

Efficient Image Synthesizing for Enhancing Object Detection and Segmentation

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Technology Licensing Opportunity

Technology Overview

Machine learning and AI industries face a critical bottleneck as computer vision model development requires massive annotated datasets, but manual annotation is extremely labour-intensive, time-consuming, and costly, creating significant barriers to AI deployment across various sectors. Existing automated solutions using GANs and VAEs are fundamentally flawed: GANs are notoriously difficult to train, prone to instability issues like mode collapse and vanishing gradients, and require enormous amounts of training data before producing usable results. Most critically, even after generating synthetic images, manual annotation remains necessary, meaning these technologies fail to eliminate the core labour bottleneck whilst introducing additional complexity and training requirements that make them impractical for many organizations.

Our innovative software solution eliminates these barriers by providing efficient automated synthesis of high-quality, pre-annotated images that dramatically reduce manual annotation requirements. The technology employs advanced algorithms and image processing techniques that generate synthetic images with integrated annotations, streamlining the entire dataset creation process without the training instability and data requirements of traditional generative models. This automated approach significantly reduces time and labour costs whilst improving annotation robustness and accuracy, transforming computer vision development from a resource-intensive manual process into an efficient, scalable operation that enables faster AI model deployment across industries requiring annotated datasets for machine vision applications.

Potential Applications

- Allows users to train more robust and accurate machine learning models.
- Allow user like smaller companies and academic researchers to create their own datasets accessible
- Allow users to customize the synthesis process and create tailored datasets
- Fast generation and annotation of images enable rapid prototyping and iterative testing of computer vision models.
- Applied in education to teach and train students in machine learning and computer vision techniques
- Safety and Security computer vision project for construction
- Inspection vision project for manufacturing / agriculture

Commercialization / R&D Opportunities

- ✓ Ready for commercialization
- ✓ Looking collaborators for further development / to develop new applications
- ✓ Available for licensing
- ✓ Accepting business plans from interested parties

Intellectual Property -

- *Know-how*

Technology Features & Specifications

- **Enhance Efficiency:** Significantly reduce the time and labour involved in creating annotated image datasets. By automating the image synthesis and annotation process, the software aims to streamline workflows and accelerate the development of machine vision models. Annotations are automatically generated together with the synthesis data. This will save a huge bulk of development time as annotation generally needs a lot of manual effort to generate quality labels.
- **Customized Annotation Parameters:** Users can specify various foreground (ground truth) labels and background types. The software randomly combines these elements with transformation factors, such as scaling, rotation, and lighting variations, to generate diverse and realistic synthetic images.
- **Cost Reduction:** Lower the financial burden associated with manual image annotation. By automating this process, the software aims to provide a cost-effective solution, making it accessible to a wider range of users, including SMEs and research institutions.
- **Increase Data Diversity:** Generate a wide variety of images that cover different scenarios, environments, and object variations. This diversity is essential for creating comprehensive datasets that can train models to perform well in real-world conditions.
- **Improve Annotation Quality:** Ensure consistent and accurate annotations across all synthesized images. This consistency is crucial for training reliable and robust machine learning models, minimizing human error and variability inherent in manual annotation processes.

Unique Value Proposition

- The global machine vision market size was valued at USD 10.75 billion in 2023 and is projected to grow from USD 11.61 billion in 2024 to USD 22.59 billion by 2032, exhibiting a CAGR of 8.7% during the forecast period. Asia Pacific dominated the global market with a share of 31.44% in 2023. The machine vision market in the U.S. is projected to grow significantly, reaching an estimated value of USD 3.46 Bn by 2032, driven by the growing need for quality control & automated inspection in manufacturing sector.

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