

Machine Vision System for inspection of the gluing process

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One of the main cardboard box producing processes is the gluing. It is very important that the proper amount of glue is placed to the right position on the cardboard. Too much and too less glue both make waste. Two types of gluing are widely used: gluing with wheel and gluing with glue-JET device. The first method – which can be used only on the side of the cardboard – usually works well with no risk but the second – gluing with glue-JET device – has more risk to fail. That is why it is important to make an inspection and measure the right amount of glue and measure the proper position of the glue on the cardboard.

SANXO-Systems Ltd has developed a Machine Vision system which supports 3 cameras working simultaneously and parallel checking three different gluing processes. The PC based system was designed to be very flexible due to the wide variety of the cardboard boxes. UV pigments in the glue helps to reach the necessary contrast between the white glue on the white cardboard. The system is designed so that operators of the production line can easily teach a new inspection for a new cardboard within about 10 minutes. Or he or she can load previously made and saved test sequence file (MVA) from the HDD. An Ink-JET marking system was integrated to the Machine Vision System. The cardboard box which failed at the inspection of the glue is marked with a single dot of UV ink. Before the packing starts the operators sort out the failed products using an UV light.

The flexible application SW makes the Teach-IN procedure easy. The following figures and text describe the Teach-IN module and the Measure module.

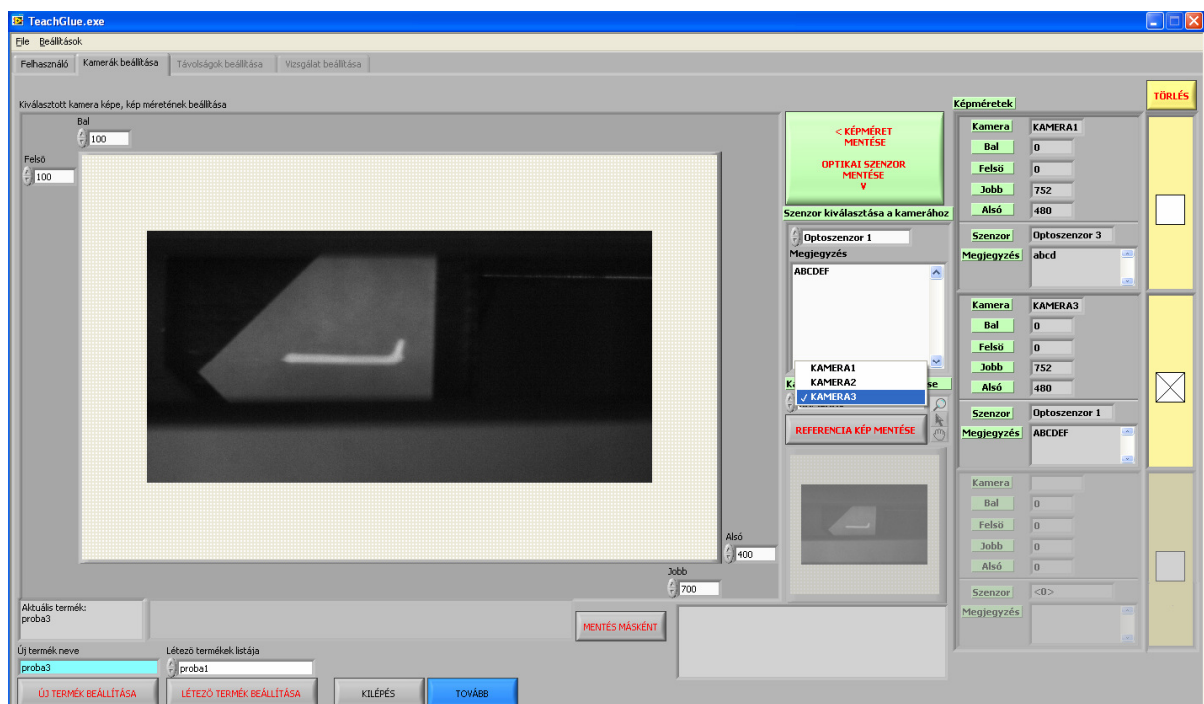


Fig 1.: The Teach-IN module, selecting cameras and setting the cameras and opto-sensors

There are three parts of the Teach-IN module. In the first window the operator select the cameras and the optical-sensors – which are used for the gluing device. In this window the cameras give LIVE continuous pictures. So in this step the operator can adjust the position of the cameras above the cardboard on a special rail. Also the intensity of the light source is adjustable. After the cameras and their positions, image sizes and opto-sensors are set the operator go on with the second step.

