

KUNDE: BAYER DATA DRIVEN FARMING

tecRacer connects Bayer Data-Driven Farming apps with AWS resources

BAYER works to provide farmers with sustainable agronomic recommendations and develops digital products and services that help them assess field conditions using specific machine learning algorithms and DataLake technologies, among other things. The long-term goal is to help farmers with tailored recommendations and improve crop yields. tecRacer supports the Data-Driven Farming department at BAYER's Digital Hub in developing a holistic concept for image acquisition, its analysis and the resulting recommendation for action. As a result, agricultural experts and students can use mobile applications to capture images of weeds, pests, diseases and more, annotate them and quickly receive an assessment or recommendation for action. This helps, above all, in supporting more sustainable agriculture.

Cause crop problems via smartphone apps for agriculture

Via mobile apps for iOS and Android (such as FieldCatcher), images of plants and so-called yellow trays with insects can be sent to the backend services and, thus, to the data lake. The images are evaluated using machine learning algorithms. This gives users access to a virtual expert. He helps to determine the cause of harvesting problems. tecRacer played a significant role in developing the backend in AWS and ensuring that the front ends work correctly with the AWS resources. In addition, they train and support the developers. The platform now allows any use case to be connected. The API interface is also available for others: Machine Learning/Artificial Intelligence developers can train new ML models in the existing environment. With the images and annotations provided, the DataLake is enriched increasingly, resulting in more meaningful AI models.



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Continuous improvement of image recognition in the library

Internally, the FieldCatcher app is already used in more than 20 countries worldwide - currently mainly for detecting weeds, diseases or pests. The next step is to extend the offer to farmers. Even without internet access, they will receive immediate results on the cause of the problem via smartphone, thanks to „Serving on Edge“ - the AI processing of the images directly on mobile devices. The faster action can be taken, the better for field yields. The mobile apps collect large amounts of images and data in different environments, growth stages, weather conditions and light conditions. Every image uploaded from a smartphone becomes part of the library; recognition is continuously improved. FieldCatcher, for example, uses image recognition models trained with Amazon SageMaker and then optimises them for mobile phones with Amazon SageMaker Neo.



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Other different use cases for image recognition

The serverless architecture is based on AWS Lambda, among others, and is scalable and follows the „zero maintenance“ philosophy. Multiple AWS services work together to support the data lake. In addition to storing images in Amazon S3, Amazon DynamoDB and Amazon RDS store the metadata. Amazon Elasticsearch Service (Amazon ES) supports indexing and querying this metadata. Due to the serverless architecture and the managed AWS services used, additional, different use cases can be added at any time. Many other use cases for capturing images are also possible in the FieldCatcher application. Queries to this dataset can be very different, such as „All images taken in Germany with an image resolution of more than 800 × 600 pixels“ or „All images of diseases in winter wheat“.

Ansprechpartner beim Kunden:

Giuseppe La Tona, Senior IT Solution Architekt, Bayer CropScience

„We have determined that implementing the solution using Amazon SageMaker is much more efficient and effective. Therefore, we have started implementation and are working with tecRacer to ensure proper collaboration between the frontends and AWS resources, and they are also training our developers.“



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Project goals

- Improved field yields through rapid detection of problems for more sustainable agriculture
- Creation of an open platform for AI/ML (Artificial Intelligence / Machine Learning) development.
- Future provision of the API, which the apps use, for further customers

Project duration

August 2018 until today

Project deliverable tecRacer

- Create an open platform for AI/ML development (Artificial Intelligence / Machine Learning).
- Support in the iOS, Android and Flutter/Dart mobile apps „FieldCatcher“ and TrapMonitor with proof of concepts in the use of AWS libraries
- Support the complete implementation of AWS and CI/CD Automation.
- Ensure that frontends work correctly with AWS resources Training and support for developers.
- On the AWS side, the use of API Gateway, S3 and ElasticSearch and especially SageMaker
- Implement CI/CD (continuous integration and delivery) pipeline with Gitlab and runners on AWS.
- Implementation of 3 stages (DEV, QA and PROD), each in their accounts

Further persons in the team:

Bayer

Matthias Tempel, Product Owner
Dr. Alexander Roth, Senior Cloud Architect

tecRacer

André Reinecke, Cloud Consultant
Sascha Stöckel, Cloud Consultant

About tecRacer

tecRacer is based in Hanover and has offices in Duisburg; Frankfurt am Main, Hamburg, Munich and Vienna. It consists of the division's Cloud Consulting - Amazon Web Services, Agile App Development - Web & Mobile and Managed Services.

tecRacer is an Amazon Web Services Authorised Training, Premier Consulting and audited Managed Services Partner and offers official training, consulting, projects and managed hosting around Amazon Web Services.

tecRacer was founded in 1999 as the business unit „iRacer“ of Herrlich & Ramuschkat GmbH. In 2006, tecRacer GmbH & Co. KG was founded as a separate company. Today, the owner-managed company employs more than 120 permanent staff and has more than 450 customers and 1,500 projects worldwide since 1999.

You can find more information at www.tecracer.com
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