SpeedWise® ML Empowers Environmental Engineering Consulting Firm.
Machine Learning on AWS Case Study

Executive Summary

Amphos 21 is an environmental consultancy firm that specializes in complex environmental challenges in the Nuclear, Mining, Oil and Gas and Water sectors.

Amphos 21 is in constant search of expansion of its multinational business. For this they resort to new cutting-edge technologies such as machine learning (ML) that allows them to differentiate themselves from the competition in a disruptive way.

With SpeedWise® ML (SML) from QRI, Amphos 21 has at its disposal a generic ML tool, very versatile, capable of adapting to all kinds of problems and highly competitive from an economic point of view. All of this ensures that SML becomes a hyper-efficient value-creation tool.

The Challenge

Challenge 1
Accurately and quickly predict the evolution of the quality of water that is leached from mining waste deposits.

Challenge 2
Determine the quality of water in aquifers hosting deep geological storage facilities for nuclear waste.

Challenge 3
Calculate low cost water analytics that serve as a proxy to predict the value of water analytics that are much more expensive in both time and cost.

Challenge 4: Ultra-fast simulations of chemical reaction processes in aquatic systems.

Why choose AWS for your machine learning needs?

With high-performance compute options powered by machine learning, Amazon Web Services (AWS) enables organizations to undergo broad digital transformations with modern, cloud-native solutions. Offering a broad set of machine learning services and supporting cloud infrastructure, AWS enables organizations to tailor their machine learning solution to meet the unique needs of their business.

Organizations are already realizing great value from AWS, enabling them to provide new experiences for their customers and drive business growth. Improved processes, increased efficiency, and accelerated innovation are just some of the benefits realized from the inclusion of machine learning in business operations.

AMPHOS 21

About Amphos 21

Amphos 21 is a Spanish company that is very well known in applying the scientific knowledge to provide environmental solutions to the mining, O&G and nuclear waste management industries.

Amphos 21 has long term clients in South America (Chile and Peru), North America (USA), Europe (Spain, Belgium, Finland, Sweden or France) and Asia (Japan or South Korea).

The environmental business is expanding, given the growing need for fresh water, the increase in social demands in terms of carrying out environmentally-friendly industrial activities and the imminent emergence of large storage systems for nuclear waste that will run in the coming years. The latter is a billion-dollar business, which is about to begin developing around the world and in which Amphos 21 has a privileged position.

"Spectacular! I can't think of another way to define the results we are getting with SpeedWise® ML."

- Lara Duro, CEO at Amphos 21

"Thanks to SML we are helping our clients to generate value from their available databases, and our tools have a predictive accuracy never seen before in the environmental sector."

–Jorge Molinero, Deputy Managing Director at Amphos 21

Why QRI

QRI Group as a company has some unique characteristics that have allowed Amphos 21 to fully trust in their acquisition of SML:

1. QRI understands what Amphos21 needs and has thoroughly explained how to get results using SML.
2. The versatility of SML is impressive compared to other ML tools on the market that are oriented to specific problems. With SML you can tackle all kinds of challenges.
3. SML pricing is incredibly attractive. QRI Group has adopted an incentive policy that allows Amphos21 to test the tool at a very affordable price for the first few months, with the price increasing as the value created by the tool increases.

The Solution

The essential challenge of Amphos 21 is to create a data science team within the company. This data science team aims to develop solutions to Amphos 21 projects using disruptive machine learning technologies.

Creating this team requires a set of people with the necessary skills and appropriate ML technology (software) and involves a typical recruitment phase. The problem arises in the technologies that the team will use. The data science team can develop their own technologies and software for each project that enters the Amphos 21 portfolio, or they can look for commercial software that can address the wide variety of water resource management problems that Amphos 21 faces on a daily basis.

Creating their own software is expensive, risky, and time-consuming. However, using a reliable ML tool already on the market is much safer and faster. SML fits perfectly into the parameters that Amphos 21 wanted. SML is safe, robust, and tested for any generic problem, with functionalities that other ML tools on the market do not have, such as uncertainty quantification, and a very attractive price. Having a tool in the cloud and hosted on AWS offers Amphos21 many guarantees:

Collaborative work: Offers the possibility of SML work from the many offices they have all over the world.