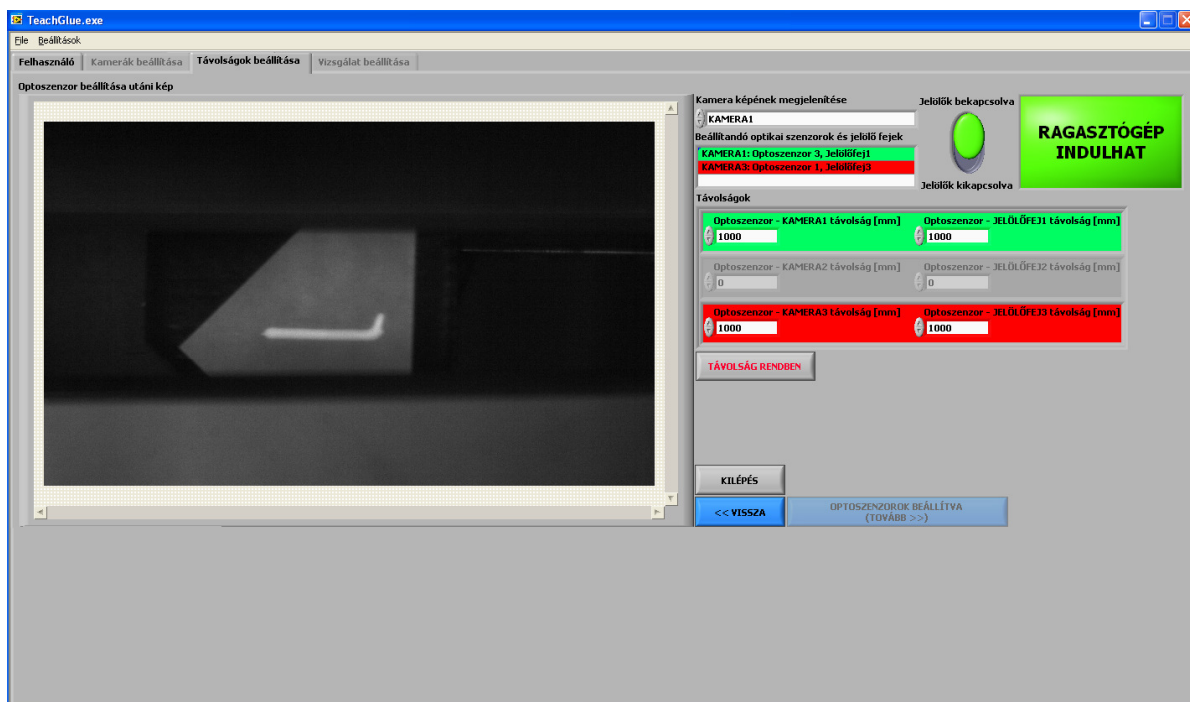


Fig 2. Set the distances

In the second window the operator can set the distances of the opto-sensors and the ink-JET devices. This all about the triggering, it tells the system when will be the cardboard under the camera and under the ink-JET device. Here the operator sees single triggered images and not continuous LIVE pictures. The triggered single images will be used in the third step of the Teach-IN module.

In the third window of the Teach-IN module the operator will build up the test sequence step by step by using simple functions. First of all the camera should be selected then new image will be taken and displayed.

By selecting the function – e.g. edge detection – all necessary parameters are highlighted and overlay graphics makes the function easily understandable. The searching window of a function can be set to the absolute coordinate system or relative to results of other functions. This way searching windows can be attached to the cardboard box so it filters out the misalignments.

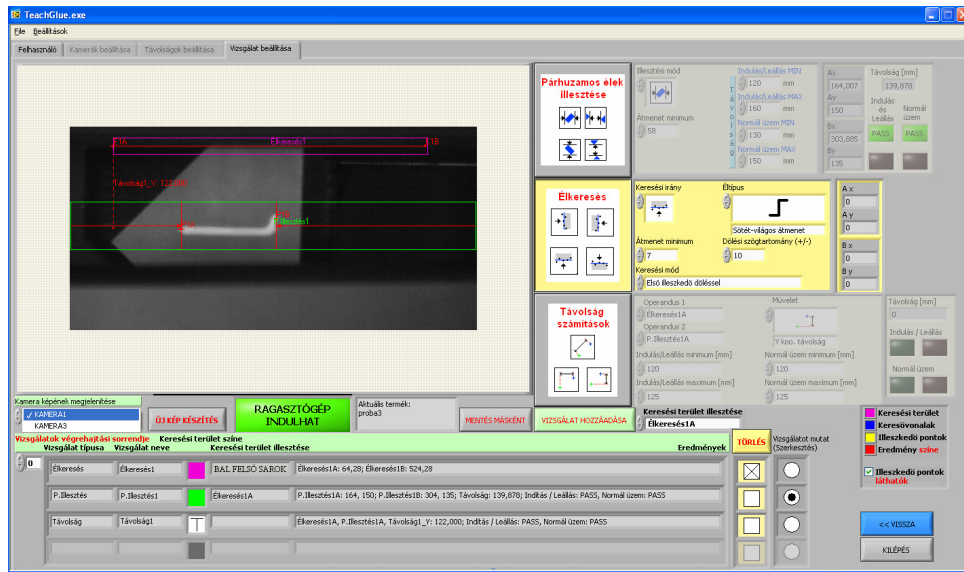


Figure 3. Defining the measurement steps

Measure Module:

In the Measurement module from a list the operator can select the test sequence he or she intends to run. Then the test starts automatically. A blinking indicator lamp and a horn warn the operator if he or she is a distance from the system and many failures happen in serious. The UI of the system shows the current and the historical results of the test and it provides statistical data too. The operator can precisely follow and control the gluing process with this system.

