

What's the Hype About AI

Artificial Intelligence (AI)

- What is AI
- Why is AI important
- Some potential AI uses for today
- What risks does AI represent
- Where do you go from here

What are your thoughts on AI

- Coming to Take Our Jobs away
- It's All Hype and will blow away
- Embracing it to make me better
- What the #%\$#%\$ is AI

AI is new, right?



What is Artificial Intelligence (AI)

- Natural Language Processing (NLP)
 - Alexa
 - Google
 - Siri
 - ChatGPT, CoPilot, Gemini, Grok

- Machine Learning (ML) Decisions
 - Collision Avoidance Systems
 - Tesla Self Driving
 - Waymo

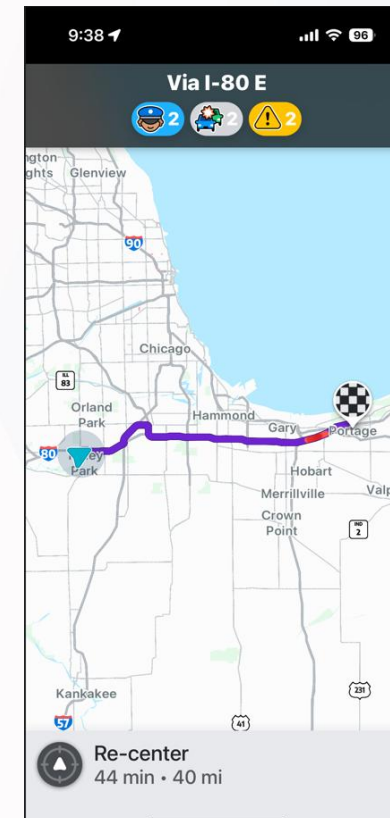
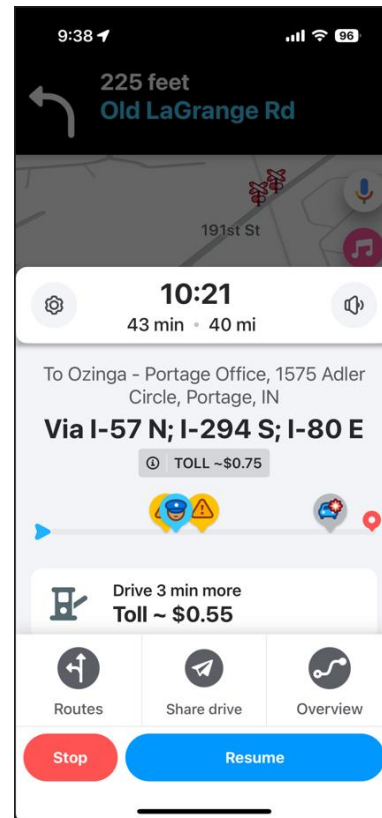
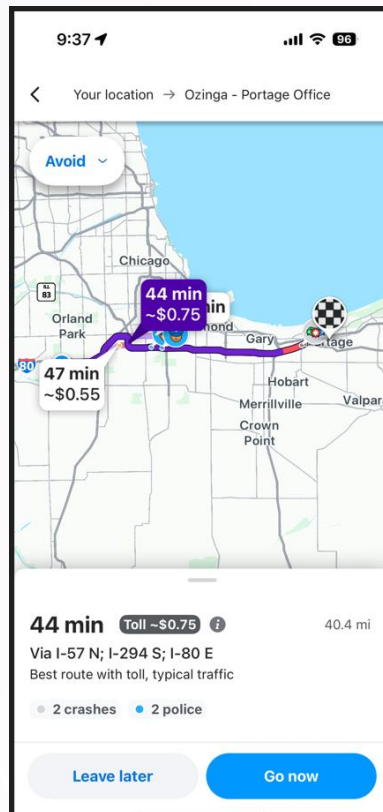


Why is AI important

- AI will be transformative, bigger and faster than the internet and the smartphone
- When used to solve problems AI can make us more efficient
- AI will not replace people, but it could replace people who do not adopt AI

Why is AI important

- It will help us get places faster!



Use Case - CoPilot / ChatGPT

- Need a Jump Start on a Job Description
 - “Can you create a job description for an Aggregate Quarry Maintenance person”

Job Title: Aggregate Quarry Maintenance Technician

Job Type: Full-Time

Job Summary: We are seeking a skilled and dedicated Aggregate Quarry Maintenance Technician to join our team. The successful candidate will be responsible for maintaining and repairing equipment used in the quarry, ensuring optimal operation and minimizing downtime. This role requires a strong understanding of mechanical systems, troubleshooting skills, and a commitment to safety.

