AI Robotics for Real World Logistics
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Most robotic automation deployed in the real world involves little to no reasoning about the surrounding environment and adaptation to it. From car manufacturing to conveyor systems, traditional robotics relies on specialized pre-programmed behaviors that cannot afford variations in its highly structured environment. This restricts the emergence of general automation solutions for materials handling in warehouses.

Recent research in robotic learning systems provides great hope for the field, but from academia it is hard to understand and address the long tail of challenges blocking the way to the reliability needed to provide value in the real world.

At Covariant, we go beyond the latest published state of the art in Computer Vision and AI Robotics, building systems that adapt and learn from the data collected. Our same core technology has enabled us to deploy a wide range of new automation solutions, from apparel induction to mixed-sku depalletizing.

In this session we cover three pillars behind Covariant's ability to provide solutions that scale: Composability, Self/Semi-Supervised Learning, and Simulation.

Composability of learned models gives us interpretability and flexibility to master new problem domains quickly. Despite recent trends in academic research advocating for fully end-to-end learning approaches, it is less suitable for developing real-world applications where long-tail issues, introspection and robustness to modifications are paramount. We build our system as interconnected skills, where each component can benefit from the supervision obtained by the others but can still work and be re-used independently. Some examples of particular relevance are our object detection and 3D understanding models.

Clever solutions to maximize the amount of self/semi-supervised learning allow us to best utilize our exponentially growing dataset of object SKUs seen in logistic applications and robotic-scene interactions. Our deployed robots are equipped with multiple sensors that enable self-teach to keep improving performance and adapt to changes in the environment like the objects handled.

Finally, we leverage ever more realistic simulated environments that provide SOTA sim-to-real transfer. This is a critical capability to improve in situations where learning through experience is too noisy, expensive or dangerous.

Hopefully, by the end of this session, you will appreciate both the technical challenges and the exciting commercial possibilities of AI Robotics for more efficient supply chains.
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