

Case Study

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Performance Optimization of Photovoltaic
Systems Using AI/ML Solutions



The Client

Our client is an Austrian company with more than 70 years of tradition and over 5,000 employees. It is organized into three main divisions: Perfect Welding, Solar Energy, and Perfect Charging.

Although the company began its operations by developing battery charging systems, over the years it has grown into one of the leading manufacturers of solar energy systems and robotic welding machines.



Challenge

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Due to the large volume of data from various sources, the complexity of photovoltaic systems, and the need for long-term sustainability, the client faced the challenge of developing a robust analytical framework for assessing PV system performance.

The goal of the project was to establish a comprehensive understanding of the data environment specific to the solar energy domain. Additionally, the client wanted to develop an intelligent analytical framework for evaluating the performance of photovoltaic (PV) systems. Although the client had access to large amounts of data from various sources, they lacked advanced tools for analysis and pattern detection that could enable timely identification of issues and opportunities for optimization.

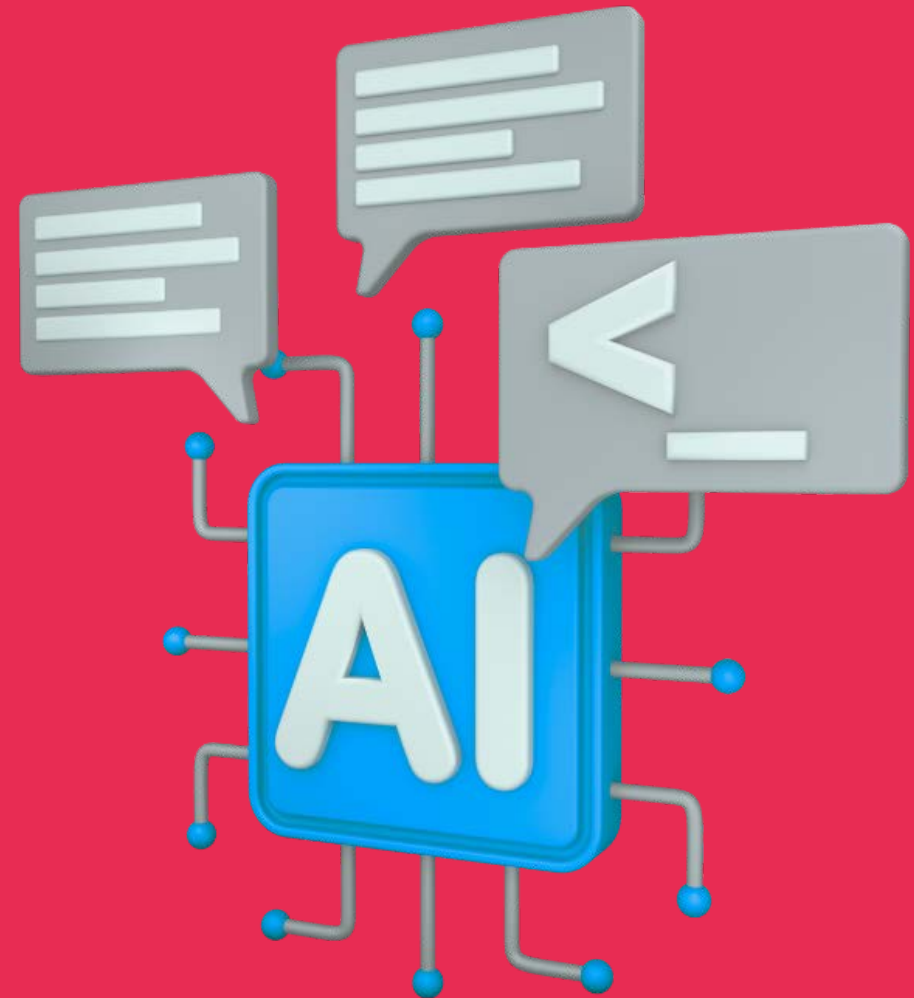


Solution

Serengeti's approach was based on systematic exploration of available datasets, assessment of data quality, and identification of PV-specific anomalies.

Accordingly, we developed an AI/ML-powered solution enabling automated processing, analysis, and interpretation of PV data, including domain-specific anomalies. Alongside detailed statistical processing and data quality assessment, AI models were used to detect anomalies, predict performance deviations, and identify patterns associated with environmental and technical factors.

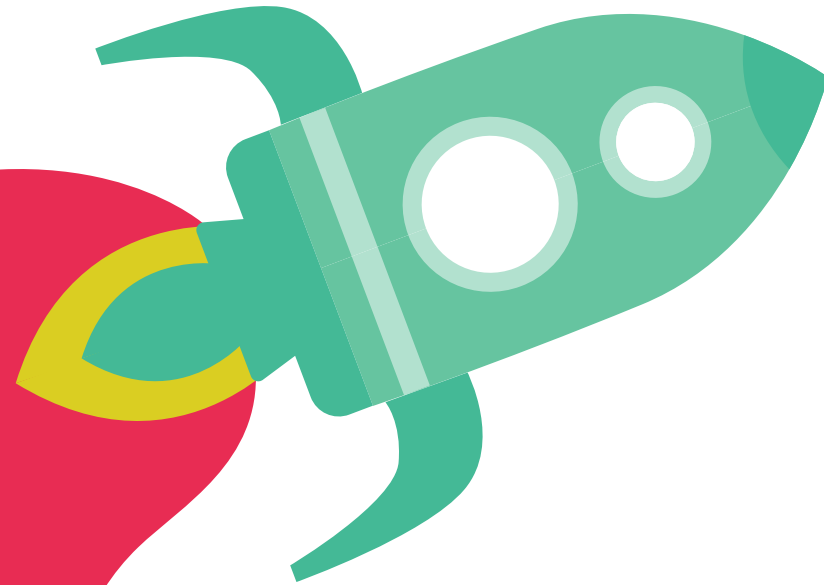
The client was provided with a comprehensive analytical report documenting insights, data quality issues, and recommendations, as well as a fully functional ML pipeline for continuous data processing and KPI monitoring.



Result

The analytical system generated precise insights into system performance and identified factors affecting efficiency reduction, enabling targeted interventions and optimization. The client received a comprehensive report with clear recommendations and a platform that enables continuous performance monitoring and data-driven decision-making.

By applying AI technologies, domain expertise, and advanced analytics, Serengeti enabled the client to establish a strong analytical foundation for the long-term improvement of PV system performance. By integrating data from multiple sources, we laid the groundwork for optimization, analysis, and performance enhancement, while enabling automated and scalable efficiency tracking across all future stages.



Accelerating business transformation through innovative technology

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Serengeti is a software development nearshoring and consulting company. For the past 20 years, we have been partnering with our clients to reinvent their business models using innovative information technology.

We work according to the principles of DevOps, implementing disruptive trends in our specializations. Our experience and business acumen comes from successfully working on over 300 projects.

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