IntelliBlink-AI

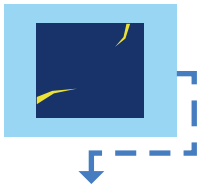
Few-Requirement High-Quality Object Generation for Automatic Optical Inspection

LEAPER IntelliBlink-AI (IB-AI) is comprehensive and reliable deep learning system, integrating efficient and fast sample generation. It does not rely on a large volume of samples nor require continuous investment. Focusing on the complex and urgent application scenarios of industrial clients, and quickly provides defect detection solutions.

Integrate Intelliblink™ Vision Tools for Complete Solutions

LEAPER IB-AI strengthens the integration of deep learning and traditional vision algorithms, establishing a smooth data path, and can provide more flexible, robust and complete vision solutions and technical support.

Cold Start from One Image

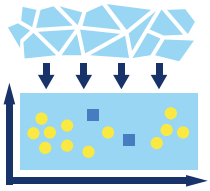


Generate a massive amount of trainable features with only a few original samples.

Diversity and Authenticity

With diverse backgrounds and varied forms, enhance the model's generalization ability to meet the data requirements of the project.

Feature Reduction and Visualization



Intuitively and efficiently identify labeling errors and lack of diversity within the sample set.

Sample Generation in Just Two Steps

Source

Step 1

Building a Sample Set
High-Dimensional Feature Visualization

Feature visualization is achieved by reducing the dimensionality of sample features from a high-dimensional space to a lower-dimensional space, facilitating easier analysis. By visualizing the features, labeling errors, categories with insufficient sample sizes, and categories lacking sufficient diversity can be identified.

Step 2

Sample Generation
Diversity and Authenticity

For categories lacking sufficient diversity or sample size, IBAI generates a large number of authentic new samples based on ground truth sources.

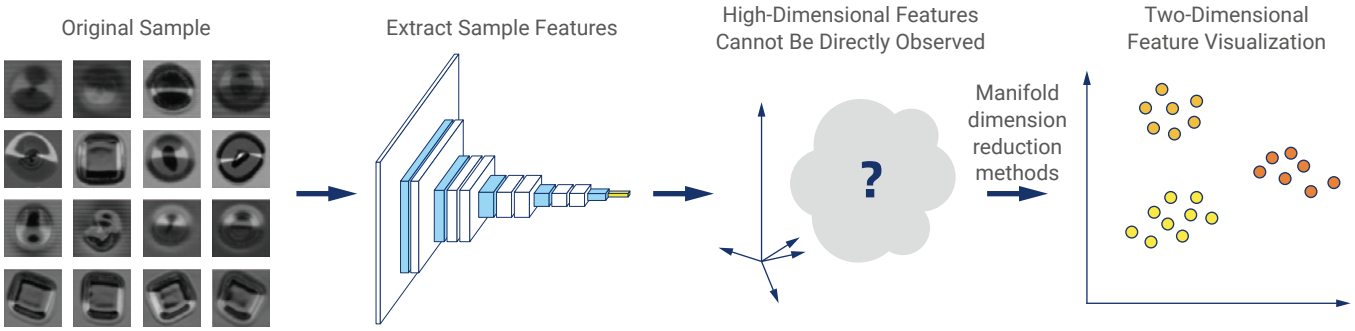
Massive Sample Generation

High-Dimensional Feature Visualization

Three Requirements for Building a Sample Set	Three Challenges in Building a Sample Set	Three Functions of Feature Visualization
Ensure accurate labeling.	Manually checking each sample for accurate labeling.	Quickly identify errors in manual labeling.
Ensure a balanced quantity of samples.	The collection of rare samples typically requires a considerable amount of time, especially for those that are scarce but of high severity.	Quickly detect imbalances in category quantities.
Ensure sufficient diversity.	Samples must not only be sufficient in quantity but also ensure adequate diversity.	Quickly identify insufficient diversity of some categories.