Key Responsibilities:

- Perform routine maintenance and repairs on quarry equipment, including crushers, conveyors, screens, and other machinery.
- Diagnose and troubleshoot mechanical issues to ensure efficient operation of equipment.
- Conduct inspections and preventive maintenance to identify potential problems and prevent equipment failures.
- Collaborate with the operations team to schedule maintenance activities and minimize disruption to production.
- Maintain accurate records of maintenance activities, including work orders, parts used, and equipment status.
- Ensure compliance with safety regulations and company policies during all maintenance activities.
- Assist in the installation and commissioning of new equipment as needed.
- Provide training and guidance to junior maintenance staff.

Qualifications:

- High school diploma or equivalent; technical certification or associate degree in mechanical engineering or related field preferred.
- Proven experience in maintenance and repair of heavy equipment, preferably in a quarry or mining environment.
- Strong knowledge of mechanical systems, hydraulics, pneumatics, and electrical components.
- Ability to read and interpret technical manuals, blueprints, and schematics.
- Excellent problem-solving skills and attention to detail.
- Strong communication and teamwork skills.
- Ability to work independently and manage multiple tasks effectively.
- Commitment to safety and adherence to safety protocols.

Physical Requirements:

- Ability to lift and carry heavy objects, climb ladders, and work in confined spaces.
- Willingness to work in outdoor environments and varying weather conditions.
- Ability to stand, walk, and bend for extended periods.

Use Case - CoPilot / ChatGPT

- Need a Jump Start on a SOP
 - “Create a SOP for performing gradations on aggregates”

Standard Operating Procedure (SOP) for Performing Gradations on Aggregates

Purpose: To ensure consistent and accurate gradation testing of aggregates used in construction and other applications.

Scope: This procedure applies to all personnel involved in the sampling, testing, and reporting of aggregate gradations.

Equipment and Materials:

- Sieves of various sizes (e.g., 75 mm, 50 mm, 37.5 mm, 25 mm, 19 mm, 12.5 mm, 9.5 mm, 4.75 mm, 2.36 mm, 1.18 mm, 600 μm , 300 μm , 150 μm , 75 μm)
- Mechanical sieve shaker
- Balance accurate to 0.1 g
- Sample splitter
- Oven capable of maintaining $110 \pm 5^\circ\text{C}$
- Brushes and pans for cleaning sieves
- Containers for samples
- Personal protective equipment (PPE)

Procedure:

- 1. Sample Collection:**
 - Collect a representative sample of aggregate according to ASTM D75 or AASHTO T2.
 - Ensure the sample size is sufficient for testing, typically 5 kg for coarse aggregates and 2 kg for fine aggregates.
- 2. Sample Preparation:**
 - Dry the sample in an oven at $110 \pm 5^\circ\text{C}$ until a constant weight is achieved.
 - Allow the sample to cool to room temperature.
- 3. Sieve Analysis:**
 - Weigh the dried sample and record the weight.
 - Assemble the sieves in descending order of size.
 - Place the sample in the top sieve and cover it.
 - Secure the sieve stack in the mechanical sieve shaker.
 - Shake the sieves for a specified duration (usually 10 minutes).

4. Weighing and Recording:

- Carefully remove each sieve and weigh the material retained on each sieve.
- Record the weight of material retained on each sieve.
- Calculate the percentage of material retained on each sieve relative to the total sample weight.

5. Calculations:

- Determine the cumulative percentage passing each sieve.
- Plot the gradation curve using [the cumulative percentages](#).

6. Reporting:

- Prepare a report including the following information:
 - Sample identification
 - Date of testing
 - Weight of sample
 - Weight retained on each sieve
 - Cumulative percentage passing each sieve
 - Gradation curve

7. Quality Control:

- Verify the accuracy of the balance and sieve [shaker](#) periodically.
- Ensure sieves are clean and free of any debris before use.
- Follow safety protocols and wear appropriate PPE during testing.

Safety Considerations:

- Wear PPE, including gloves, safety glasses, and dust masks.
- Handle hot samples and equipment with care to avoid burns.
- Ensure proper ventilation in the testing area.

Use Case – Copilot / ChatGPT

- I need to coach an employee who has attendance problems, can you write a corrective action plan

Corrective Action Plan

Employee Name: [Employee's Name]

Date: [Today's Date]

Department: [Department Name]

Supervisor: [Your Name]

Issue:

The employee has demonstrated a pattern of attendance problems, including [specific examples of attendance issues, such as tardiness, unexcused absences, or leaving early].

