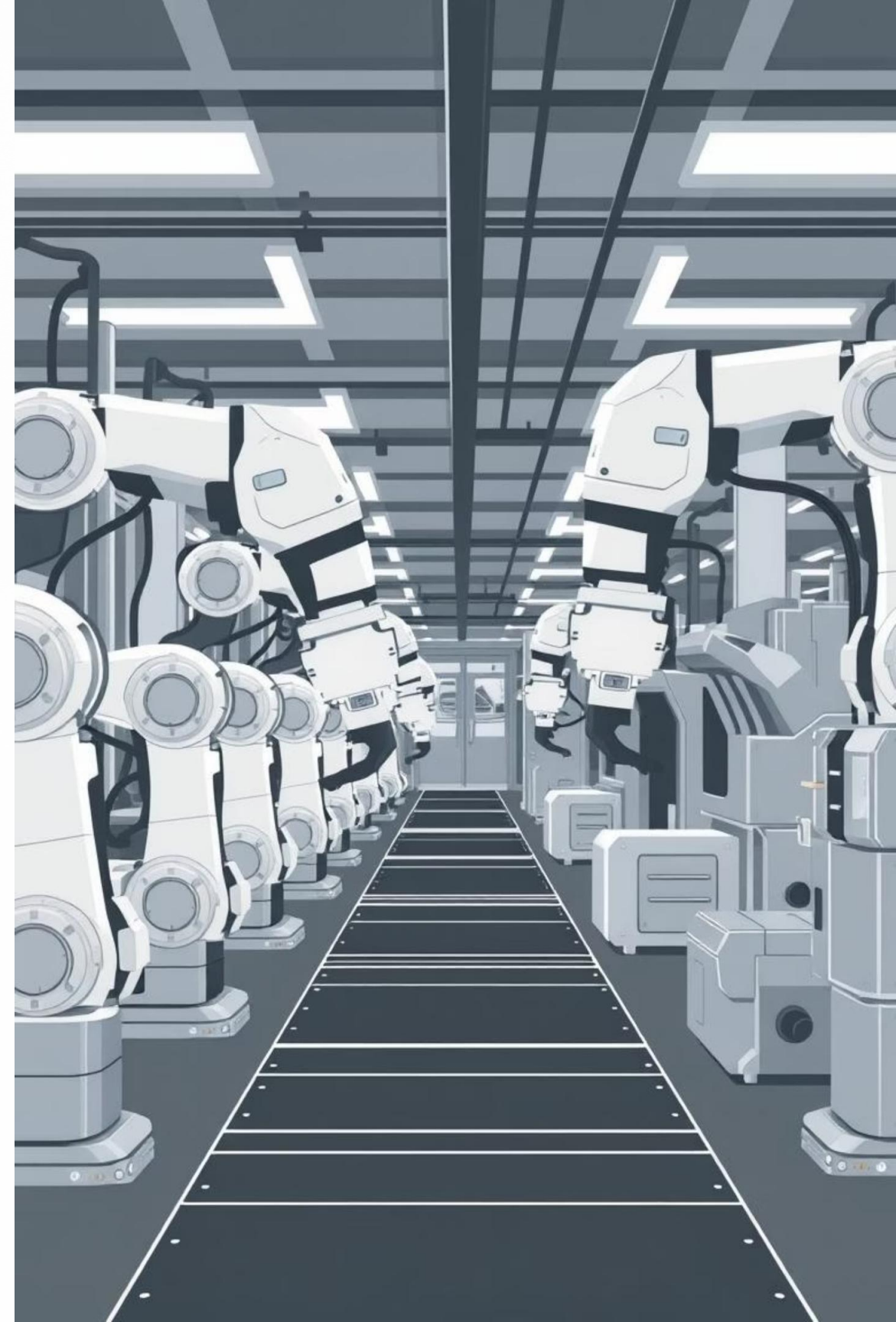# AutoCode AI: Revolutionizing PLC Programming

Narrative to IEC 61131.

By Engineers, For Engineers.

Navigating PLC Complexity: Problem Statement

- Manual coding is slow and error-prone. PLC engineers waste significant time on repetitive, manual coding and debugging logical errors, delaying project completion.

- Existing IEC 61131 code is often difficult to understand, making maintenance and updates a time-consuming and costly reverse-engineering process.

