Unearthing the IoT in Agriculture

Real-time monitoring of airborne pathogen spores for M2M disease forecasting

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Burkard

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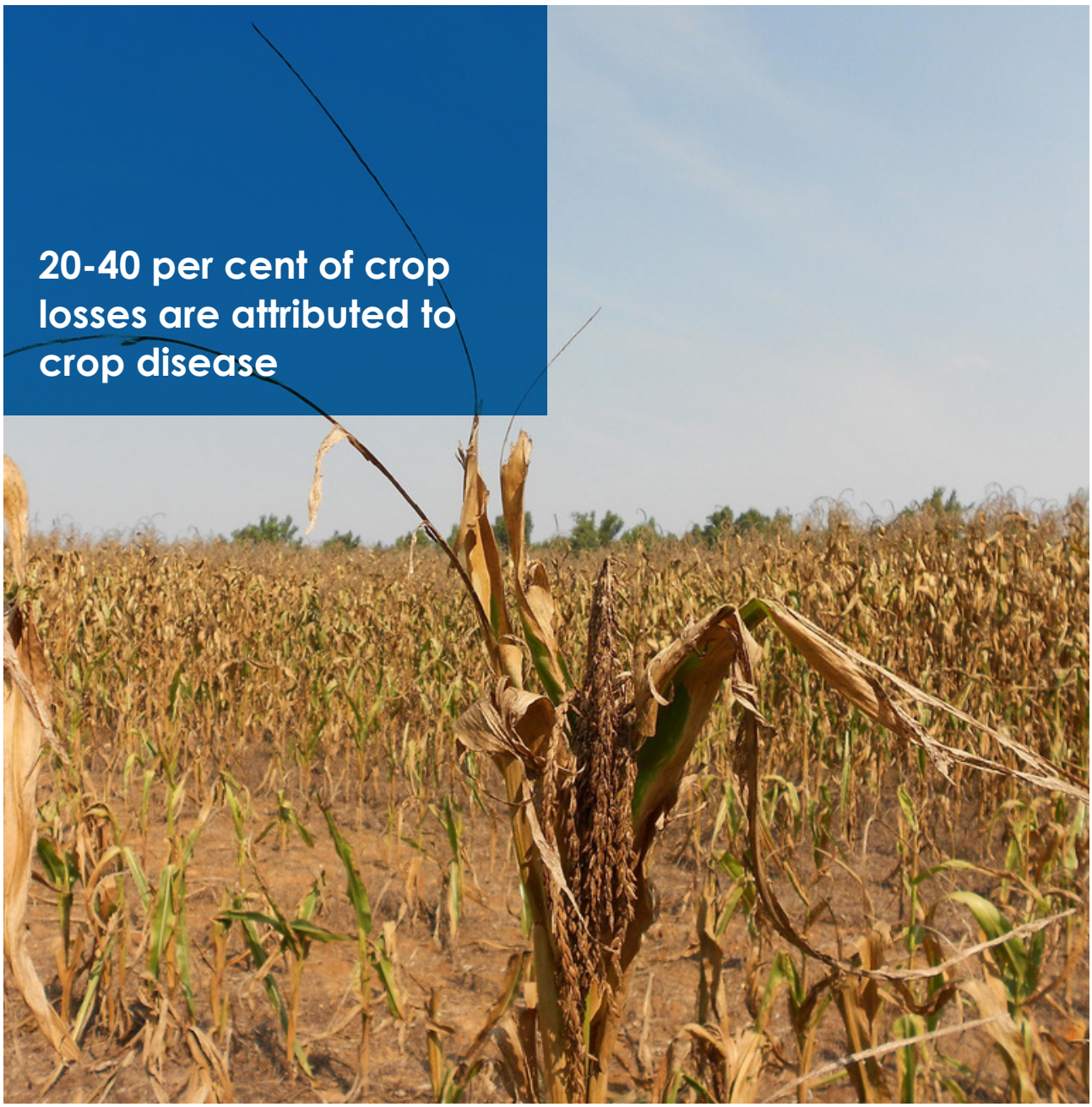

Increasing the world's food supply is a major issue, crop diseases can have a devastating humanitarian and economic impact and with sustained global population growth it is estimated that by 2050, a **70 per cent** increase in food production is required to ensure the world is fed. With 20-40 per cent of crop losses attributed to disease, the accurate prediction and prevention of diseases is a vital area to address in the battle to enhance yields, and is now an area in which cellular IoT and the AWS Cloud is providing support to an innovative solution.

Traditionally, the method of identifying signs of crop disease has been time-consuming, cumbersome and costly, involving research scientists assessing the contents of in-field samplers under a microscope.

Preventative pesticide spraying is also used to protect crops from possible disease, with weather or planting dates informing decisions on the chemicals to be applied. This is less effective and more costly than targeted spraying, it may be detrimental to consumer health and the environment, and over time, sees pests and diseases becoming resistant to the treatment.

