

CNC programming and toolpath optimization

Automatically generates optimized CNC programs and toolpaths from CAD designs, reducing programming time by 60% and improving material utilization through intelligent nesting and cutting sequence optimization.

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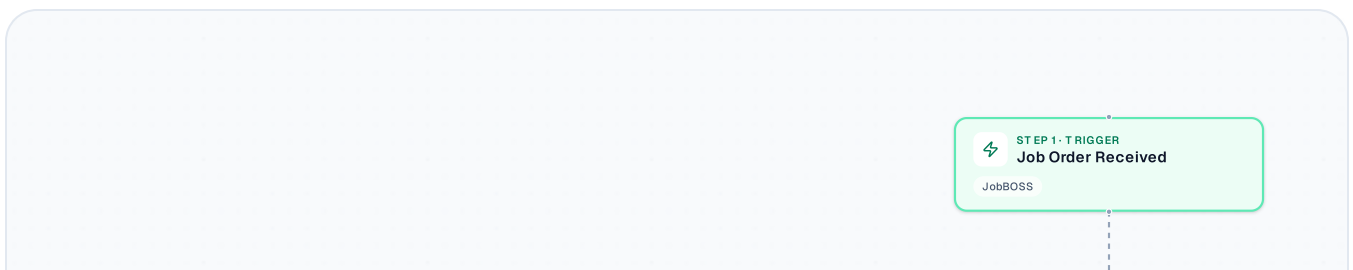


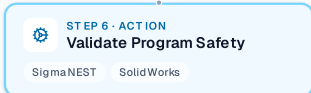
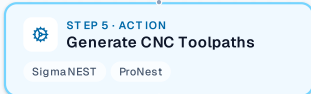
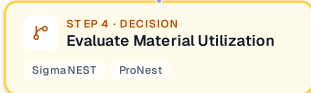
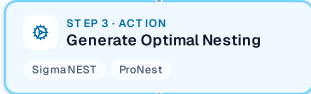
WORKFLOW TRIGGER

New fabrication job with CAD files is received in JobBOSS system

Visual Flow

Each node represents an automated step. Connections show how data and decisions move through the workflow.





Step-by-Step Breakdown

Detailed explanation of each automated stage in the workflow.

1

⚡ TRIGGER

Job Order Received

New fabrication order with part drawings and specifications is created in the job management system. System extracts part geometry, material specifications, and quantity requirements.

2

 ACTION

Import CAD Geometry

CAD files are automatically imported and part geometry is analyzed for machinability. System validates design for manufacturing constraints and identifies critical dimensions.

SolidWorks

AutoCAD

3

 ACTION

Generate Optimal Nesting

AI-powered nesting software arranges parts on raw material sheets to maximize material utilization. System considers grain direction, heat zones, and cutting sequence efficiency.

SigmaNEST

ProNest

4

 DECISION

Evaluate Material Utilization

System checks if material utilization meets minimum efficiency threshold (typically 75%). If below threshold, alternative nesting configurations or material sizes are explored.

SigmaNEST

ProNest

5

 ACTION

Generate CNC Toolpaths

Optimized cutting toolpaths are automatically generated with proper lead-ins, cutting speeds, and tool selection. System accounts for material thickness and cutting method requirements.

SigmaNEST

ProNest

6

 ACTION

Validate Program Safety

Generated CNC programs undergo automated collision detection and safety validation. System simulates full cutting cycle to identify potential machine conflicts or part clamping issues.

SigmaNEST

SolidWorks

7

 OUTPUT

Deploy Production Files

Validated CNC programs, nesting layouts, and setup sheets are automatically distributed to shop floor systems. Production schedule in JobBOSS is updated with estimated cycle times.

JobBOSS

SigmaNEST



Outputs

- Optimized CNC G-code programs

AI Business OS

- Material nesting layouts with cutting sequences
- Setup sheets and tooling requirements
- Updated production schedule with cycle times



Key Metrics

- Material utilization percentage
- CNC programming time reduction
- Setup time per job
- First-pass program success rate



Tools & Integrations

- JobBOSS
- SolidWorks
- AutoCAD
- SigmaNEST
- ProNest

AI Business OS

Actionable AI implementation strategies for business leaders ready to transform their operations.

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