FROST & SULLIVAN

BEST PRACTICES AWARDS

LANDING AI

2020 GLOBAL AI-POWERED VISION INSPECTION ENABLING TECHNOLOGY LEADERSHIP AWARD

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Background and Company Performance

Industry Challenges

Inspection, identification, and assembly are some of the key tasks performed during the entire industrial manufacturing process, and machine vision techniques are increasingly used to verify these processes. Consistent advancements and improvements in quality inspection and automation are driving the need for technically advanced equipment, and the industrial revolution and advent of artificial intelligence (AI) have transformed manufacturing verticals. Moreover, AI-integrated machine vision systems are in demand because of the increasing need for quality inspection and automation.

Traditional machine vision inspection solutions that are rule based and static have many shortcomings. For example, they often result in high number of false discoveries, meaning good parts are marked as defective or defective parts marked as good. Furthermore, these solutions are often unable to deal with complex surfaces or variations in what is being inspected.

AI technology is transforming the industrial vision inspection market by making systems smarter so they can learn quicker and adapt to variations either in the product or from the production environment. To attain a leadership position in the AI-powered vision inspection market, companies must leverage AI when developing powerful, accurate, flexible, and easy-to-use solutions that can handle harsh and highly variable production environments.

Technology Leverage and Customer Impact

Pioneering AI-powered Vision Technology for Industrial Inspection

Landing AI is headquartered in Palo Alto, California, and was founded in 2017 by Dr. Andrew Ng, a globally recognized leader in AI, founding leader of the Google Brain team, and former chief scientist at Baidu. Under the leadership of Dr. Andrew Ng and with a team of the strongest techno-commercial minds in the AI industry, Landing AI possesses the rich and driven human resource ability to transform the industrial AI market.

Landing AI's LandingLens, an AI Visual Inspection Platform, enables global companies to gain practical AI value, and the company is one of the pioneers in applying AI to industrial problem solving, successfully commercializing its creative and innovative platform to enable customers to build, deploy and scale AI-powered vision inspection solutions that are based on continuous learning abilities. Landing AI has developed a robust data preparation module to help customers produce more accurately labeled data by avoiding unclear defect definitions and labeling instructions, which ultimately leads to better performing models in less time. Landing AI's data preparation module is further enhanced by the company's proprietary data augmentation tool that uses the latest AI techniques to produce synthetic data for model training. Together these capabilities enable users to maximize the benefits of their limited datasets and set an AI project up for successful deployment.

Furthermore, Landing AI's tech stack uses general-purpose computing hardware and cloud technology and uses standard industrial cameras or the customers' existing image

acquisition systems, to capture images and edge computing hardware to analyze the image data. The edge computing AI model is updated with newly learned intelligence from Landing AI's cloud training servers through either the push or the pull method, depending on the customer and application needs.

To accelerate AI adoption, Landing AI's core technology and platform involve the following:

- **Small data**—Companies lack large datasets for specific scenarios but Landing AI's proprietary data preparation and augmentation module help customers produce more accurately labeled data and generate synthetic data, which lead to better performing models that can detect defects with as few as ten training examples.
- **Live inspection book and smart labeling**—Defining unambiguous defect labels is frustrating and iterative for AI projects. Landing AI's platform generates an objective, fact-based defect and label book that continues to evolve dynamically.
- **Model Iteration engine**—Landing AI's training and evaluation tools enable users to rapidly iterate on model training to achieve a deployment-ready model.
- **Continuous Learning**—Inference and monitoring modules allow users to scale their AI solutions by enabling them to deploy production-ready models to the edge with ease, while continuously monitoring those deployments from a central location.

The above features of its platform differentiate Landing AI's AI-powered vision inspection solutions from other run-of-the-mill approaches by competitors, in terms of tackling industrial vision inspection requirements. These features and capabilities make Landing AI a forerunner in this space by providing maximum value to its customers.

Growth Driven through Customer Value Maximization

With its effective and innovative AI approach to vision inspection, Landing AI helps industrial manufacturers with several applications, such as air leak detection from compressors; oil leak detection from engines, tanks, and mufflers; surface inspections of sheet metal stampings in automotive applications. Compressor air leak detection is typically conducted through human inspection, with fatigue usually occurring after 30 minutes; however, Landing AI's solution successfully avoids this issue. In addition, with sheet metal stamping inspections, Landing AI's solution can reduce false positives by 10 times, compared to human inspection.

Landing AI's customer base includes automotive, industrial goods, agricultural equipment, electronics, and pharmaceutical companies based in the Americas and in Asia. Landing AI works with customers to help them in the following ways:

- Solve specific visual inspection problems with AI Visual Inspection Platform
- Launch new AI-powered products/services or enable existing products/services with AI (joint product development)
- Complement or strengthen clients' existing yet limited AI capabilities
- Offer a custom-built platform/product/service to customers that do not want proprietary data on an external platform/product/service

With its Industrial AI- platform and innovative commercial business model, Landing AI is continuously expanding its customer base and has become a strong force in the industrial AI application space.

