Leading iron ore mining company reduces unscheduled downtime of the port conveyor fleet.

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The Challenge

With dozens of kilometers of conveyors, **the iron ore port experienced an average annual downtime of roughly 800 annual hours for the port inflow conveyors.** Various issues, including pulley failures, belt rips, run-offs and drift issues, motor and gearbox failures, and roller failures, caused these failures.

The financial impact of this unscheduled downtime was significant, with an **estimated cost of over $70M per year.** The company sought a solution to identify and prevent equipment failures proactively in order to reduce unplanned downtime and increase productivity.

The Solution

Leveraging DataMind AI™'s predictive capabilities, the mining company was able to detect potential failures more than three months ahead of time, allowing them to undertake targeted maintenance actions that addressed the underlying causes and prevented future occurrences. Furthermore, remote equipment monitoring and advanced maintenance scheduling not only enhanced operational efficiency but also significantly reduced the risk of accidents and injuries, which tend to increase when working in close proximity to the machinery.

The Value

25%
Reduction in unplanned shutdown time
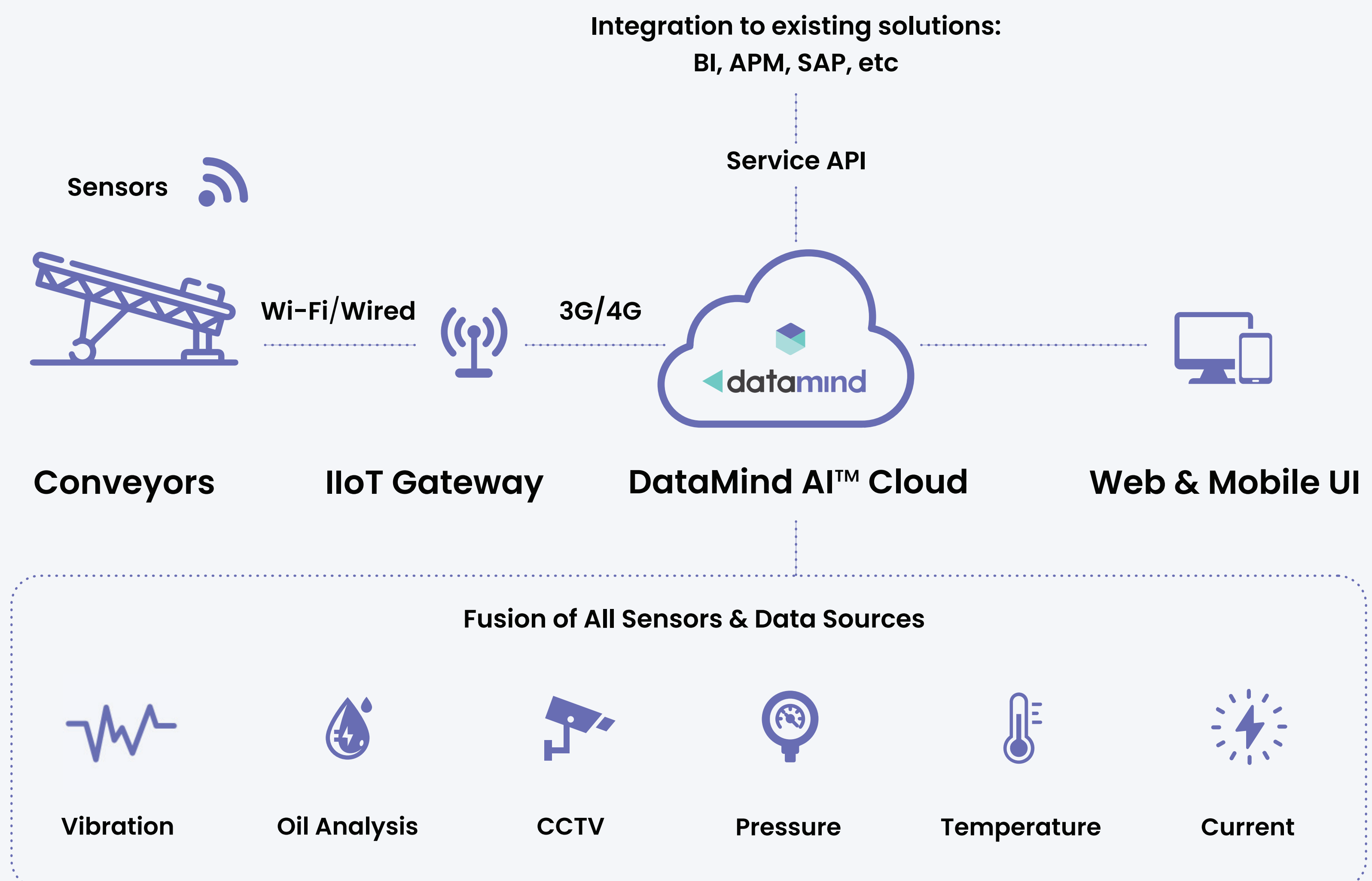
1.3Mt
Increased annual throughout

15M
Prevented productivity loss and maintenance costs

The Results

The company implemented DataMind AI™'s predictive maintenance solution to address recurring conveyor failures. The Razor Labs team performed a site survey and completed the installation of the DataMind AI™ out-of-the-box solution in just two weeks.

- Vibration sensors were deployed during the pilot phase to cover the conveyor pulleys, motors, gearboxes, and impact rollers to provide online visibility of the equipment and ensure that no failures were missed. One of the system's differentiation factors is its unique ability to handle especially slow components, such as pulleys which can be slower than 100 RPM.

- Cameras were deployed to cover belt drift issues which are a potential root cause of increased pulley wear, belt run-offs and rips.

- Current sensors were deployed to indicate motor overload, and oil sensors indicate internal wear and oil contamination.

- DataMind AI™ fused these different sensors together to provide a holistic view of the equipment's health, identify the root cause of failures and take corrective actions to prevent recurring failures in the future.

- No data science expertise or effort from the site team was required for the product installation.

Solution Architecture

Integration to existing solutions:
BI, APM, SAP, etc

Service API

Sensors

Wi-Fi/Wired   3G/4G

datamind

Conveyors   **IIoT Gateway**   **DataMind AI™ Cloud**   **Web & Mobile UI**

Fusion of All Sensors & Data Sources

| Vibration | Oil Analysis | CCTV | Pressure | Temperature | Current |

The Discovery

- The system identified incidents of belt imbalance that increased wear and shortened the life of the pulley bearings.

- The system identified incidents of out-of-spec ore top size caused by crusher liner wear.

- The system identified incidents of failure of hydraulic pumps and oil contamination which would have led to sleeve bearings failure and consequently gearbox failures.

- The CCTV footage analysis indicated decentralized ore caused by chute blockages due to humid ore.

- The system detected bearing wear vibration patterns in idler rollers, suggesting the presence of damaged or misaligned rollers that can cause increased wear on the conveyor belt and reduce overall system efficiency.