Expectations:

The employee is expected to adhere to the company's attendance policy, which includes arriving on time, attending all scheduled shifts, and notifying the supervisor in advance of any absences.

The employee must provide valid reasons for any future absences and follow the proper procedures for reporting them.

The employee should demonstrate a commitment to improving attendance by [specific actions, such as setting an alarm, arranging transportation, or seeking medical advice if needed].

Action Steps:

The employee will meet with the supervisor weekly to discuss progress and address any concerns.

The employee will attend a training session on time management and effective communication.

The employee will submit a written plan outlining how they intend to improve their attendance.

Consequences:

Failure to improve attendance may result in further disciplinary action, up to and including termination of employment.

Support:

The company is committed to supporting the employee in improving their attendance. The employee is encouraged to seek assistance from [HR, Employee Assistance Program, or other resources] if needed.

Acknowledgment:

By signing below, the employee acknowledges that they have read and understood this corrective action plan and agree to comply with its terms.

Employee Signature: _____

Supervisor Signature: _____

Date: _____

Date: _____

Use Case - Copilot / ChatGPT

- Where in Illinois are the biggest opportunities to build an aggregate quarry? Take into consideration zoning and noise ordinances, proximity to rail, marine and truck transportation.

Key Factors for Quarry Site Selection

1. Zoning and Land Use Regulations

- Illinois municipalities possess the authority to designate land uses through zoning ordinances. For quarry operations, areas zoned for industrial or agricultural use are typically favorable. It's essential to consult local zoning maps and ordinances to ensure compliance. [NoNoise+4Illinois Pollution Control Board+4Justia Law+4](#)

2. Noise Ordinances

- Noise regulations in Illinois vary by municipality. Industrial zones often have more lenient noise restrictions compared to residential areas. Engaging with local authorities to understand specific noise ordinances is crucial. [State Regs Today+1State Regs Today+1](#)

3. Transportation Infrastructure

- Proximity to transportation networks enhances the efficiency of aggregate distribution. Key transportation modes include:
 - **Railroads:** Illinois boasts an extensive rail network, facilitating bulk transport.
 - **Highways:** Major interstates like I-55, I-57, and I-80 traverse the state, offering vital road connectivity.
 - **Waterways:** Access to the Mississippi and Illinois Rivers provides opportunities for barge transport.

Use Case - Copilot / ChatGPT

- Where in Illinois are the biggest opportunities to build an aggregate quarry? Take into consideration zoning and noise ordinances, proximity to rail, marine and truck transportation.

Promising Regions for Quarry Development

1. Southern Illinois (e.g., Jackson, Williamson, and Saline Counties)

o Advantages:

- Abundant limestone reserves.
- Lower population density, potentially easing zoning and noise constraints.
- Access to rail lines and proximity to the Mississippi River.

o Considerations:

- Engage with local planning departments to navigate zoning approvals.

2. Central Illinois (e.g., Macon, Logan, and McLean Counties)

o Advantages:

- Strategic location intersected by major highways and railroads.
- Established industrial zones conducive to quarry operations.

o Considerations:

- Assess local noise ordinances and community engagement requirements.

3. Western Illinois (e.g., Adams and Pike Counties)

o Advantages:

- Proximity to the Mississippi River enhances barge transport options.
- Existing industrial infrastructure supports heavy operations.

o Considerations:

- Evaluate environmental regulations related to river proximity.

Use Case - Preventative Maintenance

[Redacted] - Tunnel Belt Amperage

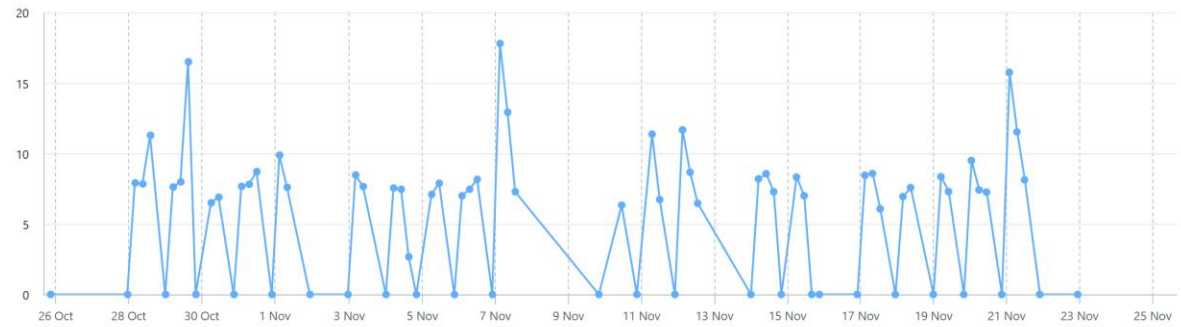
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Edit