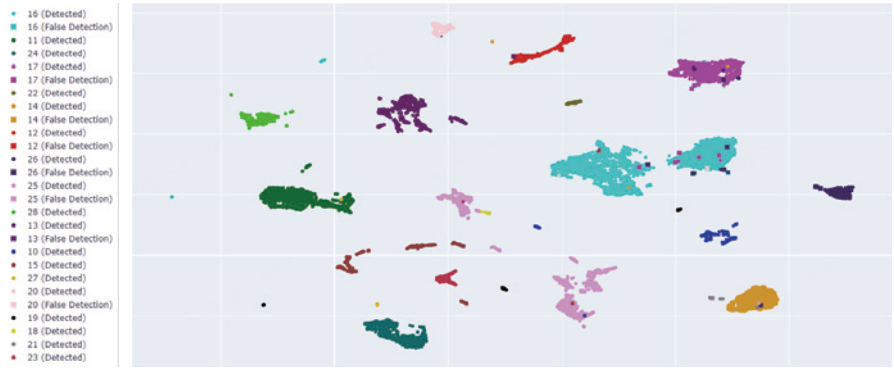
Sample Feature Dimension Reduction

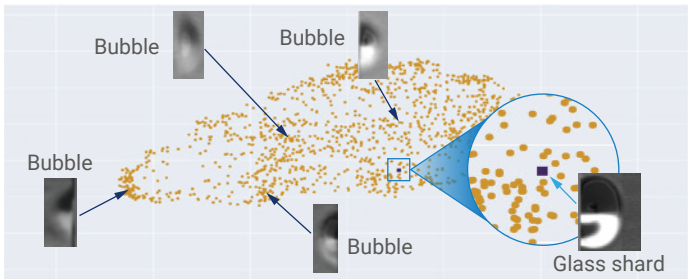
Sample features are transformed from abstract visual characteristics into quantifiable mathematical features, and high-dimensional features are reduced to two- or three-dimensional space for visualization. The challenge of dimensionality reduction lies in preserving both the local and global relative positions of sample points in the original high-dimensional space.

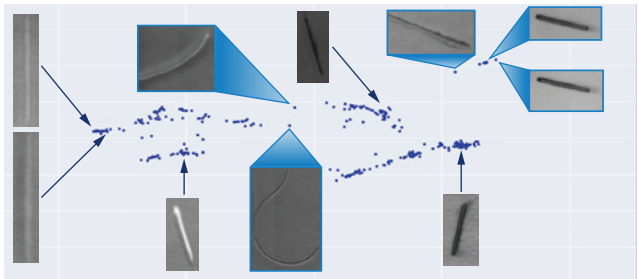


Feature Visualization

◆ Top right: Scatter plot visualization after reducing high-dimensional feature data to two-dimensional space.
◆ Bottom left: Quickly identify error in manual classification, where bubble defects are mixed with glass shard defect.
◆ Bottom right: Easily identify a lack of diversity in a specific category.







Diversity and Authenticity in Sample Generation

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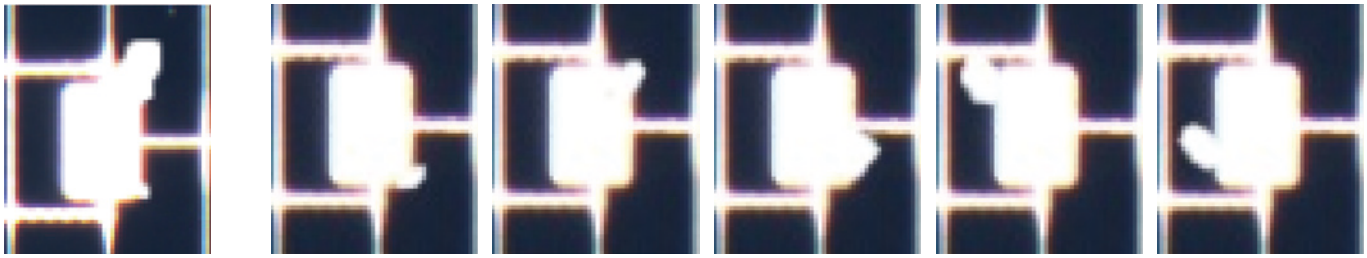

