Matta

Matta

Building AI to Manufacture the Impossible

Website

Overview

At Matta we are building the AI operating system for additive manufacturing. Our technology is based on state-of-the-art research by engineers and scientists at Cambridge. We have developed the first AI platform that can detect almost all errors autonomously and then correct them on the fly.

Like humans, it creatively proposes multiple solutions and can even learn how to print new materials by itself! Ultimately, we are working on applying our AI from design to manufacture.

This will enable the creation of highly complex products with unrivalled consistency, unlocking new capabilities in sectors like robotics, spaceflight, and bespoke medical devices.

The Challenge

Additive manufacturing is growing rapidly but its application in end-use products is limited by a vulnerability to errors. Users across industries often report scrap rates well over 10%, costing enterprises $1.8bn+ a year whilst also wasting energy, material, and time. Frustrated operators can watch for errors but cannot provide continuous monitoring or real-time corrections. This lack of

autonomous error detection/correction is the barrier prohibiting the mass adoption of AM and other digital manufacturing technologies.

Solving this will also facilitate the rollout of new complex products with exciting capabilities, such as next-generation medical devices, bespoke aeronautical components, and even organ replacements.

The Solution

Matta's operating system (OS) uniquely utilises, cutting-edge AI, low-cost sensors, and a new data labelling approach, to enable the reliable and autonomous detection, correction, and prevention of errors across a wide variety of products, materials, and manufacturing systems. We train deep neural networks to learn the fundamental physics of manufacturing processes and thus create AIs that are invariant across setups and can even explain to users why an error has occurred and how to fix it.

This differs to competitors who just memorise how to manufacture a single part, from single material, on a single setup. Ours is therefore the first system that could be applied industrially, and excitingly it opens the door to manufacturing platforms that can observe and learn together how to make things better, potentially enabling incredible advances across diverse industries.

Initially, we are targeting the additive manufacturing market where over the next 18 months we will be launching 3 SaaS products built off this core AI technology via our OS platform.

Publications and Patents

Publications:

- Brion, D.A.J., Pattinson, S.W. Generalisable 3D printing error detection and correction via multi-head neural networks. Nat Commun 13, 4654 (2022)

- Brion, D.A.J., Shen, M., Pattinson, S.W. Automated recognition and correction of warp deformation in extrusion additive manufacturing. Additive Manufacturing 56, 102838 (2022)

- Brion, D.A.J., Pattinson, S.W. Quantitative and Real-Time Control of 3D Printing MaterialFlow Through Deep Learning. Advanced Intelligence Systems 4, 2200153 (2022)

Patents:

- Patent GB2204072.9 Method, Apparatus and System for Closed-Loop Control of a Manufacturing Process

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