

# **MODEL BASED SAFETY INSTRUMENTED SYSTEM PROGRAMMING USING ARTIFICIAL NEURAL NETWORKS**

## **ABSTRACT**

A system for programming a safety programmable learning controller (PLC) of a safety-instrumented system includes a safety workstation wherein a safety control program is developed for execution by the safety PLC. The safety workstation comprises a memory configured to store programming instructions and a configurator processor. Upon execution of the programming instructions, the configurator processor receives a set of safety instructions defining one or more relationships between inputs and outputs of an industrial plant, populates an artificial neural network (ANN) based on the safety instructions, trains the ANN to determine weights and biasing nodes for the ANN such that the ANN is configured to replicate the relationships defined by the safety instructions, and provides a safety control program based on the configured ANN. The safety control program is downloaded to the safety PLC so that upon execution, the safety PLC mitigates and prevents safety hazards within the industrial plant.

FIG. 1