ASTRI
Hong Kong Applied Science and Technology Research Institute
香港應用科技研究院

AI for Manufacturing

An advanced AI model development solution for multiple manufacturing applications under the conditions of data hungry and qualified AI expertise shortage.

Keywords:
- Quality inspection, Object recognition, Deep learning, Image classification, Object detection, Semantic segmentation, OCR, Automated machine learning, Small-data machine learning

Problems addressed

- While AI is playing a key role in manufacturing, its implementation relies on a huge amount of data and AI expertise
- Expanding applications for AI create a shortage of qualified workers therefore hinders companies in adopting AI to increase the productivity
- Obtaining sufficient high-quality data is expensive, time-consuming, and sometimes infeasible, especially to small batch production

ASTRI's advanced AI model development solution fills the vacancies in the labor market and reduces the massive engineering efforts by using AI to automate the AI development process; helping data immature manufacturers in adopting AI solution quickly with small data technologies to tackle cold-start problems and adapt rapid change in production environments.
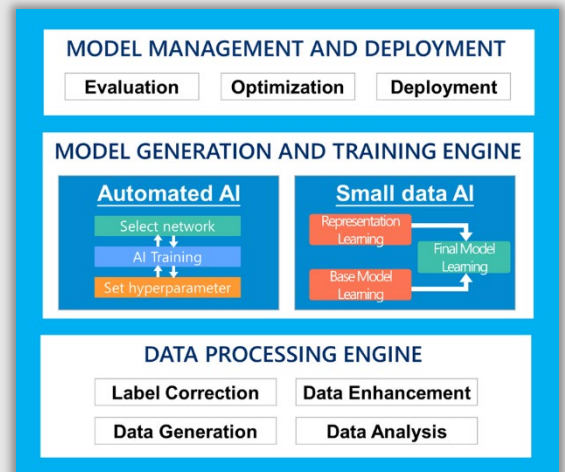
Innovations

The solution integrates advanced automated machine learning and small data machine learning technologies to remove the obstacles of AI adoption in manufacturing applications. The major features of the innovation includes the followings:

- **Data correction engine:** Automatically detect misclassified training data and suggest revisions to improve the final AI performance
- **Synthetic data engine:** Generate synthetic training data by using CAD files to reduce the required amount of real data in AI training
- **AI generation system:** Automatically generate unique AI solution for user-specified manufacturing data by automated machine learning
- **Small data learning module:** Flexibly transfer knowledge from unlabeled data or related tasks to learn representation and models that can generalize well in data limited regimes

Key impact

- Removing the major obstacles (data and expert) of AI adoption in various manufacturing applications by one system
- Automating rare item or event detection, tackling cold-start problems, and adapting systems to changing production environments rapidly
- Supporting local industries, including the SMEs, in transformation and upgrading with advanced technology to increase the competitiveness

Innovation snapshot

Project completed
- On-going

Applications
- Quality inspection
- Pick and Place
- Assembly
- Packaging

Patent(s)
- N/A

ASTRI Patent Search

Commercialisation opportunities
- IP licensing
- Technology co-development

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