

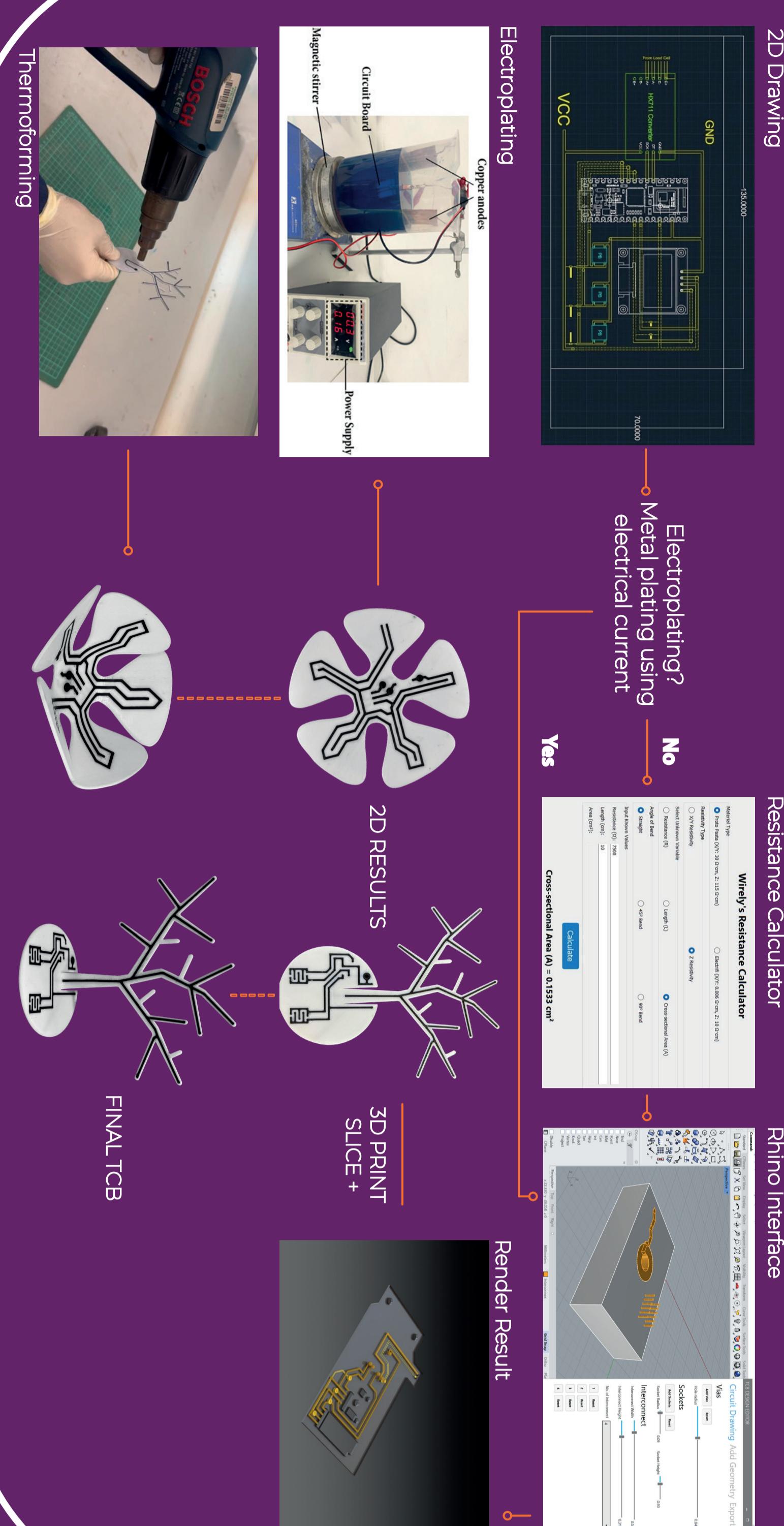
REVOLUTIONIZING 3D PRINTING

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THERMOFORMED CIRCUIT BOARDS

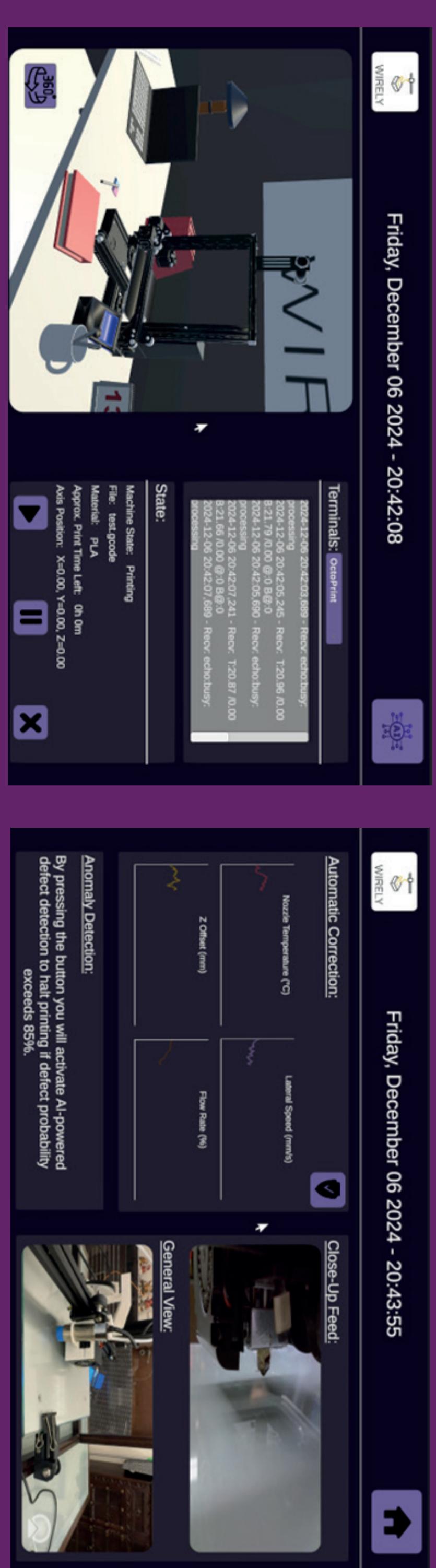
Thermoformed Circuit Boards (TCBs) leverage 3D printing to produce custom-shaped, conductive circuit boards using accessible FDM printers, offering enhanced design freedom compared to traditional methods. Our workflow streamlines the process from 2D design to fully functional TCBs, enabling rapid prototyping and integration of electronics into complex shapes tailored for various applications.



Digital Twin

Our real-time digital twin replicates the 3D printer's movements with zero delay, utilizing G-code parsing and dynamic equations to accurately simulate all XYZ movements, state metrics, and operational parameters.

This Industry 4.0-enabled system ensures seamless two-way communication, real-time visualization of key metrics such as temperature, offset, and flow rate, and is perfectly suited for print farms to monitor and manage multiple printers efficiently.