- The complexity of PLC programming and lack of intuitive tools hinder new engineers and prevent experienced professionals from working efficiently.

Introducing AutoCode AI: Intelligent Automation

Convert natural language descriptions directly into production-ready PLC code, adhering to industry standards.

AI-Powered Efficiency
Automate tedious
coding tasks.

Enhanced Reliability
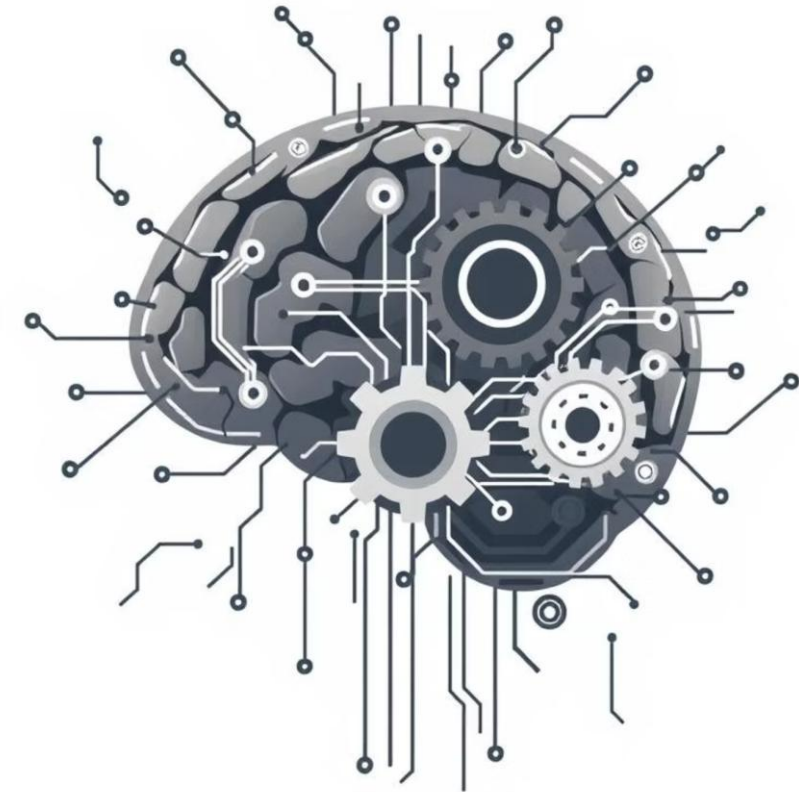Minimize errors
with intelligent validation.

Accelerated Development
Reduce time-to-market
for automation projects.

Seamless Translation

Simply describe the desired PLC logic in plain English, and AutoCode AI generates IEC 61131-3 compliant code formats.

- Structured Text (ST)
- Ladder Diagrams (LD)
- Function Block Diagrams (FBD)
- Sequential Function Chart (SFC)

