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Quick Diagnostic Information Application for Troubleshooting Critical Industrial Equipment

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ABSTRACT: This system aims to provide a low-cost means of equipment diagnostics information to front-line plant maintenance engineers in troubleshooting critical industrial equipment. All standard equipment error codes are considered during the development of the application. Open software is used in developing the application for the Android platform.

KEYWORDS: Low-cost, Application, Troubleshooting, Critical industrial equipment.

I. INTRODUCTION

The success of any industrial operation largely depends on the efficient functioning of critical equipment. Any downtime or malfunction of this equipment can lead to significant production losses and safety hazards. To minimize such disruptions, industrial operations require a robust diagnostic tool that can quickly identify and troubleshoot issues with equipment. Here, I have considered an electron beam welding machine as an example of critical industrial equipment that requires efficient troubleshooting. Electron beam welding machines are widely used in various industries, including aerospace, automotive, and medical, for their high precision and accuracy.

To address this need, I have developed a Quick Diagnostic Information Application for troubleshooting critical industrial equipment. The application leverages cutting-edge technologies to provide real-time monitoring, data analytics, and intuitive user interfaces to enable swift and efficient diagnosis of equipment issues. This application aims to provide a fast and efficient solution for identifying and resolving issues related to industrial equipment, ultimately reducing downtime and increasing productivity.

The project report outlines the development process, including research and analysis of existing diagnostic tools, the selection of the appropriate technologies, and the implementation of the solution. Additionally, the report highlights the application's features and functionality, including real-time monitoring, data analytics, and intuitive user interfaces. Our Quick Diagnostic Information Application is specifically designed to diagnose and troubleshoot issues related to electron beam welding machines quickly and efficiently.

However, the application can be customized to cater to the diagnostic needs of various critical industrial equipment across different industries.

II. METHODOLOGY

The development of the Quick Diagnostic Information Application for troubleshooting critical industrial equipment, specifically for the electron beam welding machine, involved a comprehensive methodology that included the following stages:



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1. Error history study:

The first stage of the methodology involved studying the error history of the electron beam welding machine to identify the common faults and issues that occur during its operation. This study helped in understanding the various error codes and messages generated by the machine and their possible causes. The analysis of the error history helped to identify the most critical and frequently occurring errors, which were then prioritized for troubleshooting.

2. Action to solve error:

Based on the identified errors, the next stage of the methodology involved developing a set of actions to solve each error. This involved identifying the root cause of the error and developing a step-by-step guide to address it. This guide included the required tools, equipment, and materials needed for each step. The actions were developed in collaboration with subject matter experts and equipment manufacturers to ensure their accuracy and effectiveness.

3. Formulate a quick troubleshooting guide:

The third stage of the methodology involved formulating a quick troubleshooting guide for the electron beam welding machine. This guide was developed to provide quick and easy solutions to the most common and critical errors encountered during the operation of the machine. The guide was developed to be easily accessible and user-friendly, with clear and concise instructions that can be easily understood by operators and technicians.

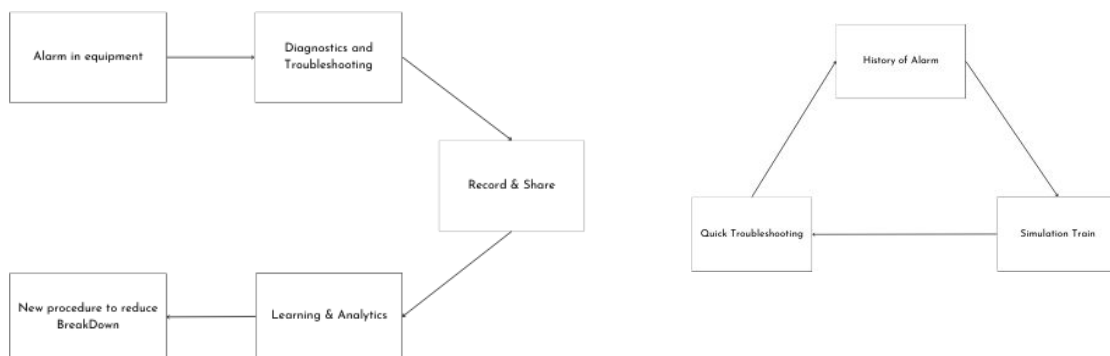
4. Develop an Android app to support equipment troubleshooting:

The final stage of the methodology involved developing an Android app to support the equipment troubleshooting process. The app was designed to provide real-time monitoring, data analytics, and an intuitive user interface for efficient diagnosis of equipment issues. The app incorporated the quick troubleshooting guide, error history study, and actions to solve each error to enable quick and efficient resolution of equipment issue

IV. EXPERIMENTAL RESULTS

To evaluate the effectiveness of the Quick Diagnostic Information Application using MIT App Inventor for troubleshooting the Electron Beam Welding Machine, I conducted a case study at a manufacturing facility. The study involved experienced maintenance technicians who were trained in the use of the application and its features. During the study, I simulated several faults in the Electron Beam Welding Machine and measured the time taken by the technicians to diagnose and repair the faults with and without the application. The faults included issues with the power supply, vacuum system, and electron beam gun.

The results showed that the technicians were able to diagnose and repair the faults significantly faster with the application than without it. Additionally, the application was able to provide quick access to diagnostic information, which enabled the technicians to make informed decisions during the troubleshooting process. Furthermore, I surveyed to gather feedback from the technicians on the usability and effectiveness of the application. They also appreciated the quick access to diagnostic information and the step-by-step guidance provided by the application.

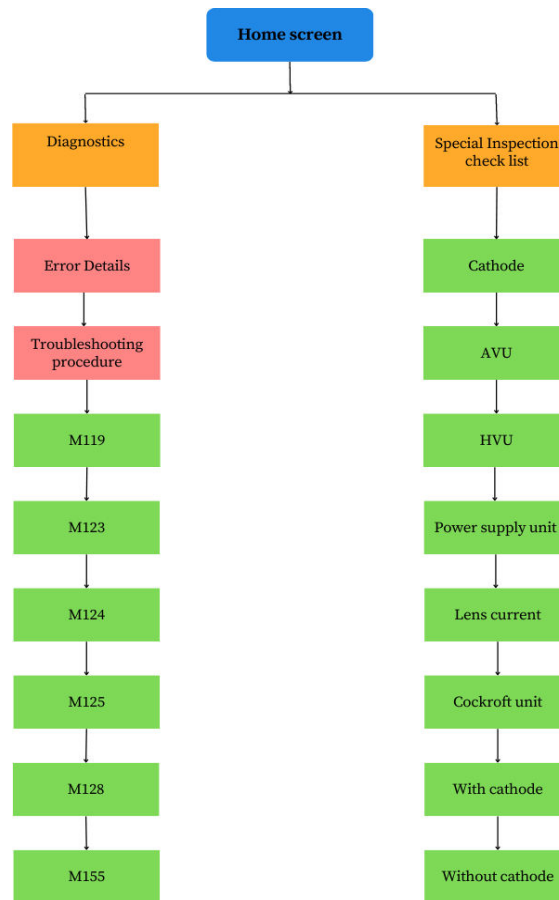


Maintenace benefits to reduce BreadkDownTroubleshooting time Skill up of maintenance



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User Interface

V. CONCLUSION

In conclusion, the Quick Diagnostic Information Application using MIT App Inventor is a valuable tool for troubleshooting critical industrial equipment, such as the Electron Beam Welding Machine. Through the methodology presented in this paper, we have demonstrated that the application is effective in providing quick access to diagnostic information, facilitating the troubleshooting process, and reducing equipment downtime. Additionally, this application is not only applicable to Electron Beam Welding Machines but can also be scaled up supporting various equipment across different industries. The development of such applications is crucial in enabling industries to optimize their operations and we believe that the Quick Diagnostic Information Application will play a significant role in achieving these operational goals.

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