

CNC program generation and optimization

Automatically generates and optimizes CNC programs from CAD designs, validates toolpaths through simulation, and deploys optimized code to CNC machines for enhanced machining efficiency and reduced cycle times.

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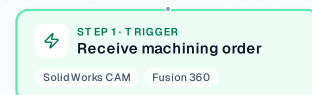


WORKFLOW TRIGGER

New machining order with CAD file is received in the production system

Visual Flow

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





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Step-by-Step Breakdown

Detailed explanation of each automated stage in the workflow.

1

⚡ TRIGGER

Receive machining order

Production system receives new work order containing CAD file, material specifications, and machining requirements. Order details are parsed and validated for completeness.

2

 ACTION

Generate initial CNC program


CAM software automatically creates toolpaths and generates G-code based on part geometry, material properties, and available tooling. Initial feeds, speeds, and cutting parameters are calculated.

Mastercam

SolidWorks CAM

Fusion 360

3

 ACTION

Simulate machining process

Virtual machining simulation runs to verify toolpaths, detect potential collisions, and identify optimization opportunities. Cycle time and material removal rates are calculated.

Mastercam

Fusion 360

4

 DECISION

Evaluate program efficiency

System analyzes simulation results against efficiency thresholds for cycle time, tool life, and surface finish. Programs meeting criteria proceed to deployment, others trigger optimization.

Mastercam

Fusion 360

5

 ACTION

Optimize cutting parameters

AI algorithms adjust feeds, speeds, and toolpaths based on historical machining data and current machine capabilities. Tool selection and cutting strategies are refined for optimal performance.

Mastercam

SolidWorks CAM

FANUC CNC Controls

6

 ACTION

Deploy to CNC machine

Optimized G-code is automatically transferred to the designated CNC machine controller and loaded into the program memory. Machine setup instructions are generated for the operator.

FANUC CNC Controls

Haas VF Series

7

 OUTPUT

Generate program documentation

System creates comprehensive documentation including setup sheets, tool lists, and quality checkpoints. Program performance metrics and optimization notes are logged for future reference.

Mastercam

SolidWorks CAM



Outputs

- Optimized G-code program

AI Business OS

- Machine setup instructions
- Tool list and cutting parameters
- Quality inspection checkpoints



Key Metrics

- CNC program generation time
- Machining cycle time reduction
- Tool utilization efficiency
- First-pass quality rate



Tools & Integrations

- Mastercam
- SolidWorks CAM
- Fusion 360
- FANUC CNC Controls
- Haas VF Series

AI Business OS

AI Business OS

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

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