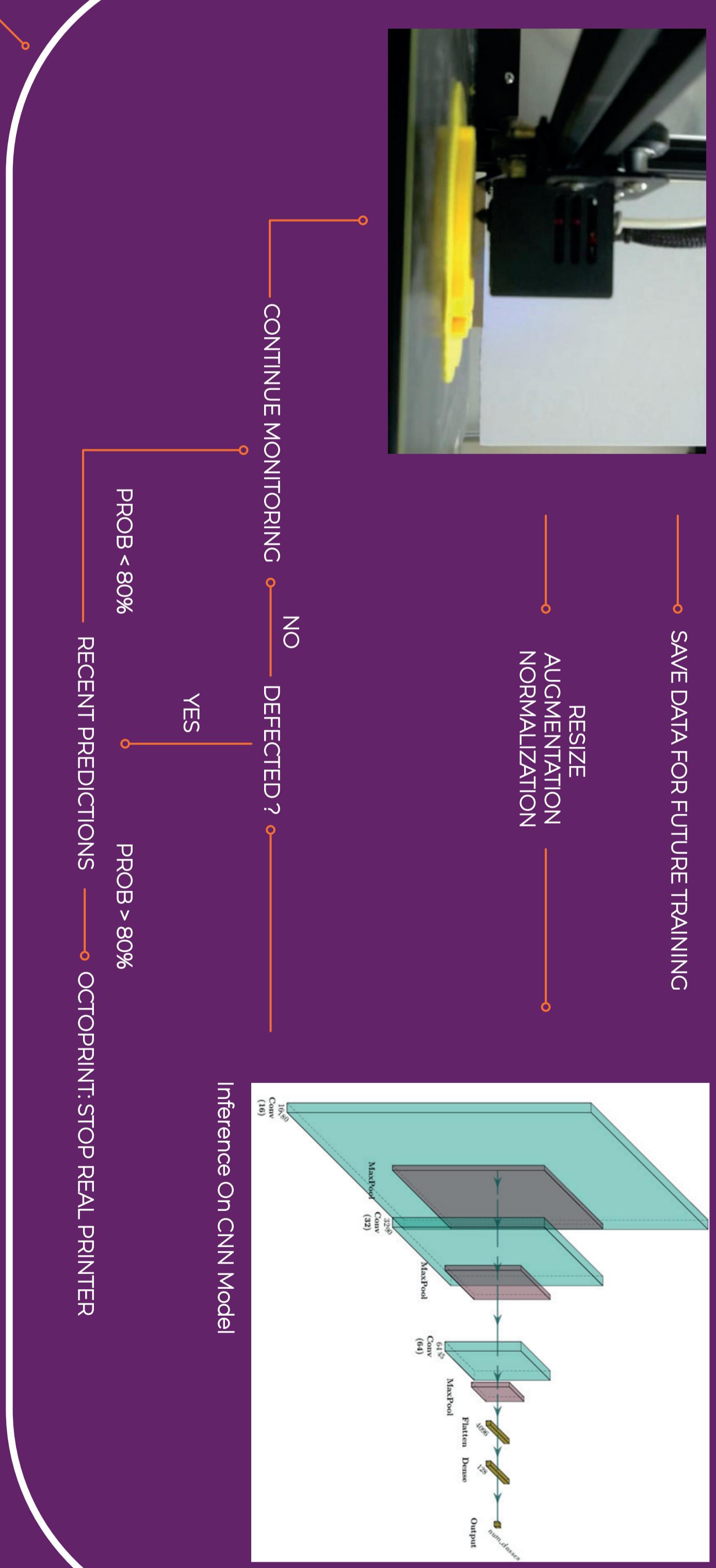


Digital Twin Interface: Real-Time 3D Printer Monitoring and Control

Live Feed with AI-Powered Automatic Correction, Defect Detection, and Real-Time Display of Critical Data

