



POSITION PAPER

How Drishti benefits factory line associates

EXECUTIVE SUMMARY

Most factories face a significant lack of data on manual activities, as it is usually hand-curated by engineers or supervisors. Without better data, factories struggle to help operators achieve their highest potential.

Drishti is used on manual assembly lines to create a continuous dataset from activities performed by people. This data takes the form of time study data (such as cycle timing or standardized work elements), with each data point backed by video of the process.

With Drishti, the creation of this data is automatic and continuous. This data and video available to engineers, trainers, quality teams, team leaders and line associates themselves to fit into existing continuous improvement workflows or create new ones.

As a video-based system, some initial concerns may be raised about line associate privacy and surveillance. However, line associates at most Drishti customers ultimately find the system beneficial for the following reasons:

- **Job security, creation and satisfaction.** Drishti represents an investment in improving existing manual processes, as opposed to displacing them through automation or outsourcing.
- **Safety and ergonomics.** Drishti's video record is used to further company efforts to protect operators during the process. In the case of safety incidents, Drishti's video provides rapid root cause evidence for specific, rapid countermeasure design.

- **Record of truth.** Drishti's video record is often used to clarify the root cause of process issues, providing evidence for process failures or other issues that might otherwise be blamed on associate performance.
- **Associate engagement in creative improvements.** Drishti helps identify "brilliant outliers" that would otherwise go unnoticed, giving associates a clearer path to contributing their wisdom and experience back into the process.
- **Associate training improvements.** Customers use video as an education and coaching tool to help operators learn new skills and more quickly improve their existing skills.
- **In-station error proofing.** One Drishti product, Drishti Assist, offers real-time alerts for process deviations. Consider it akin to "spellcheck" — it's a digital assistant that helps the associate avoid making mistakes.

Drishti's [corporate mission statement](#) is to "extend human potential in an increasingly automated world." Drishti's cameras focus on the process, not the people, in order to create data that uncovers productivity, quality, training and other improvement opportunities.

The subsequent process improvements benefit both the business and the line associate.

This document provides more detail on these benefits. It also includes numerous customer and third-party perspective



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I. PURPOSE OF DRISHTI

Drishti's [corporate mission statement](#) is to “extend human potential in an increasingly automated world.” Drishti's cameras focus on the process, not the people, in order to create data that uncovers productivity, quality, training and other improvement opportunities. The subsequent process improvements benefit both the business and the line associate.

II. PRIVACY

Drishti does not capture personally identifiable information. Its system has no information on the name or employee ID of the operator. It does not perform facial recognition. The data Drishti creates is focused on the process, not the person. Drishti makes every effort to find camera angles that do not capture the operator's face, though it is sometimes unavoidable.

Drishti's privacy and security safeguards have been carefully examined by its existing customers, including DENSO, Ford, Nissan, and many other global manufacturers. Drishti's customers include global manufacturers in the automotive, electronics and medical device industries.

III. LEGAL

Many factories have already deployed camera systems throughout the work areas. Drishti's understanding is that video capture of manual activities is permitted in the United States, Canada and Mexico. (Drishti does not capture audio.)

IV. WHAT IS THE STATUS QUO FOR LINE ASSOCIATES?

In most factories today, very little data is created from manual activities, and very few activities are preserved on video. As a result, factory line associates lack insights and analysis into the tasks they perform.

The results of this manifest in a number of ways:

- Abnormalities on the floor may be incorrectly blamed on a line associate, when better data would demonstrate the true root cause is elsewhere in the process
- In cases when root cause of an abnormality cannot be sufficiently isolated, all the operators on the line may be required to attend extra training, or new countermeasures may be put in place that slow the process, necessitating overtime
- Abnormality analysis and root cause assignment often becomes heated and emotional, negatively impacting morale on the line



- While line associates generally understand the process better than the process engineers, they often lack the tools or data necessary to contribute new ideas that result in mutually beneficial process improvements
- Similarly, operators may identify ergonomic issues, but lack the data to validate their concerns
- New line associate training takes a significant amount of time, which reduces the productivity of the line

V. HOW DRISHTI BENEFITS LINE ASSOCIATES

There are a number of ways our technology benefits operators on the line. In keeping with our mission statement, these include:

1. **Job security, creation and satisfaction.** Drishti is deployed in order to optimize existing assembly processes and maintain them in a highly optimized state. This is an investment in the role of people in the assembly process, with attendant benefits in terms of job stability, job creation, and a shift in the economics of manual labor vs. automation or outsourcing.

Drishti also brings benefits to associate morale and job satisfaction. A line with Drishti typically performs with less variability and fewer defects. This results in fewer conflicts and less stress on line associates and supervisors.

