Autonomous Solutions for Solar Farm Inspections

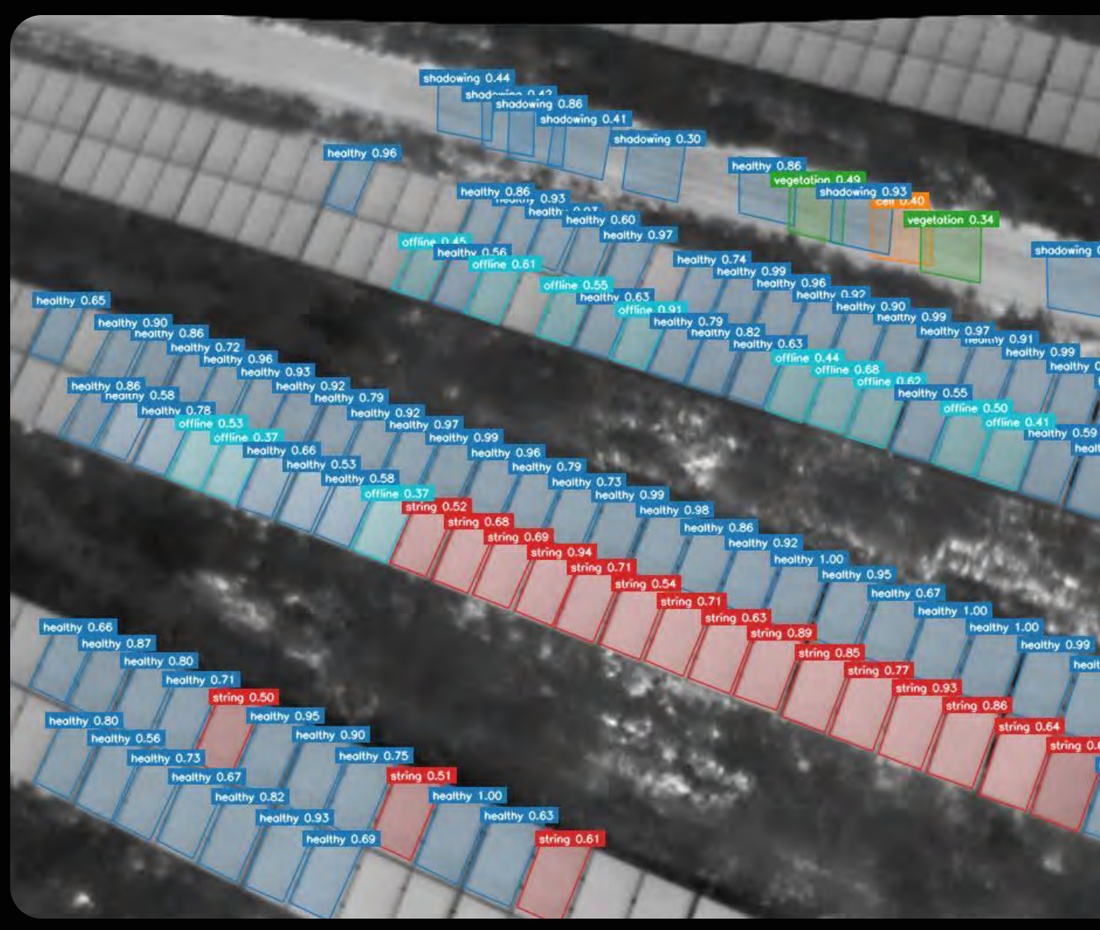
Modernizing solar farm inspections using robots, drones, AI and computer vision technology

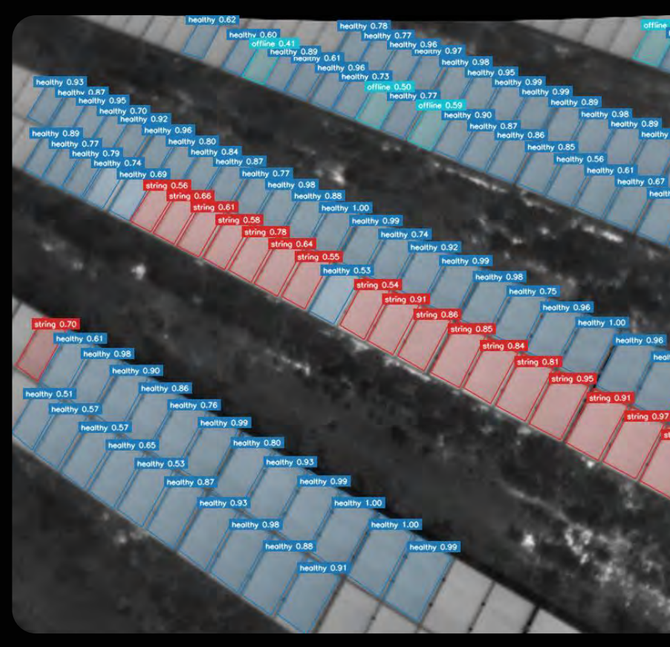
codequest

We are codequest 👋

Our software solutions aim to improve the management and maintenance of solar farms.