Ensuring Code Quality: Validation & Reverse Engineering

AutoCode AI provides robust tools to verify code integrity and improve readability, ensuring optimal system performance and maintenance.
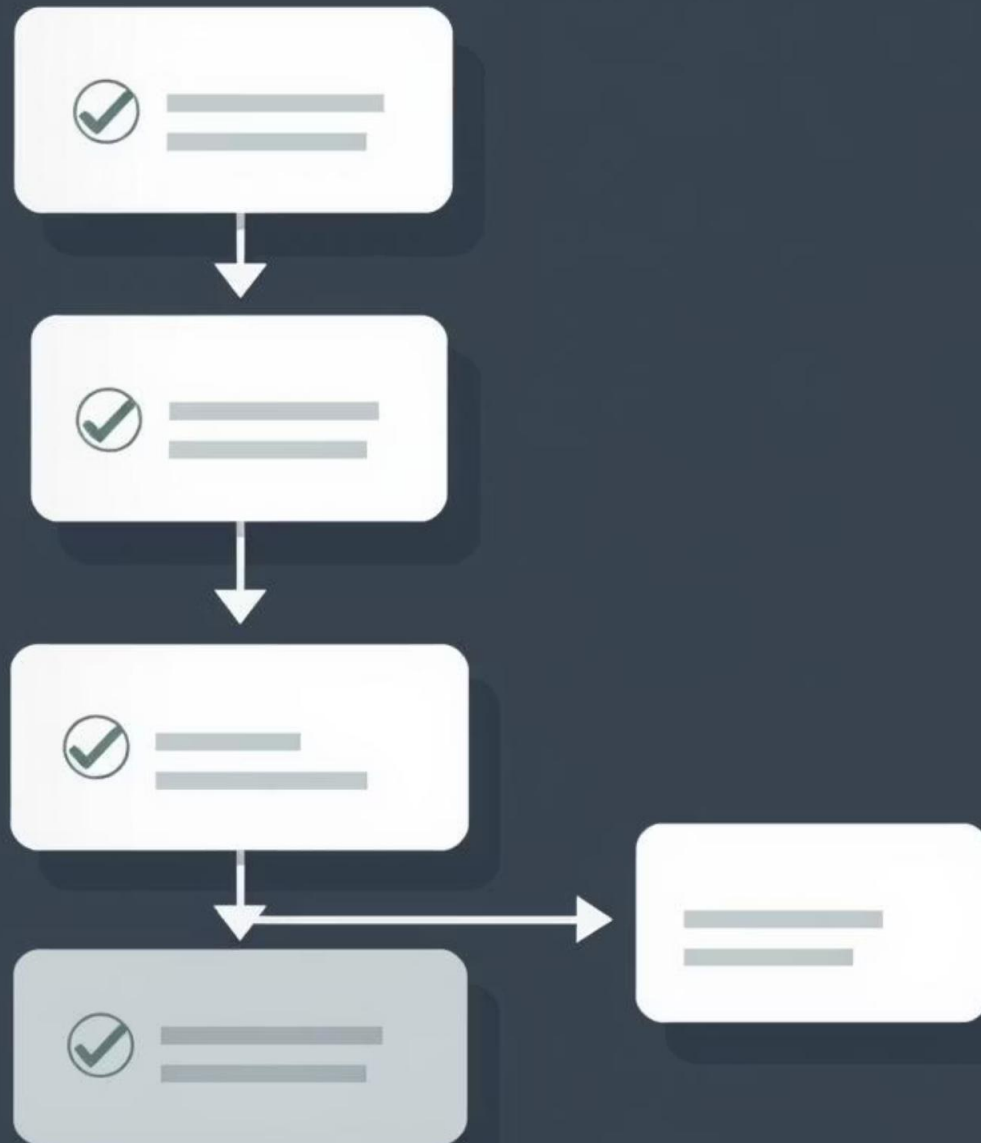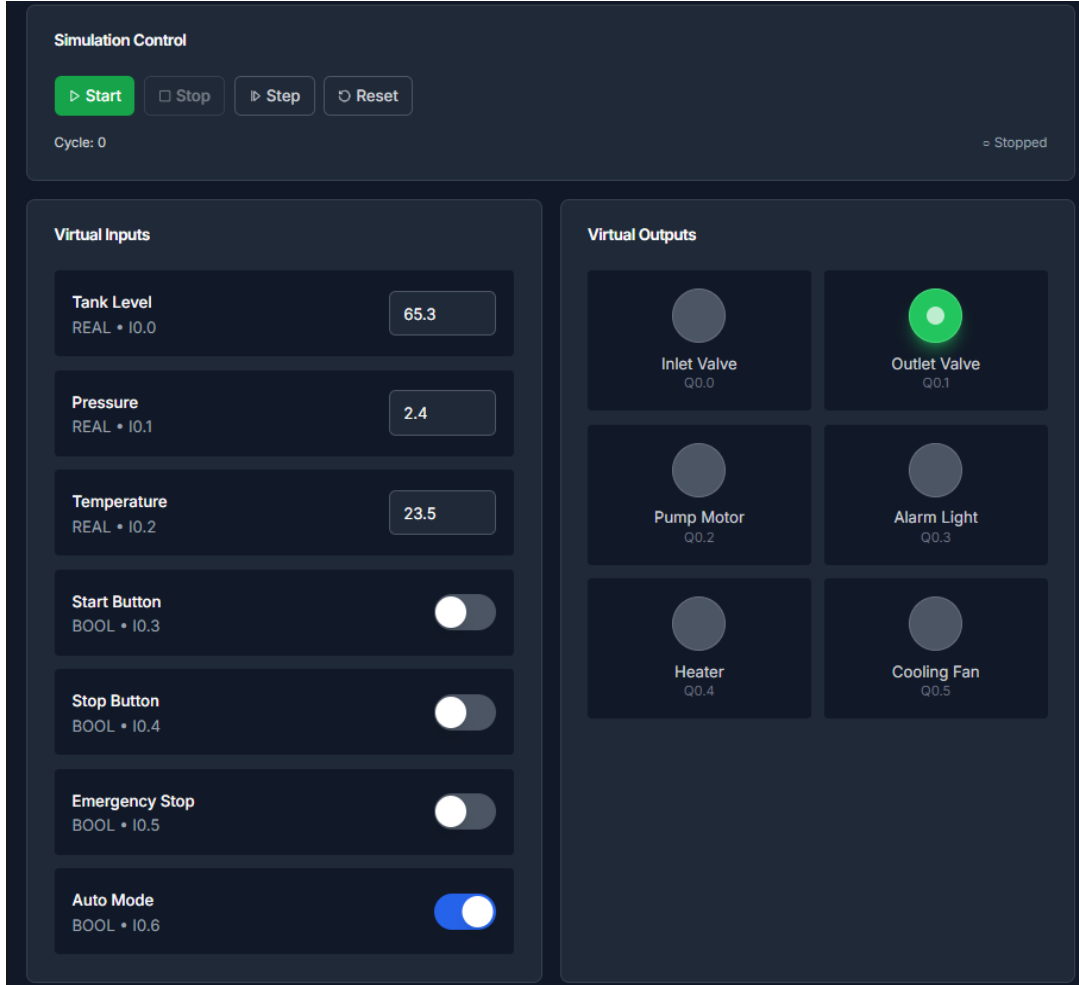
Automated Validation