Conclusion

As the AI tide takes over all industries, Landing AI's most innovative, effective, and easy-to-use AI-powered vision inspection platform enables manufacturers to achieve high-quality output. Landing AI offers immense value to its customers through its robust and adaptive AI algorithms, which is constantly improved by some of the best technical minds in the industry and seamlessly updated at the customer site through the cloud. The visionary leadership of Dr. Andrew Ng, the highly driven techno-commercial team, strong vision inspection domain knowledge, and resilience toward ensuring customer success well position Landing AI to remain a market leader in this space.

With its strong overall performance, Landing AI has earned Frost & Sullivan's 2020 Enabling Technology Leadership Award in the global AI-powered vision inspection industry.

Significance of Enabling Technology Leadership

Ultimately, growth in any organization depends on customers purchasing from a company and then making the decision to return time and again. In a sense, then, everything is truly about the customer. Making customers happy is the cornerstone of any successful, long-term growth strategy. To achieve these goals through enabling technology leadership, an organization must be best in class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.

Understanding Enabling Technology Leadership

Product quality (driven by innovative technology) is the foundation of delivering customer value. When complemented by an equally rigorous focus on the customer, companies can begin to differentiate themselves from the competition. From awareness, to consideration, to purchase, to follow-up support, organizations that demonstrate best practices deliver a unique and enjoyable experience that gives customers confidence in the company, its products, and its integrity.

Key Benchmarking Criteria

For the Enabling Technology Leadership Award, Frost & Sullivan analysts independently evaluated Technology Leverage and Customer Impact according to the criteria identified below.

Technology Leverage

Criterion 1: Commitment to Innovation
Criterion 2: Commitment to Creativity
Criterion 3: Stage Gate Efficiency
Criterion 4: Commercialization Success
Criterion 5: Application Diversity

Customer Impact

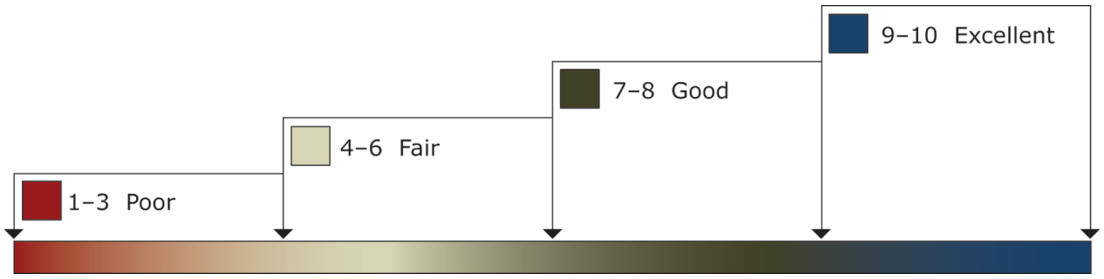
Criterion 1: Price/Performance Value
Criterion 2: Customer Purchase Experience
Criterion 3: Customer Ownership Experience
Criterion 4: Customer Service Experience
Criterion 5: Brand Equity

Best Practices Award Analysis for Landing AI

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows research and consulting teams to objectively analyze performance, according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation. Ratings guidelines are illustrated below.

RATINGS GUIDELINES



The Decision Support Scorecard considers Technology Leverage and Customer Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criterion are provided beneath the scorecard). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, Frost & Sullivan has chosen to refer to the other key participants as Competitor 1 and Competitor 2.

Measurement of 1–10 (1 = poor; 10 = excellent)			
Enabling Technology Leadership	Technology Leverage	Customer Impact	**Average Rating**
Landing AI	**9.5**	**9**	**9.3**
Competitor 1	8.5	8	8.3
Competitor 2	7.5	7.5	7.5

Technology Leverage

Criterion 1: Commitment to Innovation

Requirement: Conscious, ongoing adoption of emerging technologies that enable new product development and enhance product performance.

Criterion 2: Commitment to Creativity

Requirement: Technology leveraged to push the limits of form and function in the pursuit of white space innovation.

Criterion 3: Stage Gate Efficiency

Requirement: Adoption of technology to enhance the stage gate process for launching new products and solutions.

Criterion 4: Commercialization Success

Requirement: A proven track record of taking new technologies to market with a high rate of success.

Criterion 5: Application Diversity

Requirement: The development and/or integration of technologies that serve multiple applications and can be embraced in multiple environments.

Customer Impact

Criterion 1: Price/Performance Value

Requirement: Products or services offer the best value for the price, compared to similar offerings in the market.

Criterion 2: Customer Purchase Experience

Requirement: Customers feel they are buying the optimal solution that addresses both their unique needs and their unique constraints.

Criterion 3: Customer Ownership Experience

Requirement: Customers are proud to own the company's product or service and have a positive experience throughout the life of the product or service.