From initial construction to ongoing operation, our comprehensive system supports the entire lifecycle of solar farms using modern technologies such as AI, computer vision, drones, droneport systems, and robots..





The Problem With Solar Panel Inspections

Solar panel inspections are essential for maintaining system durability and efficiency. However, many “modern” inspection methods aren’t as advanced as they seem.

Solar panel inspections nowadays typically are:

Too expensive:

Inspections are still costly, requiring specialized personnel and equipment maintenance. Missed issues can also lead to expensive repairs.

Human-led:

Too reliant on human inspections, compared to our fully autonomous, AI-driven inspection system. This approach can result in human error, fatigue, and inconsistent data assessment.

Time-consuming:

Requiring extensive hours or days to complete inspections with considerable time spent on manual data collection and analysis.

Even though many solar farms employ aerial, image-based inspection techniques, data interpretation and storage still pose challenges.

That's where our drones and robots come in, offering safer, more accurate, and sustainable inspections.

Key Features of Our Solution

We use AI to monitor, autonomously inspect, and detect anomalies in solar farms, both during construction and when they’re operational.

Detect

We have developed a specialized AI model trained to detect various anomalies in solar panels, ensuring the highest levels of accuracy and reliability.

Monitor

Our software meticulously tracks the installation of solar farm panels, ensuring that all panels are correctly mounted and accounted for. Automated panel counting and verification maintain both accuracy and efficiency.

Inspect

Once the solar farm is operational, our system provides continuous, autonomous inspections using drones and robots. This ensures early detection of potential issues and supports proactive maintenance.

codequest’s solutions make inspections safe, sustainable, and accurate!

Drones, Robots, Advanced AI, and Computer Vision

Leveraging advanced technology, we navigate and analyze solar panels with high precision. Our drones perform autonomous inspections anywhere, certified for BVLOS operations. Explore the benefits of our cutting-edge solution:

Imaging Technology

We use high-resolution color and thermal cameras that inspect with superhuman precision.

Cost-Effective Alternative

Our drones provide a more cost-efficient solution compared to our competitors.

Enhanced Documentation

Generate detailed digital records of inspections.

Elevated Safety

Conduct remote assessments of solar panels without doing hazardous climbs or using heavy machinery.

Preventative Maintenance

Spot potential problems early on for facilitating maintenance.

Real-Time Insights

Transform your inspection data into real business insights instantly with AI-driven analysis, enabling immediate action on identified issues.

Enhanced Efficiency

Rapidly cover over 20 km in a single inspection round, significantly streamlining the inspection workflow. With a quick 90-minute recharge, they’re ready to go again.

Cost Reduction

Save money on inspection costs by using fewer workers and completing inspections more quickly.