Readings

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AMPS



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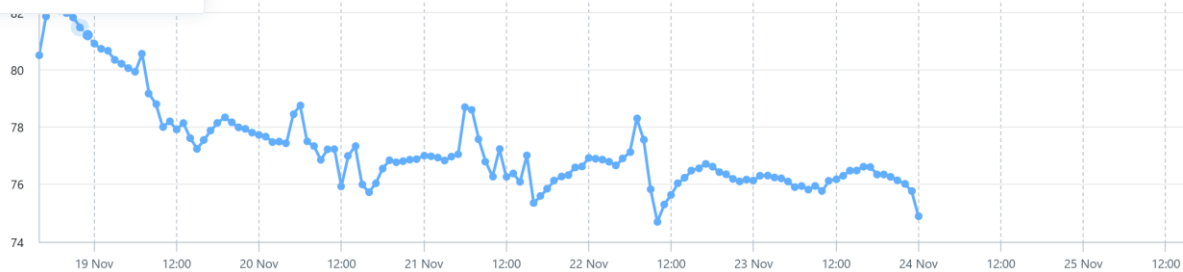
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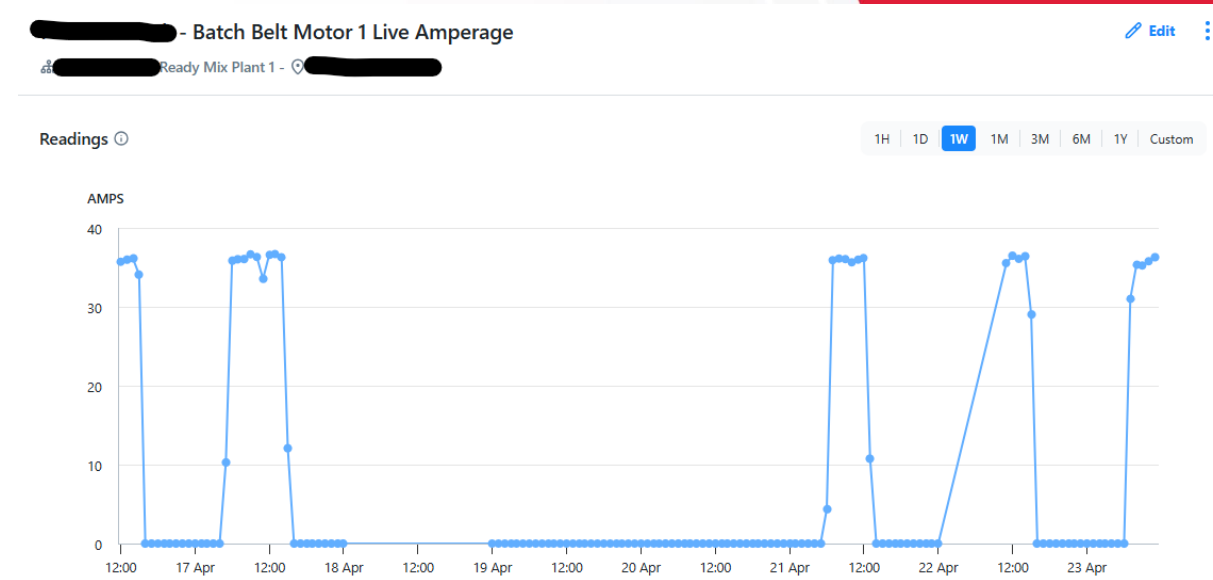
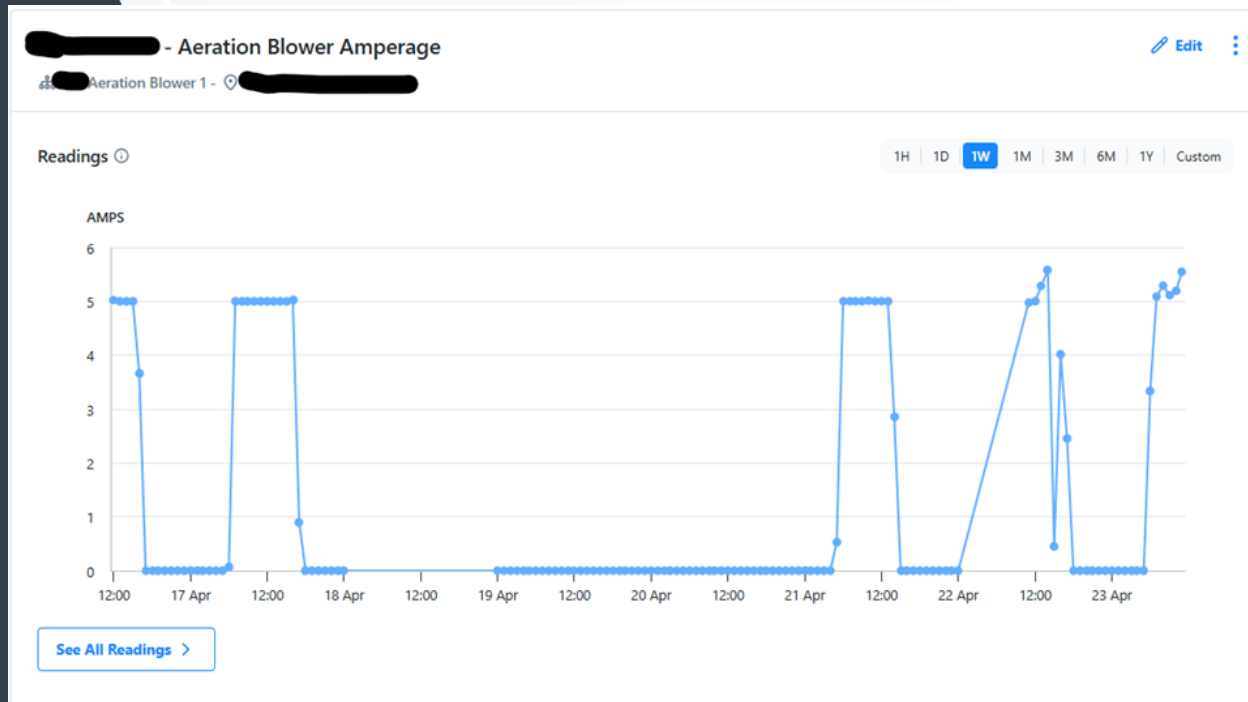
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Use Case - Preventative Maintenance