Security: Projects with confidential data (in some highly sensitive cases) are stored in a highly secure and reliable system—without the risk that an accident damages the information or that a hacker could enter your system.

Power of calculation and storage: The possibilities of parallel computing and the great capacity of AWS are essential to the success of SML. ML projects require massive amounts of data that must be processed on supercomputers with large storage capacity. By having AWS, large projects can be saved. SML is a unique solution in the market, allowing consumers to make high-level ML from any terminal anywhere in the world.

"SML is as friendly, intuitive and easy to use as a video game, but at the same time it is so powerful that it is shedding light on problems that we have never known how to solve."

-Amphos 21

Results and Benefits

For Amphos 21, the use of SML is proving very beneficial in many aspects: consumption of working time, internal cost savings and access to new markets.

There are certain instances where the time savings generated by SML have been essential for Amphos 21. For example, in the study of mining waste, the methodology to know what the leachate evolution of a given mine was like involved carrying out experimental studies lasting more than half a year. At this time, with sufficient trained data, the prediction of the evolution of these leachates and how they will affect the environment of the area in which they are placed will be reduced literally to "a click." This leap positions Amphos 21 with a brutal competitive advantage over its competitors.

Another example of saving time is the classical numerical models of polluting chemical reactions. Running these models on supercomputers could take weeks. However, with SML they can train machine learning models that emulate simulation processes. Again, the time savings would be theoretically "infinite" in the sense that compared to classical numerical calculations, SML predicts a result of a chemical reaction in a simple click.

Finally, an example of economic cost savings is the analysis of freshwater reserves in particularly sensitive lakes and rivers, like those close to nuclear waste deposits. These freshwater reservoirs require constant analytics. In many cases, continuous analytics use IoT-type devices. Basic analytics require studies of parameters such as pH, suspended solids, amount of dissolved oxygen, etc. However, there are some extremely complex and expensive analytics such as the chlorophyll content, the presence of certain heavy metals or organics. Using SML, ML models can be trained to predict the results of "expensive" analytics from much cheaper "basic" analytics. This can represent relevant savings while increases the understanding of aquatic systems.

Easily Deploy Machine Learning Capabilities Across Your Organization

Deploying machine learning models effectively within organizations tends to be time-consuming and costly, with the need to have data specialists on staff. It is not uncommon to spend several months and even years implementing machine learning and deploying it in the production environment, even for an integrated team involving domain experts, data engineers, data/machine learning scientists, computer scientists, and IT.

Powered by QRI's enterprise-grade automatic machine learning algorithm, SpeedWise® ML (SML) is a web-based software platform allowing everyone and every company to conduct cutting-edge machine learning practices and predictive analysis. Through the platform, everyone, with or without a deep understanding of machine learning, will be able to deliver high-quality production-level models through a few mouse clicks within minutes, without typing a single line of code.

SpeedWise® ML can be used by any company or organization that has data that is not yet fully exploited. This technology is applicable to any industry or sector, and it simply requires uploading an input data table (e.g., a .csv file) to start triggering thousands of machine learning models.

Benefits

Build ML Models 10x Faster

Smart AutoML technology finds the optimal model configuration for your models automatically.

Smart Data Processing Capabilities

Quickly process and clean data needed for ML. Options to autopilot smart data processing are also provided.

Maximize ML through Collaboration

A collaborative platform makes sharing data and models across organizational teams as easy as a button click.

Say Goodbye to the Black Box

Get the answers and also the reasons behind the answers using our built-in explainable machine learning module.

About QRI

QRI is an artificial intelligence solutions provider. Using practical applications of AI, data mining and advanced analytics, QRI helps companies automate complex workflows, identify obstacles, mitigate risks and illuminate opportunities from their data.

SpeedWise® ML (SML) can be used by any company or organization that has data that is not yet fully exploited. The SML platform is intuitive and educational, and will simply guide you throughout the entire data-to-model process, and not a single line of code will be required.

Generate machine learning models (both unsupervised and supervised learning) that can unveil hidden trends and patterns from data, offering new solutions or opportunities within your organization that were not visible before.

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