

# Autonomous Mining

# Overview #1

	Problem	Solution
Pain Point	High operating costs & dangerous working conditions	Autonomous mining equipment
Root Cause 1	Heavy machinery in tight areas with humans	Remove workers from dangerous conditions and replace with autonomous equipment overlaid with AI
Market Size	The global mining equipment market size is anticipated to reach USD 284.93 billion by 2025 with a CAGR of 11.7% over the forecast period.	

# Data Analyzed

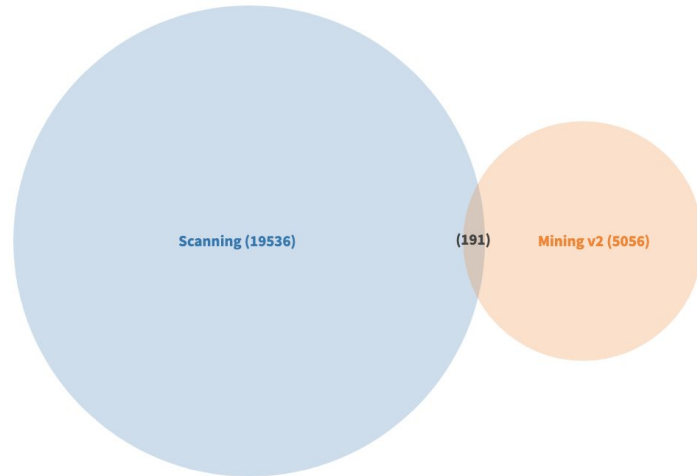
Topic	Count
mining	5,056
scanning	19,536
sorting robots	28
machine learning	8,526

## Count of search results for each category.

(A) Scanning: 19536

(B) Mining v2: 5056

(AB) **Intersection Scanning and Mining v2: [191](#)**



## Count of search results for each category.

(A) ML: 8526

(B) Mining v2: 5056

(AB) **Intersection ML and Mining v2: [309](#)**



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Ecosystem Partners

B2B2C



**TERRA**

Developing ground engagement tools and software for efficient extraction

**eleven-x**

Wireless network to connect IoT devices and create a network throughout the mining operation

**FORO ENERGY**

Develops high-powered lasers for the mining industry. These make the early-stage processes of drilling more efficient.

**RAIN**

Neuromorphic chips for efficient and low energy data processing at the edge

**ROKULO**

Real-time fragment analysis and ore classification for extraction and recovery

**Photoneo**

focused on 3D  
High resolution machine vision for machine learning and automation

**einsite**

Digital Worksite and operations management

**ARKeX**

Digital Twin of the Mine.










**RA Rockwell Automation**

Develops machinery and robotics for industrial automation, including in the mining sector.

# Summary

ROCKWELL AUTOMATION develops and manufactures mining equipment. Working with them on autonomous electric powered equipment is the first step. Samples produced with FORO lasers can be analyzed by of a combination of PHOTONEO and ROKULO. If the sample comes back positive, EINSITE and ARKEX can be updated to keep track of mining operations and data and be used to predict future extraction sites. Ground engagement tools developed by TERRA can then be used to extract desired raw materials autonomously. The robot would be driven by RAIN's neuromorphic chips, and all data collected can be sent to the cloud through ELEVEN-X's wireless network.

# Startup Statistics

																		
	Score	Cohort Average	Score	Cohort Average	Score	Cohort Average	Score	Cohort Average	Score	Cohort Average	Score	Cohort Average	Score	Cohort Average	Score	Cohort Average	Score	Cohort Average
Age	15	10.3	10	10.3	115	-	4	8.6	6	9.9	unknown	14.8	unknown	4.5	2	4.75	5	7.3
Funding	\$62.1M	\$3.9M	\$66.1M	\$3.9M	IPO	-	unknown	\$2.4M	\$2.1M	\$1.7M	unknown	\$4M	unknown	\$2.7M	yes amount unknown	\$2.6M	\$1.3M	\$1.9M
Survivability	5	4.2	5	4.2	10	-	4.1	4.9	6.8	4.5	6.9	4.3	3.5	5.3	8.7	5.5	5.6	4.9
Execution	7.5	5.3	8.6	5.3	10	-	4.2	6.1	6.5	5.8	6.8	5.3	3.5	6.3	5.5	5.8	7.2	6
Rank	top 5%	-	top 5%	-	top 1%	-	top 25%	-	top 5%	-	top 10%	-	top 33%	-	top 20%	-	top 33%	-
Fast Facts	Gives a better understanding of subsurface geology.		Commercializing the application of high power lasers for the oil, natural gas, geothermal, and mining industries.		Develops machinery and robotics for industrial automation, including in the mining sector.		Management for construction and mining.		2018 vision award winner, highest resolution and accuracy 3D camera in the world		Looking to disrupt mining and construction industries		Can be used down the whole supply chain		The MN3 can perform deep learning on-chip and can be utilized as a liquid state machine for a broad range of AI applications		Connecting IoT devices in an integrated network	