The Industrial Sixth Sense: Anticipating What Has Yet to Happen



A machine can continue operating and, at the same time, begin to fail.

Production does not stop. The asset's overall operation appears to remain within normal operating ranges. However, some signals - such as vibration, temperature, or electrical consumption - begin to deviate from their usual behavior. Each signal, considered separately, might appear normal. But when they are related to one another, something begins to emerge.
The failure has not yet occurred. It has only begun to leave traces.

One Signal Does Not Tell the Whole Story

For years, recognizing these early changes depended on the experience of operators and maintenance personnel. Today, cameras and sensors make it possible to observe and measure much more. They record images, temperatures, pressures, vibrations, and other variables with a precision that exceeds human perception. But measuring does not necessarily mean understanding.

Artificial intelligence makes it possible to analyze the relationships among these variables and identify deviations. It does not seek only to determine the value of a signal, but how it

is changing, which other signals coincide with it, and whether that behavior differs from what normally occurs. This is where a different capability begins to take shape.

Anticipating Is Not Guessing

The industrial sixth sense does not reside in a camera, a sensor, or an isolated algorithm. It emerges from integrating different sources of information with knowledge of the asset and the process.

Artificial intelligence can analyze large volumes of data, recognize patterns, and direct attention toward an anomaly among thousands of records. This does not mean that the same anticipation horizon exists for every piece of equipment. The possibilities depend on the asset, the speed at which the phenomenon evolves, and the quantity and quality of the available information.

Anticipating is not guessing the future. It is recognizing early signals and estimating how a condition might evolve within known limits.

Learning to Look Ahead

Industry already produces an enormous amount of information. The problem is not a lack of data, but our ability to distinguish which data require attention. We do not simply need more screens, but systems capable of recognizing deviations and delivering understandable alerts to those who must make decisions.

The industrial sixth sense does not replace the knowledge accumulated by people: it expands a capability that has accompanied mining throughout its history.

How many of the signals a model can recognize today began as a difficult-to-explain suspicion felt by those who learned to listen to a machine?

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