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A Novel AI and 3D Vision Based Technology to Monitor Mining Shovel Operations

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Abstract: Unplanned downtime and operational inefficiencies at open-pit mines can endanger mine personnel and cost millions of dollars each year. ShovelMetrics Gen. 3 from Motion Metrics International uses Artificial Intelligence and rugged machine vision to help mines mitigate the biggest culprits – crusher obstructions, inefficient blasting, and improper loading. Paired with custom-developed supervised deep learning algorithms, the system uses a high-resolution 3D colour camera mounted above the shovel bucket to detect broken shovel components, monitor teeth wear, measure the quantity of material moved, and analyze the size of the mined rocks. The system also includes 3 high-resolutions surveillance cameras. ShovelMetrics Gen. 3 also offers the first lip shroud monitoring solution in the world. The distributed system employs a combination of embedded processing and cloud computing to implement the required functionalities.



Speaker Bio: Dr. Shahram Tafazoli founded Canadian mining technology company Motion Metrics after completing his thesis in the Electrical & Computer Engineering (ECE) Department at the University of British Columbia (UBC) in 1997. Motion Metrics has since grown to 100+ employees with 10 offices around the world serving many large and small open pit mining operations. The company vision is to inspire a new generation of safe, sustainable, and smart mining. To do so, Motion Metrics employs the latest technologies in machine vision, industrial internet of things, and deep learning. Dr. Tafazoli is an avid inventor holding many international patents, an adjunct professor at the UBC ECE, an early-stage investor in tens of promising technology startups, and an associate member of the Creative Destruction Lab.