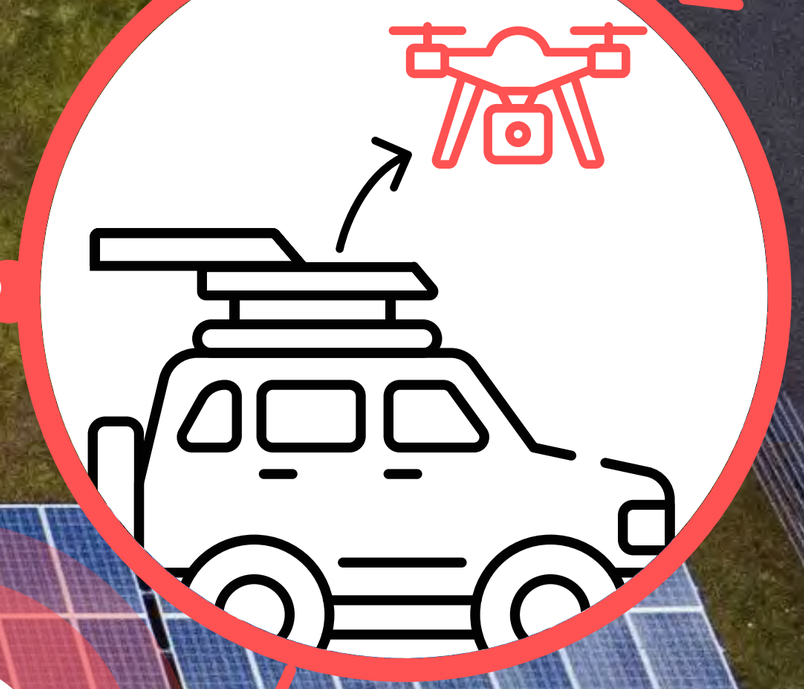
Complete Customization

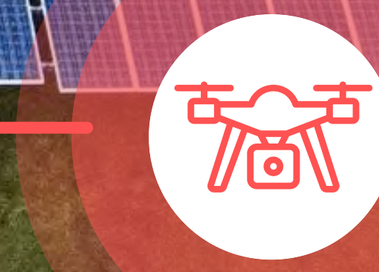
We tailor the drone's hardware and software configurations to your specific inspection needs. Fully integrates into any asset management system.

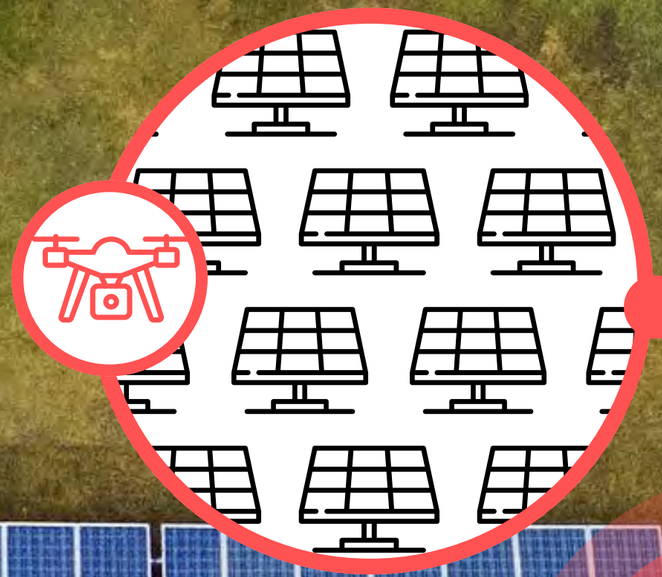
A Typical Day of a Modern Solar Farm Inspection

Drone Deployment 🚀

With a simple press of a button, the docking station mounted on your car's roof powers up, and the drone comes to life. It instantly takes off, minimizing setup hassles and kickstarting your hands-free, AI-assisted aerial inspection of the farm's solar panels.







Data Capture and Storage ☁️

With advanced cameras and AI, our drone swiftly scans each panel, detecting shading, debris, corrosion, and electrical faults. This information is instantly relayed to our app's dashboard and securely stored in the cloud, offering real-time data at your fingertips.

Unleashing Insights and Analysis 📈

Mission accomplished! Our drone autonomously returns to the docking station, seamlessly integrating all the gathered data. Every detail is meticulously organized for your analysis or incorporated into comprehensive reports. Your day's done — time to head back home!

Capturing Every Detail

Identifying solar panel risks that can affect their **efficiency, longevity, and safety.**

Our robust detection capabilities support efficient solar farm management, enabling you to take the necessary actions to maintain full operational efficiency.

Cracking

Anomalies caused by cracks on the surface.

Cell Anomalies

Hot spots with a square geometry occurring in a single cell or multiple cells.

Offline Module

Entire modules that are overheated.

Shadowing

Anomalies due to sunlight being obstructed by vegetation, man-made structures, or adjacent rows.

Temperature

Although solar panels need sunlight to produce power, excessive heat can reduce their efficiency.

Dirt and Debris Accumulation

Anomalies due to dirt, dust, or other debris on the module surface.

Weather

Hail, heavy snow, and strong winds can physically damage solar panels, affecting their ability to generate electricity.

Corrosion

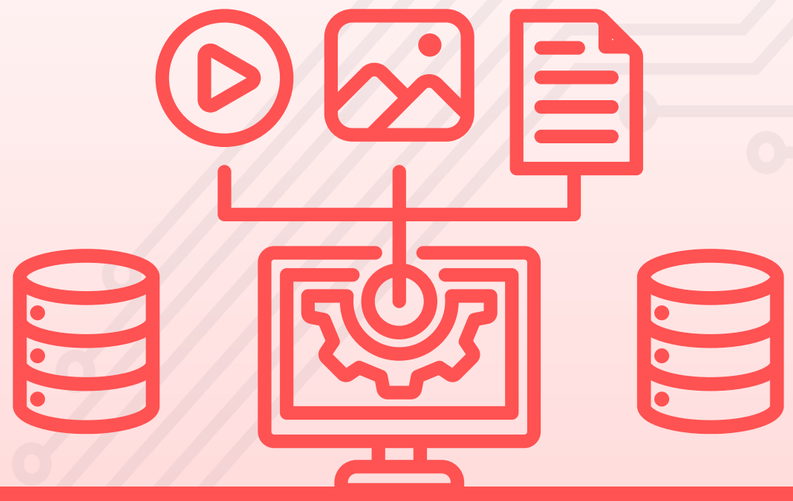
In coastal areas or places with high pollution levels, solar panel components can corrode over time, potentially leading to failures and the need for replacement.