Finally, video evidence allows you to take the emotion out of root causes analysis and focus on collaborative countermeasures in an objective way. Supervisors and operators regularly review video together to jointly identify the source of issues, solve problems and learn from past abnormalities.

2. **Safety and ergonomics.** In most factories, operator health and safety is the top priority. In the case of safety incidents, Drishti's video record provides a method to more rapidly and more deterministically identify the root cause of the issue, which therefore leads to more effective prevention efforts. For ergonomics improvements, Drishti's data and video provide much greater insight into true station activities, which allow process designers to more rapidly identify and alleviate potential ergonomics issues.

In addition, in the time of COVID-19, Drishti's video feeds provide remote visibility into assembly lines, which reduces the need to visit the line and risk social distancing violations.

3. **Record of truth.** Video evidence often demonstrates that the root cause for production abnormalities lies beyond the control of the line associate — for example, in instances of missing parts or poor process design. With video evidence, the line associate can be confident that he or she is not unfairly blamed for factors they are unable to influence.

When root cause is more accurately isolated, supervisors and engineers can avoid the need to



instill overly broad countermeasures that might otherwise force line associates to sit through unnecessary training or be required to work overtime to make up for the slowed production.

4. **Associate engagement in creative improvements.** Line associates typically know the process far better than the process engineers, but it's difficult for them to demonstrate their creativity in an objective way. Drishti's video and analytics solutions let line associates demonstrate their creativity and process improvement ideas back up the chain to contribute higher value to the company, or to flag potential issues, such as ergonomics risks.

5. **Associate training improvements.** Customers use video as an education and coaching tool to help operators learn new skills and more quickly improve their existing skills.

Trainers can use video of exemplary line associate activities to bring new employees up to speed faster. Additionally, line associates can observe video to learn from their performance, much in the way that "instant replay" is used in sports to help athletes improve their output.

6. **In-station error proofing.** One Drishti product, Drishti Assist, offers real-time alerts for process deviations. Consider it akin to "spellcheck" — it's a digital assistant that helps the associate avoid making mistakes.

How line operators benefit from Drishti



More accurate root cause analysis → avoid overly broad countermeasures



Video "evidence" helps operators avoid false blame, resolve issues using objective data



Video enables collaborative problem solving



Video helps operators learn / train / upskill



Drishti helps operators prove value & contribute more creatively



Drishti improves the conditions that lead to greater job stability



VI. FUTURE LINE ASSOCIATE BENEFITS ON DRISHTI'S ROADMAP

- **Job assignments and incentive programs.** Drishti's system currently has **no** information on the identity of a line associate. However, it's conceivable that Drishti could integrate with HR data to help the business identify which operators are the most precise in hitting their targets -- thus creating opportunities for new forms of incentive programs, as well as for objectively identifying the line associates who deserve promotion and recognition.
- **Ergonomics applications.** Drishti's long-term roadmap includes specific ergonomics applications that are expected to improve the effectiveness and speed of ergonomic improvements.

VII. BEST PRACTICES FOR DRISHTI DEPLOYMENTS

Drishti has identified the following best practices for achieving the maximum benefits for line associates:

- Include line associates from the project onset in the design and delivery process.
- Be utterly transparent about what the data is and how it is being used.
- Create a dojo station, so the line associates can interact with Drishti and understand it
- Create a culture, supported by dedicated workflows and processes, in which the line associates are empowered to drive "micro-kaizens" — instead of waiting for the IE to run big *kaizen* events.
- Utilize video as a training tool in the classroom and on-the-line as a spot-training aid
- Provide access to the Drishti Portal to line associates so they can utilize the data and video themselves.



VIII. THIRD-PARTY/INDUSTRY PERSPECTIVES

Deloitte. Insights

Deloitte Insights: Ethics and the Future of Work

[Read the report](#)

- “...While observing people in near-real time at work could be seen as a violation of personal privacy, Drishti addresses those concerns head-on by bringing workers into the conversation early.”
- “...workers almost immediately ‘see the value of the technology and its potential to improve their lives and secure their jobs, and they’re on board and excited.’”
- “The aim of the technology — improving the human experience through process analysis, measurement, and insights — sets a clear and ethical case for its use, a case that benefits the company and, just as importantly, the line associate.”

Forbes

Forbes: Tech That Helps Humans Work Smarter

[Read the article](#)

- “In one case on the test line, managers were able to confirm that a worker’s idea to rebalance a line to rid it of bottlenecks was smart before they made a costly change to operations based on someone’s gut.”
- “While Denso is currently testing Drishti in its U.S. plants, Shembekar says that he believes it could be especially helpful for its factories in lower-cost locations like Mexico and Thailand, where turnover among employees is high. ‘This tool will preserve jobs because performance in every category will improve and there’s less reason for Denso to consider expensive automation,’ he says. He declines to say how much Denso is paying for Drishti.”