Use Case - Autonomous Vehicles

Self-Driving Mining Trucks



Cat 793F autonomous truck at Navajo Mine trial. Truck image: Caterpillar

Use Case - Autonomous Vehicles



Use Case – Drone Fly Over

- Inventory Management
- Site / Pile monitoring
- Mapping Quarry
- Monitoring Operations
- Equipment Inspection



Do not believe everything you see – AI Videos

- Deep Fake Videos



Eyes on Task, Mind on Task – AI Videos

- How can you spot fake Information
 - Did it come from a trusted source
 - Did the message appear out of the blue
 - What is the intent of the message
 - Is the message trying to deceive you
 - Is the message asking you to do something
 - STOP and THINK before you react
 - If in doubt, don't; or ask for help

What Risks does AI present

- AI systems may leverage public data, the source may not be accurate
- AI systems may share your requests publicly, assume there is no privacy
- AI systems are still developing, the results are not always accurate
- AI is not really Thinking, it is looking for repetition in data to create answers
- AI will not replace you, but can do grunt work

Where do you go from here

- Create an AI Policy

AI Use Policy

1. Purpose

This policy outlines the guidelines for the responsible and ethical use of artificial intelligence (AI) tools within our company. It aims to ensure that AI technologies are used in a manner that protects the privacy, security, and rights of all stakeholders.

2. Scope

This policy applies to all employees, contractors, and third-party vendors who use AI tools in their work with our company.

3. Definitions

- **Artificial Intelligence (AI):** Technologies that enable machines to perform tasks that typically require human intelligence, such as learning, reasoning, problem-solving, and decision-making.
- **AI Tools:** Software and systems that utilize AI technologies to perform specific tasks.

4. Acceptable Use

- AI tools should be used to enhance productivity, improve decision-making, and provide valuable insights.
- Employees must evaluate the security and privacy features of any AI tool before use.
- Confidential, proprietary, or sensitive data must not be uploaded to AI tools without prior approval from the appropriate department.