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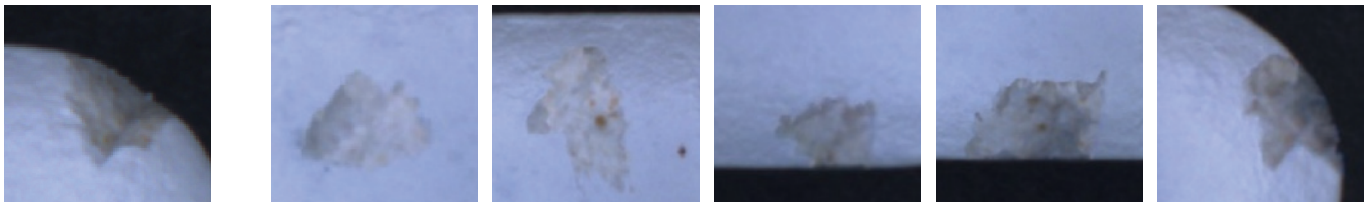

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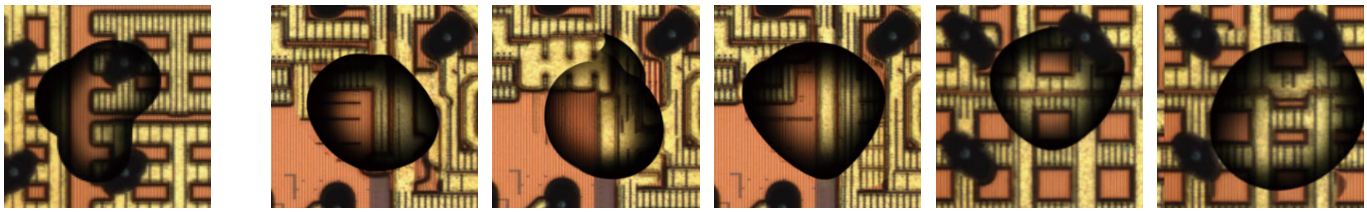

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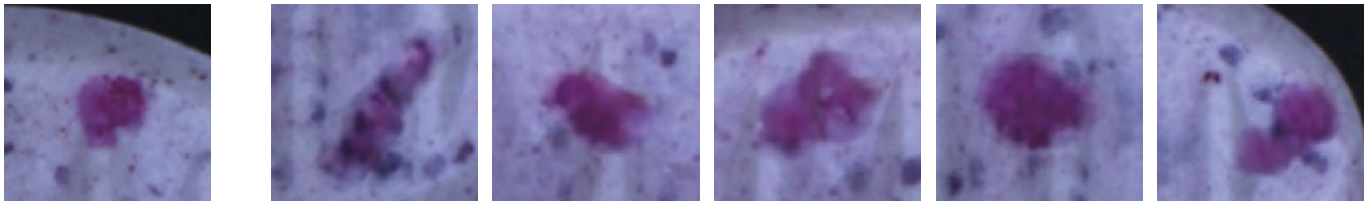

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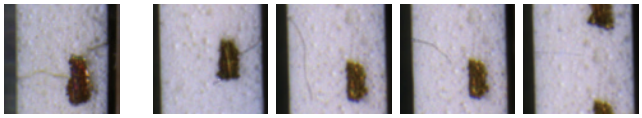

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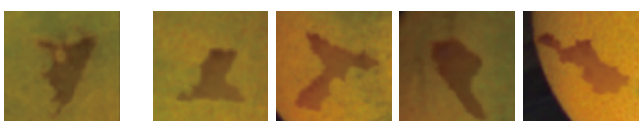

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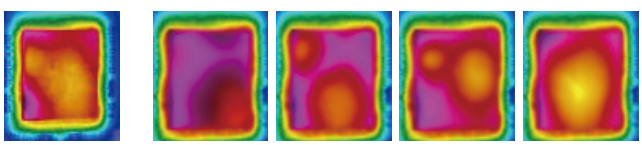