With greater pressure on land to be productive, more accurate methods of disease prevention will significantly help to improve yields and in response to this challenge, Burkard, designers and builders of air samplers for agricultural research since 1953, has harnessed the power of the IoT. The company has developed a piece of real-time pathogen monitoring equipment to predict and provide an early warning system of crop disease risk, as part of a UK Government Innovate UK project.

Burkard's innovative product uses Eseye's AnyNet Secure global cellular connectivity and AWS IoT to enable farmers to receive tailored information from their own fields, whenever they want it, and to have full control over that data. By comparison, other available solutions rely on measuring equipment that may be positioned over 100 miles away from their crops, leaving farmers reliant on disease forecasts from general prediction websites, with no guarantee the data applies to their own fields.

Farmers can see exactly which fields are at risk

The Burkard Auto Sampler sits permanently within a farmer's field remotely collecting DNA release and uses a LAMP assay to quantify airborne spores. Crop data is then transmitted, over-the-air via the AnyNet Secure SIM, back to the AWS Cloud where it is analysed and reported in a matter of minutes using AWS IoT Gateway tools, which do the mathematics behind the forecasting. Information is stored and presented back so farmers can see exactly which fields are at risk and act accordingly to treat the crops.

Historically, for similar agricultural projects, Burkard used a general modem and SIM card to send texts to alert on potential crop risks. However, Burkard found this unresponsive because the lack of reliable connectivity across different locations resulted in the frequent need to change providers.

> While working on a similar project a few years ago, we had to send operators out with mobile phones from as many different providers as possible to find out which had the best signal in certain fields. It was not only extremely inefficient but often connectivity was lost anyway. This time we knew we needed a reliable connectively solution to make the project a success.
>
> **Stuart Wili, Managing Director at Burkard**

THE SOLUTION

farmers don't need to rely on single local network coverage

Burkard turned to IoT M2M connectivity specialist Eseye to deliver highly secure and reliable global cellular network data through its AnyNet Secure™ SIM. The AnyNet technology provides automatic routing onto up to 440 cellular operators in 190 countries and links seamlessly to the AWS Cloud.

The SIM's enhanced features also enable IoT devices to remotely and securely activate, provision, authenticate and certify devices or 'things', in field, over-the-air. Integration with AWS Cloud Services, further simplifies project set up and deployment by reducing the need for investment in specialist inhouse infrastructure and development resources. By adding AWS' software tools and cloud the business establishes the means to simply and quickly analyse data and to scale instantly and securely, on demand.

> With the AnyNet Secure SIM, farmers don't need to rely on single local network coverage, which often can't be guaranteed. Instead they can be assured accurate data from the field is being securely and accurately transmitted back to the server, without any concern over connectivity, the AnyNet Secure SIM will utilise any and all connectivity available.
>
> Farmers can completely trust the system data will forewarn about any potential issues with their crops, they can then act quickly to resolve them.
>
> **Stuart Wili, Managing Director at Burkard**

The module deployed, an Eseye Hera 604 with add-on logger functionality, can store all data and publish to AWS as required, ensuring there is no loss of information. A key challenge to the solution is to deliver secure and resilient connectivity, otherwise the farmers' data will be void.

We are finally giving farmers an answer to their concerns over the ramifications of crop disease. This not only provides peace of mind, but the solution also supports the environment and saves precious time, resources and ultimately money. Looking to the future, we plan to roll out the technology across the globe, particularly in developing countries, where the importance of farming is far higher, and therefore the need to prevent disease to ensure a healthy crop is even greater.

Stuart Wili, Managing Director at Burkard

Eseye's work with Burkard and AWS is a prime example of the range of economic, social and environmental benefits which can be reaped through IoT. By using AnyNet and AWS solutions, the agricultural industry can harness the knowledge and foresight from accurate data in making informed decisions. We are delighted to be part of this Innovate UK project and look forward to seeing the benefits rolled out across the globe.

Paul Marshall, Chief Customer Officer at Eseye

About Eseye

Eseye is a leading global provider of M2M cellular connectivity for the Internet of Things (IoT). We specialise in simplifying complex global device deployments for enterprises seeking to realise the efficiency-driving, data-enhancing and product-innovating opportunities of over-the-air IoT. With 800+ customers, we deliver highly secure and resilient cellular data services through our revolutionary AnyNet Secure™ Subscriber Identity Module (SIM). The SIM offers a seamless data feed onto the AWS Cloud and provides unique zero-touch, device provisioning and certification, and true freedom to roam in more than 190 countries. Eseye is an AWS Advanced Technology Partner - IoT Competency, winner of the 2017 Frost & Sullivan Product Leadership Awards; recognised in the 2017-18 Gartner Magic Quadrant for M2M managed services; and holds ISO 27001 accreditation.

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