AltaML

CASE STUDY

AI-Powered Fireproofing Solution Saves Leading Energy Company $1.2M

Innovative technology co-developed by AltaML and Kleinfelder significantly reduces maintenance costs while improving reliability, efficiency, and safety.

A leading energy company in Alberta experienced a near-miss event when 15 pounds of compromised fireproofing fell from 20 feet overhead. This incident exposed a gap in their visual inspection and monitoring process, threatening worker safety and asset integrity. The customer engaged AltaML and Kleinfelder to co-develop an AI-powered solution using computer vision and machine learning to replace on-site inspections. This change improved worker safety, increased efficiency, and saved them over $1.2M in maintenance costs within the first year.

Key Results from First Year

$1.2M
Maintenance Costs Saved

7,400
Maintenance Hours Saved

0
Safety Incidents Reported

Challenge

Fireproofing is a cement-like compound that minimizes damage in a fire. It is a critical asset in creating a safe working environment and the customer's refinery infrastructure, worth hundreds of millions of dollars across their plants. However, fireproofing degrades over time in unpredictable ways. This leads to an increased risk of substantial infrastructure damage in the event of a fire and worker injury or death from falling fireproofing pieces if not properly maintained.

The customer relied on visual inspections to monitor the condition of their fireproofing, with inspection teams rotating through each plant twice a year. This process cost millions annually and caused productivity losses due to area closures during inspections. Additionally, these inspections were time intensive, prone to observational bias, and inconsistent across individual inspectors. The customer knew there had to be a better way, and after a near-miss event that could have resulted in a life-threatening injury, they realized the urgency of finding a better solution.

They needed a more efficient, effective, and cost-conscious way to protect the safety of their workers and the integrity of their critical infrastructure.

Solution

The customer approached Kleinfelder, a leading engineering, construction management, design and environmental professional services firm, to capture 360-degree LiDAR scans inside their plants. The customer realized immediate cost savings and safety improvements from applying several different computer vision techniques, synthetic data, and developing a historical data set of labeled cracks to shift the inspection process from a visual, on-site task to a computer-based one. However, employees still had to manually review and tag every scan, introducing the potential for human oversight, which could result in observation bias, inconsistencies, and some areas of deterioration still being missed.

> **Initially, our goal was to create a digital twin of the site to allow inspectors to inspect the facility from an office environment safely. This would enable them to identify, pinpoint, and share locations of concern with contractors and project teams to rectify. However, once we saw the richness of the data we were collecting and how AltaML could utilize it, we changed our focus to create a more comprehensive solution that included machine learning techniques without needing full human interaction. Thus, creating a solution that was more efficient and accurate.**
>
> *– Mark Franklin P. Tech (Eng), Manager of Innovation at Kleinfelder*

To eliminate the possibility of human error, Kleinfelder approached AltaML, a leading developer of machine learning-powered solutions. AltaML co-developed a machine learning model that automatically detects fireproofing deficiencies using the scanned plant images in collaboration with the customer and Kleinfelder. By leveraging the extensive image database curated from Kleinfelder's LiDAR scans, the model perpetually learns from the scans and applies its newfound knowledge to identify anomalies.

> **AltaML and Kleinfelder teamed up to deliver a computer vision-driven solution that has drastically changed how our customer operates, making the workplace safer for everyone. Gone are the days of freezing in the bitter cold while inspecting for fireproofing defects. With this solution, all it takes is a few clicks from an office to manage the entire defect management lifecycle.**
>
> *– Dave O'Connell, Director of Software Development at AltaML*

As soon as deficiencies are detected, a work order is generated automatically and sent to the customer's fireproofing repair vendor, prompting immediate repair to prevent hazardous conditions. The entire process, including initial crack detection and validation, deterioration monitoring, maintenance, and reporting, is managed seamlessly from a customized dashboard designed for the client to facilitate remote operations.

The customer's fireproofing experts subsequently evaluates identified deficiencies and categorize them as 'valid' or 'invalid'. The results are then incorporated into the model, facilitating continuous learning, improvement, and outcomes.

Results

The customer achieved heightened efficiency and effectiveness in managing their fireproofing assets by implementing the bespoke computer vision and machine learning solution developed by AltaML and Kleinfelder. As a result, they provide a safer work environment for their employees while also realizing substantial cost savings.

The customer reduced the hours budgeted for inspection and maintenance from 32,000 to 24,600 hours annually, representing a 25% reduction and $1.2M in cost savings. Additionally, fireproofing-related health and safety incidents were reduced to zero in 2022.

This innovative solution has elevated workplace standards and instilled confidence in the workforce, leading to improving job satisfaction and productivity. Moreover, applying 3D scan data and machine learning models has yielded significant benefits across other departments and projects, including engineering work, turnaround packages, safety analysis, constructability teams, and outside vendors. The potential of this solution is immense, and it is anticipated that it will continue to have a significant impact on a daily basis, driving further improvements and value for the customer.

AltaML | KLEINFELDER Bright People. Right Solutions.

About AltaML

AltaML is a leading applied AI studio and developer of machine learning (ML) software. Building powerful AI tools and pursuing product opportunities through industry-specific ventures, AltaML creates operational efficiency, reduces risk, and generates new sources of revenue for customers. With expertise across multiple industries and access to top AI/ML talent, AltaML accelerates the AI adoption journey with a focus on fostering long-term relationships with customers.

About Kleinfelder

Founded in 1961, Kleinfelder is a leading engineering, design, construction management, construction materials inspection and testing, and environmental professional services firm. Kleinfelder employs more than 3,100 professionals and operates from over 150 office locations in the United States, Canada, and Australia. The company is headquartered in San Diego, California. Poised for growth, Kleinfelder continues to provide high-quality solutions for our diverse client base.

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