Criterion 4: Customer Service Experience

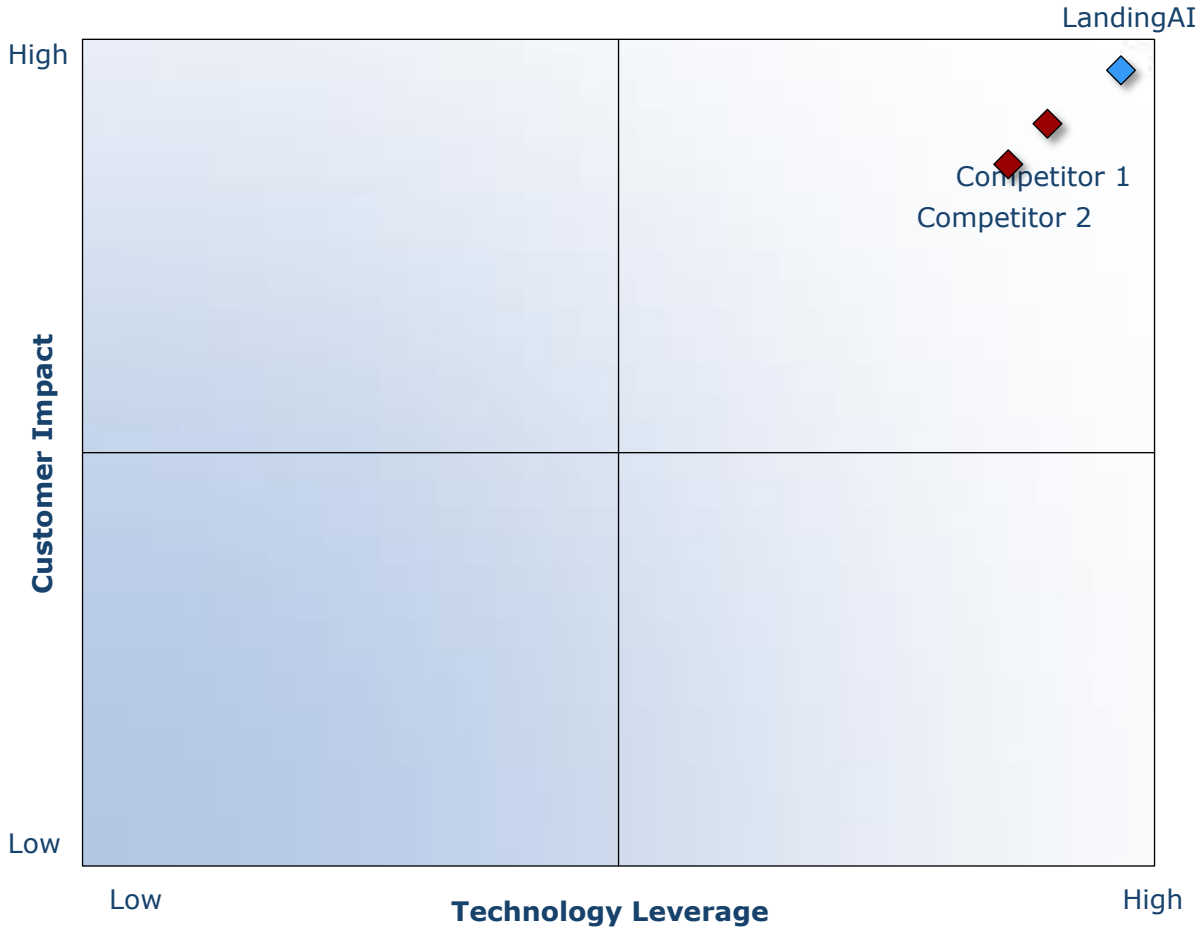
Requirement: Customer service is accessible, fast, stress-free, and of high quality.

Criterion 5: Brand Equity

Requirement: Customers have a positive view of the brand and exhibit high brand loyalty.

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.



Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate award candidates and assess their fit with select best practices criteria. The reputation and integrity of the awards are based on close adherence to this process.

	STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1	**Monitor, target, and screen**	Identify award recipient candidates from around the world	• Conduct in-depth industry research • Identify emerging industries • Scan multiple regions	Pipeline of candidates that potentially meet all best practices criteria
2	**Perform 360-degree research**	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best practices criteria • Rank all candidates	Matrix positioning of all candidates' performance relative to one another
3	**Invite thought leadership in best practices**	Perform in-depth examination of all candidates	• Confirm best practices criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4	**Initiate research director review**	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best practices positioning paper
5	**Assemble panel of industry experts**	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized award candidates
6	**Conduct global industry review**	Build consensus on award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible award candidates, representing success stories worldwide
7	**Perform quality check**	Develop official award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8	**Reconnect with panel of industry experts**	Finalize the selection of the best practices award recipient	• Review analysis with panel • Build consensus • Select recipient	Decision on which company performs best against all best practices criteria
9	**Communicate recognition**	Inform award recipient of recognition	• Present award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of award and plan for how recipient can use the award to enhance the brand
10	**Take strategic action**	Upon licensing, company is able to share award news with stakeholders and customers	• Coordinate media outreach • Design a marketing plan • Assess award's role in strategic planning	Widespread awareness of recipient's award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of the research process. It offers a 360-degree view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, resulting in errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, helps clients accelerate growth and achieve best-in-class positions in growth, innovation, and leadership. The company's Growth Partnership Service provides the CEO and the CEO's growth team with disciplined research and best practices models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages nearly 60 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on 6 continents. To join Frost & Sullivan's Growth Partnership, visit http://www.frost.com.