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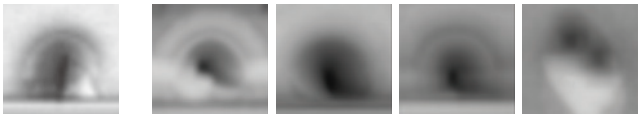

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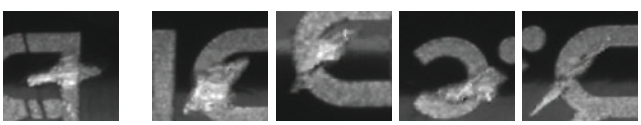

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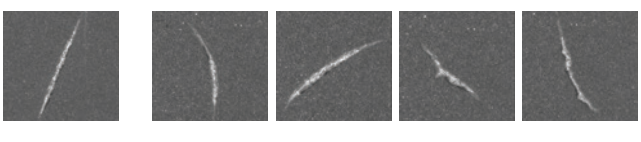
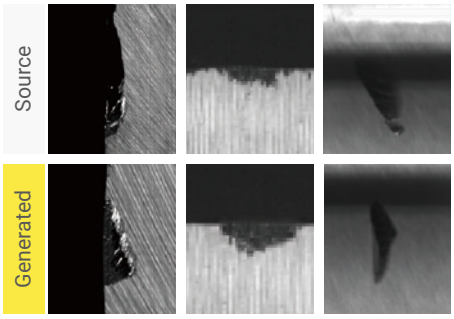


Successful Case

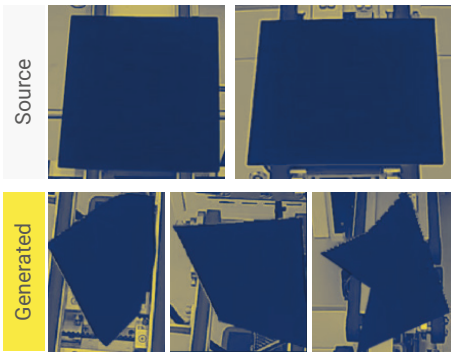
Photovoltaic

Defect	Sample Increase	Collection Time	Model Improvement	Deployment Acceleration
Chipping Dirt Microcrack	90 ▼ **500+**	7 days ▼ **5 hours**	70% ▼ **99.8%**	25 days ▼ **15 days**



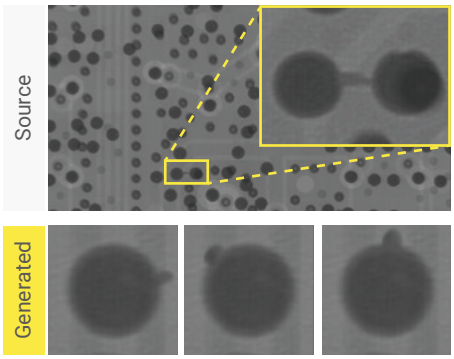
Photovoltaic

Defect	Sample Increase	Collection Time	Model Improvement	Deployment Acceleration
Debris	10 ▼ **200+**	14 days ▼ **2 hours**	95% ▼ **99.5%**	14 days ▼ **5 days**



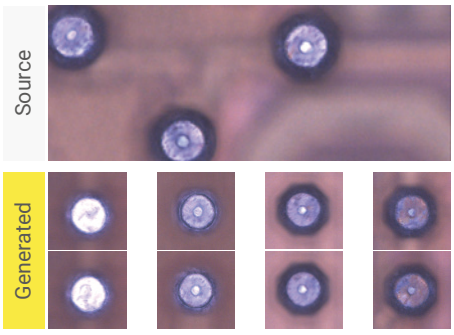
Semiconductor Advanced Packaging

Defect	Sample Increase	Collection Time	Detection Accuracy Increase	Deployment Acceleration
Leakage	40 ▼ **200+**	7 days ▼ **3 hours**	**8.7%**	120 days ▼ **30 days**



Semiconductor Advanced Packaging

Defect	Sample Increase	Oxidation Grading Accuracy	
Oxidation	200 ▼ **1180**	overkill≤ ▼ **3%**	underkill≤ ▼ **0.3%**



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