Diode

Caused by activated bypass diodes, typically affect 1/3 of a module, while diode-multi issues involve multiple activated bypass diodes, typically affecting 2/3 of a module.

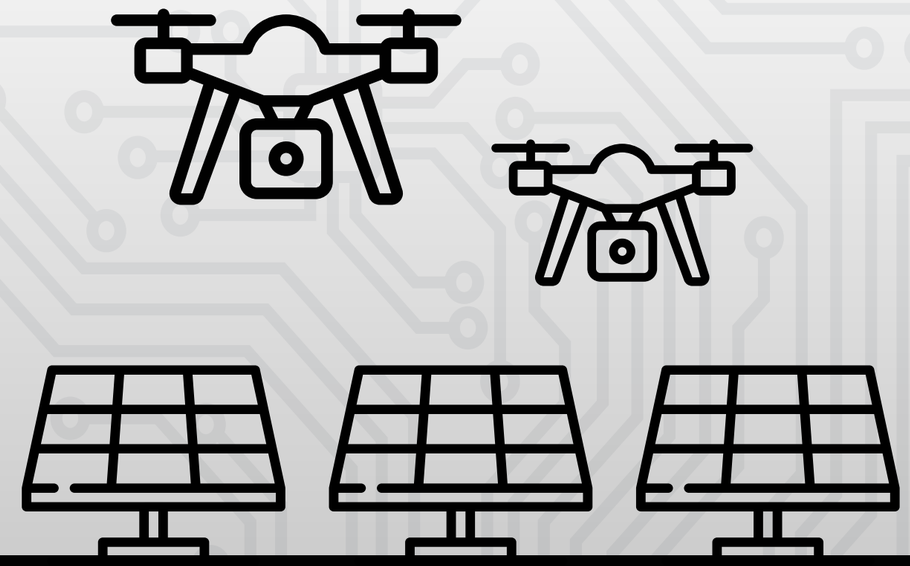
Levels of Cooperation

We offer various levels of cooperation to meet your specific needs:



Analysis of Provided Images and Videos

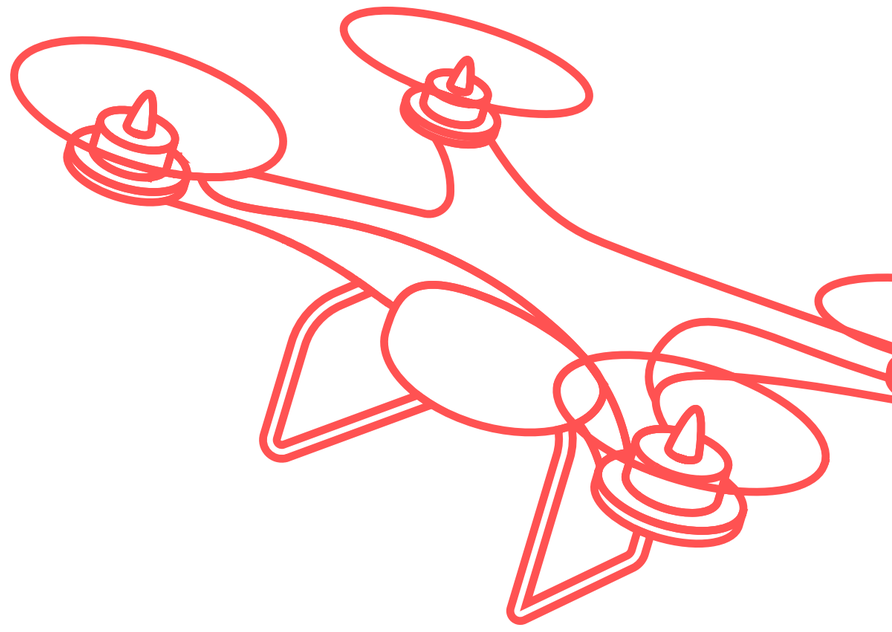
If you already have drones or robots capturing images or videos of your installation, you can provide this footage to us. We will process it through our software and deliver a detailed report, classifying all detected anomalies and providing recommended actions.