Comprehensive checks for logical errors, potential conflicts, and crucial safety condition omissions, both in generated and imported code.

Intelligent Reverse Engineering

Transform existing IEC 61131-3 code back into clear, human-readable explanations, simplifying debugging and documentation processes.
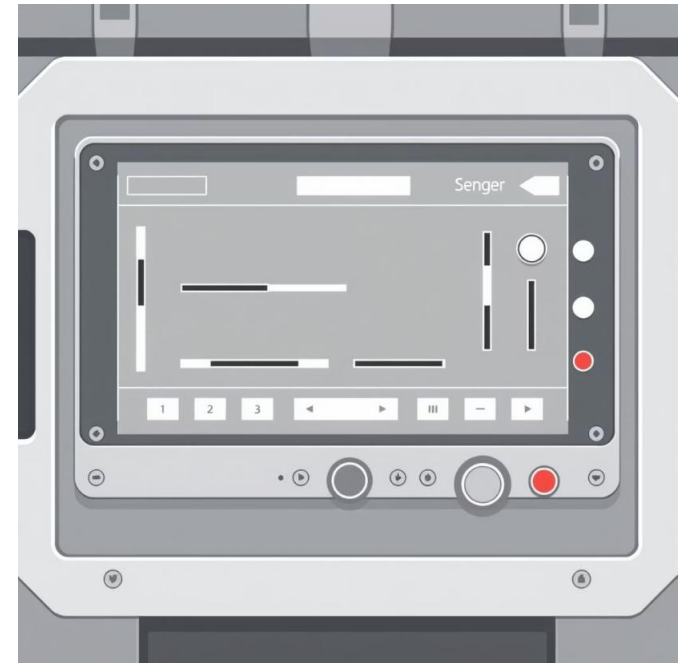
Dynamic Simulation & Seamless Export

Test your PLC logic in a risk-free environment and effortlessly prepare your code for deployment.