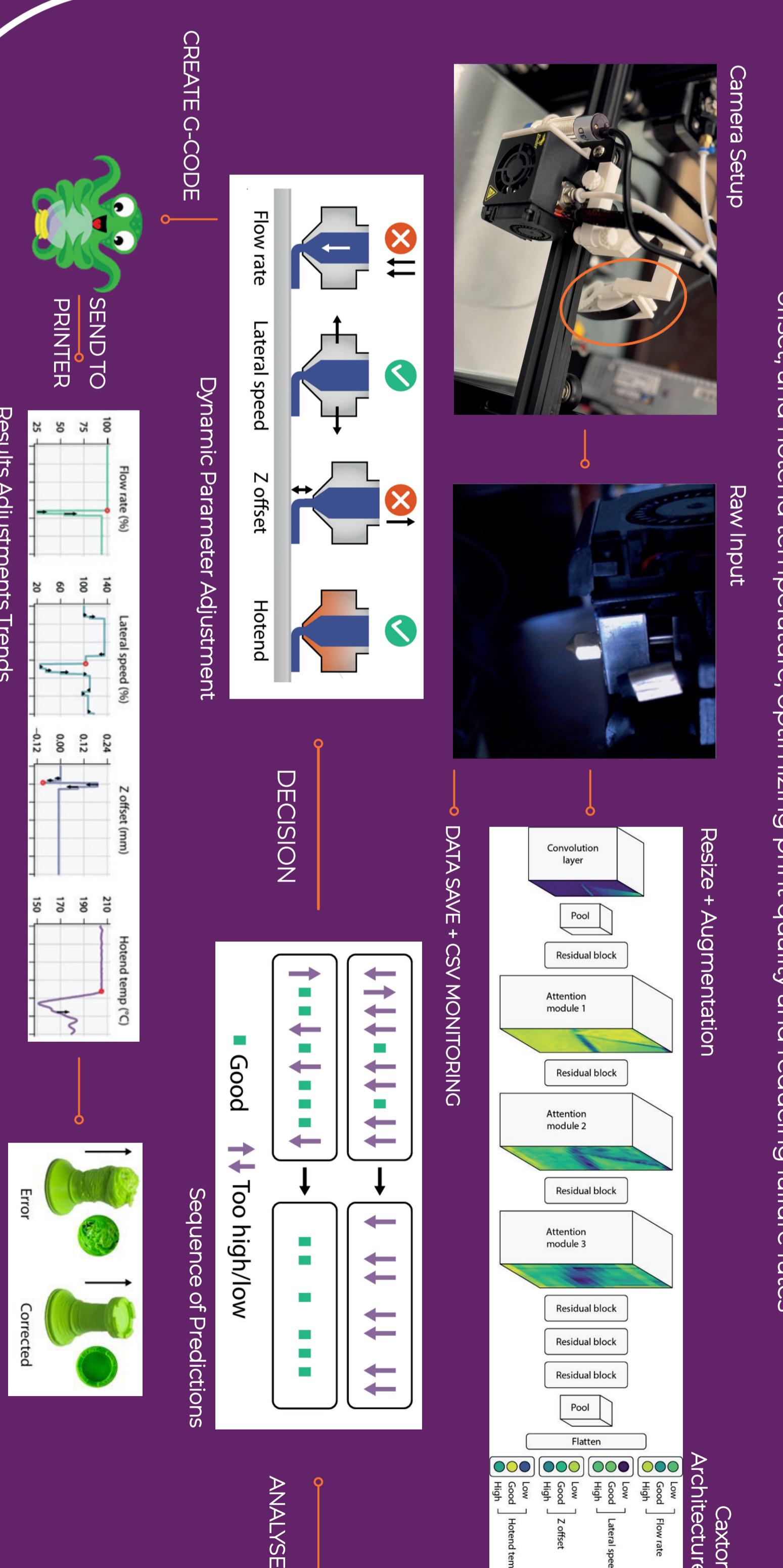
EFFECT DETECTION

Our custom-designed Convolutional Neural Network analyzes live camera feed during 3D printing, achieving 96% average accuracy in detecting defects and automatically halting the printer if the defect probability exceeds 80% in the last 5 predictions. This feature minimizes material waste, improves production efficiency, and eliminates the need for constant manual supervision, saving time and ensuring reliability.



AUTOMATIC CORRECTION

Our system employs a multi-head neural network trained on a comprehensive dataset of over 1.2 million images to enable real-time error detection and correction during 3D printing across diverse geometries, materials, and printing methods, achieving an accuracy of 82%. By analyzing prediction sequences and applying proportional corrections using mode thresholds and interpolation scaling, the system ensures precise adjustments to key parameters like flow rate, lateral speed, Z offset, and hotend temperature, optimizing print quality and reducing failure rates.



Results Adjustments Trends

Error Correction