Human Machine Interface Design Analysis of Defect Detection Prototype by Wonderware InTouch Software

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Abstract. Human Machine Interface (HMI) serves as a bridge for operators to understand the processes that occur on the machine. Without HMI, operators will have difficulty in monitoring and controlling the machine. HMI used in this study using Wonderware InTouch software. The HMI design that is used, displays the home button, as the start screen. There are two options in the home menu, which is the option to login as an identification and classification operator. To start operation and enter the monitoring window, any operator that uses this HMI must login using a username and password. The function of HMI in this research is as a connector between operators with machine. In this paper we have presented the human machine interface design of defect detection prototype by wonderware intouch software. Based on the tested results can be concluded that the designed is successfully.

Keywords: human machine interface; design; defect detection prototype; wonderware intouch software.

1. Introduction

Human Machine Interface (HMI) serves as a bridge for operators to understand the processes that occur on the machine. Without HMI, operators will have difficulty in monitoring and controlling the machine. This interface serves to facilitate the operator in plant monitoring, plant control, plant handling, and access historical data either for the whole process or each of the existing equipment in the process [1]. Wonderware InTouch is the software used to create the HMI program. This software serves as a face-to-face or interface for the operator. In this study, HMI serves as a control board consisting of various buttons with certain functions. This paper presents a portion of the work of a large project of building a prototype tool of defect detection where data capture-based image processing and is analysed based on neural network and fuzzy logic methods. Some authors have presented several design methods, including green manufacturing method [2, 3, 4], taguchi approach method [5], Wonderware InTouch [6, 7], inductive line following method [8], fuzzy logic [9, 10], solidwork program [11, 12, 13]. Some authors have made simulations to test their designs, such as computer simulation [14], supervisory fertigation system with interactive graphical supervisory control and data acquisition system [15]. Some authors have modelled the results of their simulations using various approaches, among others NNARX model structure [16], MATLAB program [17, 18], artificial neural network [19], and ultrasonic vibration assisted milling [20, 21, 22].
2. Human Machine Interface Design Scenario

Human machine interface (HMI) used in this study is using Wonderware InTouch software. The HMI design displays the home button, as the start screen. There are two options on the home menu, which is the option to login as the identification operator and login option as the classification operator. To start operation and enter the monitoring window, any operator that uses this HMI must login using a username and password. The HMI function in this research is as a connector between operators with machine. The scenario of the HMI design can be seen in Figure 1.

![HMI Design Scenario](image)

**Figure 1.** HMI design scenario of the defect detection prototype

3. Result and Discussion

The design of the HMI used in this paper is made using Wonderware InTouch software. It on this system is used to monitor the identification of defects in the fabric. It created consists of several pages that can be accessed, including home page, login page, and monitoring page. The home page is the first and main view on the HMI design. On this home page there is a display of choice between the identification process and the classification process. Therefore, the identification operator will choose the identification process and classification operator will choose the classification process. The results of HMI designed can be seen in Figure 2, it consist of (a) HMI home page display, (b) HMI login page display, (c) Example of username in HMI login page, and (d) HMI system display.

The function of login is as a security system, because only people or special operators can login and access the system. Before the operator accesses the identification process or the classification process, the operator must enter a username and password. Operator identification will login with username and password for identification and operator classification will login with username and password for
classification. When the username and password are entered correctly (received) then the operator can press the OK button and enter into the HMI System and then the windows monitoring display it. After the operator successfully log into the system then the operator will be directed to the windows monitor.

![HMI System](image1)

![HMI System](image2)

![HMI System](image3)

![HMI System](image4)

**Figure 2.** The results of HMI designed of the defect detection prototype

Test results from windows monitoring can be seen in Figure 3. This results consist of (a) the SYSTEM ON indicator lamp turns on when the system is active, (b) the conveyor moves and the lamp turns on when the START button is pressed, (c) the CAPTURE lamp turns on when the system is running CAPTURE process, (d) the EMERGENCY lamp turns on when the EMERGENCY button is pressed, (e) the MANUAL indicator lamp turns on when the identification process changed from auto to manual, (f) the CONVEYOR FORWARD indicator lamp turns on when the CONVEYOR FORWARD button is pressed, (g) the CAPTURE indicator lamp turns on when the CAPTURE button is pressed, and (h) the CONVEYOR BACKWARD indicator lamp turns on when the CONVEYOR BACKWARD button is pressed.
Figure 3. Test results from windows monitoring of the HMI designed.

4. Conclusion
In this paper we have presented the human machine interface design of defect detection prototype by wonderware intouch software. Based on the tested results can be concluded that the designed is successfully. It presents a portion of the work of a large project of building a prototype tool of defect detection where data capture-based image processing and is analysed based on neural network and fuzzy logic methods. It on this system is used to monitor the identification of defects in the fabric. It created consists of several pages that can be accessed, including home page, login page, and monitoring page. The home page is the first and main view on the HMI design. On this home page there is a display of choice between the identification process and the classification process. Therefore, the identification operator will choose the identification process and classification operator will choose the classification process.

Acknowledgments
The results of the study presented in this paper are part of a study funded by a research grant from SISPRMOSASI Laboratory of Telkom University.

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