Interactive Simulation

Preview real-world behavior with an interactive visual simulation environment. Utilize virtual sliders, switches, and sensors to fine-tune your code before hardware deployment.
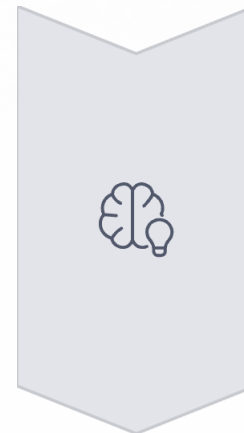
Export Function: Generate ready-to-use PLC code, comprehensive documentation, and relevant diagrams in industry-standard formats, simplifying project handover and integration.
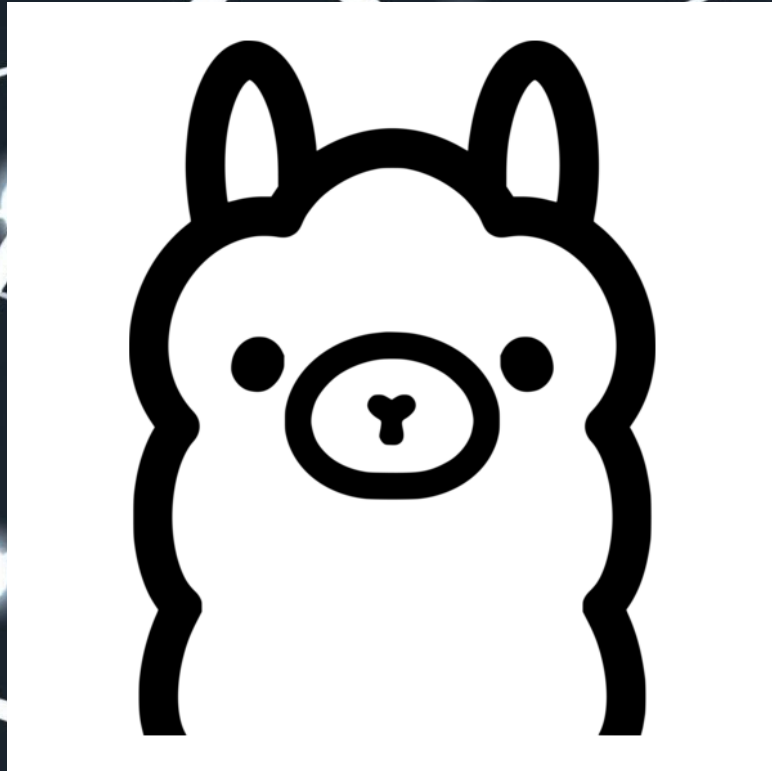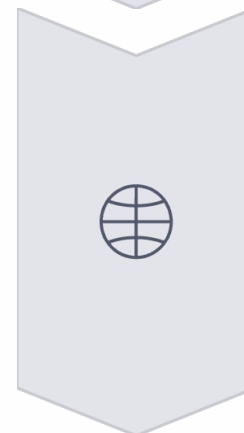
Advanced Code Intelligence

Beyond generation, AutoCode AI elevates your programming with intelligent optimization and expansive language capabilities.

Code Optimization

Receive suggestions for efficiency, readability, and reduced resource usage, ensuring your PLC programs are lean and effective. *Powered by OLLAMA & Phi-3*

Multi-Language Support

Generate and reverse-engineer code in various programming languages, broadening reach to a global engineering audience.

Collaborative Project Management

AutoCode AI integrates seamlessly into team workflows, fostering collaboration and streamlining project lifecycles.

1

Version Control

Track all code changes, revert to previous versions, and manage iterative development with ease.

2

Project Templating

Leverage pre-built templates for common industrial tasks (e.g., motor control, conveyor systems) for rapid project setup.

3

Collaborative Workspace

Enable multiple engineers to work simultaneously on projects with real-time updates and integrated commenting features.

Future Scopes of Industrial Automation

- Industrial IoT & Digital Twin Integration: Connect to real-time industrial data and digital twins for predictive maintenance and virtual testing.

- Multi-Standard Code Support: Expand beyond IEC 61131-3 to include other vendor-specific programming languages like SCL and Ladder Logic.

- AI-Powered Diagnostics: Develop the AI to analyze live PLC data, automatically diagnose issues, and suggest solutions for proactive maintenance.

Prototype Demo Link

Github: https://github.com/Sriramt384/ABBPLCcodeAI

Youtube: https://youtu.be/JOBm38Fcy_c

Team Name: Ctrl+Alt+Innovate

Team Members:

- Sriram Arasu T - EEE Final Year
- Aditya.S.M - EEE 3rd Year
- Suriya B - MTech Final Year
- Arudhra V - MTech 3rd Year