The Design and Realization of Intelligent Test System of Automobile Instrument Based on Labview

He Fang

*Abstract*—In intelligent instruments such as car and truck machinery in the development process of digital instrument, digital instrument needs to collect more amount of information, the information parameters of various models and the difference is bigger, so to quickly detect determine auto meter displays the normal execution of various functions such as vehicle information is an important part of the car dashboard production line product testing. At present, bus type digital vehicle dashboard is the most mainstream vehicle dashboard, in order to ensure that the vehicle dashboard can quickly and accurately reflect the vehicle system status, before the installation of the corresponding working conditions to display the status information is correct for a comprehensive test. the function test of automobile dashboard is mainly performed by computer-controlled instrument, which is observed by human eyes. However, the method of human eye reading has many disadvantages in instrument testing, such as uncertainty of accuracy, low detection efficiency, long delivery time with customers and so on. Although there have been many scholars in the field of automated testing has done related research, has made certain development. However, there are still some problems such as low-test efficiency, poor real-time performance, insufficient network and intelligence.

# INTRODUCTION

Intelligent manufacturing is a new mode of production with self-perception, self-learning, self-decision-making, self-execution, self-adaptation and other functions. With the deep integration of the new generation of information technology and manufacturing industry, significant achievements have been made in the development of intelligent manufacturing in China. Intelligent manufacturing equipment and advanced technology are widely used in key industries around the world. Digitalization, networking and intelligentization of manufacturing equipment in discrete industries are accelerated. Process control and manufacturing execution systems in process industries are fully popularized. In typical industries, some new models of intelligent manufacturing that can be copied and popularized have been explored and formed, laying a certain foundation for in-depth promotion of intelligent manufacturing. But at present, China's manufacturing industry is still in a stage where mechanization, electrification, automation and digitalization coexist, and the development of different regions, industries and enterprises is unbalanced. Development of intelligent manufacturing is facing the key common technologies and core equipment, intelligent manufacturing standards/software/network/information security foundation weak, intelligent manufacture new pattern of maturity is not high, the system overall solution supply capacity is insufficient, lack of international giant enterprise and cross-border integration of such outstanding problems as intelligent manufacturing personnel. Compared with the industrialized countries, the environment is more complex, the situation is more severe and the task is more arduous to promote the intelligent transformation of China's manufacturing industry.

In order to quickly and efficiently in the development process to test system functions, improve the efficiency of system development, we have designed a set of test system, the system is based on the LabVIEW software platform, using NI PXI board module is simulated to produce the various parameters of vehicle information, control of industrial camera photograph dial, finally using OpenCV image processing algorithms to design instrument, which can identify and quickly realize comprehensive test.

The hardware framework mainly controls the vehicle dashboard by controlling the PXI5413 signal generator, PXI4112 power module, PXI6509 digital I/O acquisition, PXI2727 programmable resistance, and PXI8512CAN bus protocol control card through the main control LabVIEW platform of PXI host system. Meanwhile, LabVIEW platform controls GIGE industrial camera to take photos of the dial and save the photos to the folder.

The dial we tested contains the following types of control signals: high- and low-level control signals, resistance control signals, voltage control signals, CAN bus control signals. Among them, high and low level signal adopts PXI6509 digital I/O acquisition board card, resistance control signal adopts PXI2727 16bit programmable resistance board card, voltage control signal adopts PXI5413 signal generator board card to generate 2V dc voltage signal, CAN bus control signal adopts PXI8512 board card control.

The software framework is mainly controlled by the LabVIEW platform of PXI host system to control the hardware board card and GigE camera, and transmit the data packet to OpenCV (Python). LabVIEW and OpenCV run in parallel in two threads.

This project can realize the transformation from traditional automation to intelligence. This system adopts a set of fully automated production system, 3d scanner, Internet of things technology and integrated machine control, which can continuously obtain data from the interconnected process and production system, so as to understand and adapt to new requirements. It can greatly reduce cost, increase capacity and shorten customer delivery time while the production process is traceable.