5. Security and Privacy

- **Data Protection:** Employees must ensure that any data shared with AI tools is protected according to our data security standards.
- **Access Control:** Access to AI tools must be restricted to authorized personnel only. Sharing login credentials or sensitive information with unauthorized parties is prohibited.
- **Regular Audits:** AI tools and their usage must be regularly audited to ensure compliance with security and privacy standards.

6. Ethical Considerations

- **Bias and Fairness:** AI tools must be monitored for biases and fairness. Any detected biases must be addressed promptly.
- **Transparency:** The use of AI tools must be transparent to all stakeholders. Employees should be informed about how AI tools are used and the data they process.
- **Human Oversight:** AI tools should not replace human judgment. Critical decisions must involve human oversight.

7. Compliance

- **Legal Requirements:** All AI tools must comply with relevant laws and regulations, including data protection laws such as GDPR and CCPA.
- **Intellectual Property:** Ensure proper licensing and permissions for any third-party AI tools or data used.

8. Accountability

- **Responsibility:** Employees using AI tools are responsible for their proper use and must report any issues or misuse.
- **Training:** Regular training sessions will be conducted to educate employees on the ethical and secure use of AI tools.

9. Review and Updates

This policy will be reviewed annually and updated as necessary to reflect changes in technology, laws, and company practices.

Where do you go from here

- Create an AI Education Plan
 - “Can you recommend an AI education plan for an Aggregate Quarry”

1. Introduction to AI in Quarry Operations

- **Overview of AI:** Explain the basics of AI, machine learning, and their applications in the quarry industry.
- **Benefits of AI:** Highlight how AI can optimize processes, reduce costs, and improve safety.

2. AI Applications in Quarry Operations

- **Drill-to-Mill Optimization:** Teach how AI integrates geological data with real-time equipment monitoring to improve fragmentation and reduce energy consumption
- **Predictive Maintenance:** Educate on using AI for real-time diagnostics to track equipment health and prevent breakdowns
- **Environmental Compliance:** Show how AI can automate data collection for regulatory reporting and optimize processes to minimize environmental impact

3. Practical Training Modules

- **Data Collection and Analysis:** Train staff on collecting and analyzing data using AI tools.
- **AI Tools and Software:** Provide hands-on training with AI software used in quarry operations.
- **Safety and Risk Management:** Use AI to identify patterns in safety data and mitigate risks

4. Case Studies and Best Practices

- **Industry Examples:** Present case studies of successful AI implementations in other quarries
- **Best Practices:** Share best practices for integrating AI into existing workflows.

5. Continuous Learning and Development

- **Workshops and Seminars:** Organize regular workshops and seminars to keep staff updated on the latest AI advancements.
- **Online Courses:** Offer access to online courses and certifications in AI and machine learning.

6. Evaluation and Feedback

- **Performance Metrics:** Establish metrics to evaluate the effectiveness of AI applications.
- **Feedback Mechanism:** Create a system for staff to provide feedback and suggest improvements.

Implementing this plan can help your quarry leverage AI to enhance productivity, safety, and sustainability. Would you like more details on any specific module or application?

Where do you go from here

- Create an AI Use Case Study
 - “Create a form for submitting AI use cases for an aggregate quarry”

AI Use Case Submission Form for Aggregate Quarry

Contact Information:

- Name:
- Email:
- Phone Number:

Company Information:

- Company Name:
- Location:
- Website:

Use Case Details:

- Title of Use Case:
- Description:
 - Provide a brief overview of the AI use case.
- Objective:
 - What **problem** are you trying to solve or what improvement are you aiming for?
- Expected Benefits:
 - List the potential benefits of implementing this AI use case (e.g., increased efficiency, cost savings, improved safety).

Technical Information:

- AI Technology Used:
 - Specify the type of AI technology (e.g., machine learning, computer vision, natural language processing).
- Data Requirements:
 - What data is needed for this use case? (e.g., sensor data, historical performance data)
- Implementation Plan:
 - Outline the steps for implementing the AI solution.

Additional Information:

- Challenges:
 - Identify any potential challenges or obstacles.
- Timeline:
 - Provide an estimated timeline for implementation.
- Budget:
 - Estimated budget for the project.

Attachments:

- Supporting Documents:
 - Attach any relevant documents or files.

Where do you go from here

- Experiment with Productivity tools like:
 - OpenAI - ChatGPT
 - Microsoft - CoPilot
 - Google – Gemini
 - Anthropic – Claude
 - xAI - Grok
- Review the solutions you have in place and ask if they have Genetic AI options imbedded
- **Think about specific use cases for your business**

Be safe out there!

