Impact Case Study

A mobile app for detection of wheat diseases

A mobile app has been created that farmers can use to rapidly diagnose three common wheat diseases. The work has successfully attracted funding to develop and commercialise the software.

IMPACT FACTS

China is the world's largest producer of wheat[1] which it relies on as a staple food.

CHALLENGES

It is estimated that almost 25% of worldwide crops are lost to diseases with the potential to cause serious economic, social and ecological problems. One of the most significant disease threats to wheat in China is yellow rust which causes yield losses of 20-30% or up to 50-100% in severe cases. Accurate diagnosis and quantification of crop diseases are crucial for precision crop management, allowing targeted interventions and advancing food security and sustainability

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SOLUTIONS AND IMPACT

Through this Network+ project we have developed a prototype automated, cloud-based and mobile enabled software tool for accurately and quickly diagnosing wheat diseases; implemented in English and Chinese.

The software tool:
- exploits data from remote sensing, to locate disease areas, and smartphones/digital cameras that could be used by farmers to detect disease
- can identify three types of wheat diseases: leaf rust, yellow rust and Septoria.
- is implemented as a standard web service and can be easily adapted to other types of disease detection and plugged into other systems.

Key next steps include further validation, promotion of the software and application in practice by farmers.

We have successfully attracted funding to progress the work and explore commercialisation opportunities.

PARTNERSHIPS AND KNOWLEDGE SHARING

This project built on the UK partner's expertise in **automated, data-driven approaches** for crop disease detection using advanced **image processing and machine learning,** and the Chinese partner's expertise in the **CropWatch system,** a successful application of remote sensing for crop monitoring in operation for the past 20 years in China.

Results have been disseminated at international conferences, seminars and workshops. A video describing the app has been produced:

https://youtu.be/IDTOd4G4rhA ▶ YouTube


Annotated Severity = 2.7794%
Estimated Severity = 3.5689%
Disease Detected = Leaf Rust

Example results of automatic crop disease detection

MORE PROJECT DETAILS...

The disease detection system consists of:

- Remote sensing - using the China CropWatch System (http://www.cropwatch.com.cn) to locate disease areas
- Collection of images from the field
- Expansion of existing automated crop disease detection algorithms based on advanced image pattern recognition
- Development of crop disease detection tool - a cloud-based, mobile enabled diagnostic tool to facilitate fast, automatic crop disease diagnosis

Field visits in China were carried out to collect data and the disease detection system showed high levels of accuracy.

During visits to Gaocheng and Zhengding counties in Hebei province, images from smartphones and digital cameras were collected from the field.

100%
of wheat harvest can be lost to disease
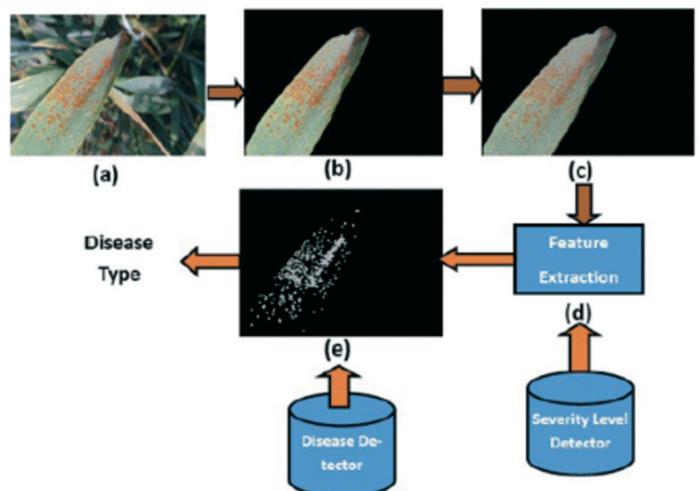
Disease detection system overview