Equipment Rental or Purchase for Autonomous Inspection

We offer rental or purchase options for drones and ground robots to perform autonomous inspections. Our team will configure the equipment, ensure seamless integration, and provide immediate customer support, regulated by a service level agreement (SLA).

🥈 2nd Place at NATO Hackathon



We are proud to have achieved 2nd place in an international hackathon organized by NATO. This prestigious competition required implementing performant object tracking and detection on very limited hardware, showcasing our ability to develop highly efficient and innovative solutions under strict conditions.

Read more

Why codequest?

5 key reasons why you should choose codequest to elevate your solar farm inspections.

Fast Development Iteration

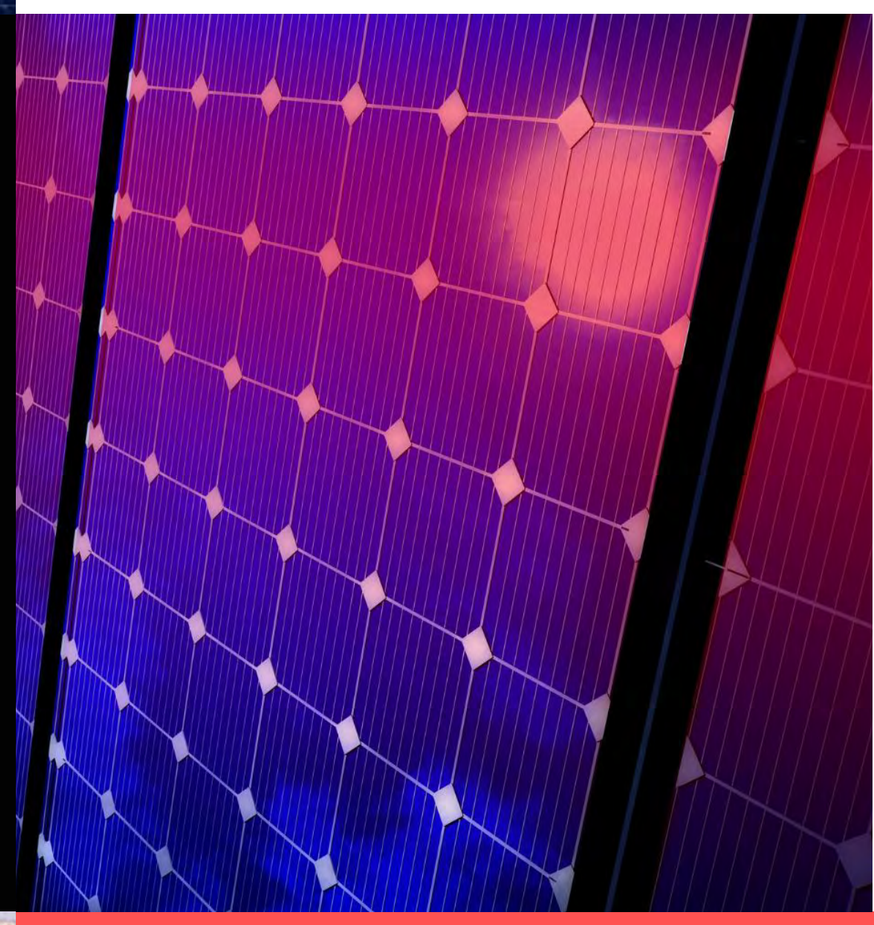
Leveraging state of the art models and techniques, we swiftly deliver custom requested skills, meeting your needs in a timely manner.

Experience With Advanced Technologies

Leverage our deep expertise in AI, drones, robots, and computer vision to ensure thorough, consistent, and precise inspections of your solar farms.

EU-Based Company

We adhere to EU regulations, ensuring all our inspections comply fully with EU laws and standards.



Tailor-Made Solutions

We offer custom software solutions that adapt to your unique inspection needs, enhancing efficiency and accuracy.

Dedicated Hardware

Our drones and robots are specially designed with the latest technology for optimal performance in solar farm inspections.

What’s Next for codequest?

We're all about continuous innovation. Right now, we're working on developing robust inspection capabilities for the back of solar panels, taking our service offerings to the next level. Want to have a look?

Feel free to reach out to us today or schedule a call.

We’re genuinely excited about the potential impact of our technology on the efficiency and maintenance of solar farms, and we can’t wait to collaborate with you.

Tomek

tomek@codequest.com

CEO @ codequest