmer's house/office

Farmer
Heat map data is sent to a farmer who applies insight to increase efficiency and conserve resources

Soil Sensor
Solar-powered soil sensors gather moisture, soil chemistry, and temperature data
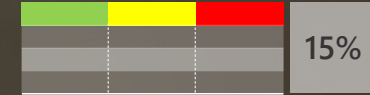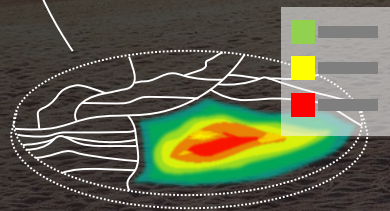
Pre-season planning

AGGREGATED INSIGHT

Creating a mixed reality view of your farm with the ability to visualize pH and soil types
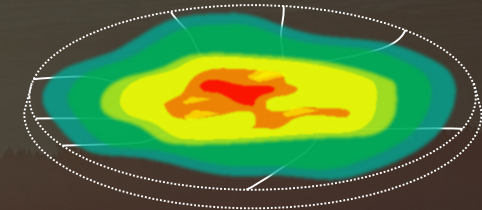
SIMULATION AND PREDICTION

Leveraging predictive insights and simulation data to inform planning decisions

15%

REMOTE SUPPORT

Collaborating with an agronomist to monitor growth stages, identify crop threats, and deliver recommendations

YIELD ANALYSIS

Leveraging agronomist recommendations to influence future farming seasons

JOHN SMITH AGRONOMIST

Crop Status Report: Field 7	
Growth Stage(s)	R4-R5
Crop Vigor	Excellent
Crop Threats	Insect, Disease

Secure data sharing

A secure, walled garden approach to sharing data in a controlled, encrypted, and monitored way. Data providers share data into a secure vault by defining policies that determine what data is shared and what encryption is applied. The data is then ingested in an Edge application and converted into a standard schema, returning insights based on the applied policy.

FIREWALL

ENCRYPTED

TAMPER PROOF MONITORING

DATA CONSENT POLICY

DATA CONVERSION

DATA ALGORITHM

DATA CONVERSION

DATA CONSENT POLICY

FARMER'S DATA

FARM

Agronomic suggestions

Research insight

AGRICULTURAL INPUT PROVIDER