WIRED

Wired Magazine

[Read the article](#)

- “Workers at Denso were initially wary of the prospect of being video-recorded all day to feed machine-learning algorithms, but Huffman says they have since come to appreciate Drishti’s technology. After something goes wrong, workers can now look at the data and video with their managers, instead of having to hope bosses take their account of what happened seriously. Huffman says having a constant readout on productivity also helps managers be more responsive to nascent problems.”
- “‘If somebody’s struggling, not every associate is going to call for help,’ he says. ‘If we see their cycle time is jumping through the roof, we can go over and say ‘Are you having any issues?’”
- “Denso originated as part of Toyota, which still owns a stake in the company, and like its parent uses the kaizen philosophy of manufacturing, which encourages workers at all levels to participate in improving how a plant operates. That could lead employees to let workers engage with data and insights from AI overseers in ways that improve their jobs as well as productivity, says Susan Helper, an economics professor at Case Western Reserve University who studies manufacturing.”



Toyota: Drishti press release

[Read the press release](#)

- “This volume and quality of data is valuable as Toyota embraces AI-powered production for a data-driven world,” said Akiharu Engo, department general manager at Toyota. “We see Drishti’s technology as a way to help everyone in the factory — including the line associates themselves — identify opportunities to improve performance and create greater value.”
- “Most manufacturers lack meaningful data about manual assembly processes, because human actions are very difficult to measure,” says Jim Adler, managing director at Toyota AI Ventures. “Drishti uses computer vision and AI to create continuous streams of data from video of manual actions.”



IndustryWeek

IndustryWeek: Scaling Brilliance on the Shop Floor

[Read the article](#)

- “New technology, such as computer vision and AI, allows manufacturers to identify the brilliant outlier – the takumi, if you will – on the assembly line. This technology augments the creativity of that person and, by incorporating his or her creativity into the standardized work instructions, allows him or her to set the standard for the rest of the team and company globally.”
- “Production has scaled exponentially since the time of the village craftsman. Paul Revere, the storied American silversmith who was immortalized by Longfellow, would never be able to satisfy demand for his wares in today’s global marketplace. New technology celebrates and allows Revere-level craftsmanship to be harnessed in the manufacturing process, ensuring quality and a superior end user experience that can be shared and incorporated across organizations at scale.”



Automotive Manufacturing Solutions: Power to the people

[Read the article](#)

- “Thinking about the progression we have gone through, from craft manufacturing to Henry Ford and Lean, to Toyota Production System, what we have missed in all of this is data. And if you can produce data at scale, your decision-making process is fundamentally different. If you can put that data in front of the person, the line associate or the line supervisor, even as they are doing their job on the production line, suddenly things are different.”
- “And this is a fundamental question in manufacturing. You’ve got 350m people [working in production operations] how do you train them? How do you give them feedback as they are doing their job? Literally in the moment. So that’s really my thinking around AI powered production.”
- “Something I realised was, even though the press likes you to believe that robots have taken over, that’s the furthest from the truth. There are around 350m people around the world working on production lines, the sum total of robots on the planet is something like 2m. And we’re putting out something like 300,000 robots a year, maybe half a million in the not too distant future. And even if you have 5.6 people being replaced by every robot, you are decades, if not a hundred years away from automation taking over.



World Economic Forum: Drishti recognized as a 2019 Technology Pioneer

Read the [press release](#) and [blog article](#)

- “Companies that were selected as Technology Pioneers demonstrated a clear potential to transform their industries and improve society for years to come,” said Fulvia Montresor, Head of Technology Pioneers at the World Economic Forum. “Drishti and its fellow pioneers are leaders in using novel technologies and driving innovation across industries.”
- Drishti’s technology fills a significant gap that has existed in the manufacturing industry for more than 100 years by making actions performed by people visible to analytics. While most Industry 4.0 technologies are focused on leveraging datastreams created by machines, Drishti’s joint research with AT Kearney found that 72% of tasks in the factory are performed by human operators. With Drishti, manufacturers can replace intermittent and unreliable time and motion studies with continuous streams of data on these manual tasks.”
- “What that means, in short, is that Drishti is creating technology that keeps humans employed in manufacturing. We’re extending their value and efficiency, rather than trying to replace them.”
- “It might seem ironic that the World Economic Forum recognition highlights our technology, because what really sets us apart is our focus on the human being. I’ve always believed that the best systems are those that bring out the best in man and machine. And I’ve invested a large part of my career building tools and systems that focus on the needs of humans – a passion that the Drishti team shares with me. “