

Project Report: Printhead Classification Software

University of Northern Iowa Metal Casting & Foundry 4.0 Centers

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Project Overview

A method was required to assess the efficiency of 3-D printheads in rotation and identify those in need of replacement. The most effective approach involved developing a program to count the number of dark pixels in an image produced by a given printhead and compare it to the number of dark pixels from a known satisfactory printhead. The program then evaluated printhead quality based on standard deviation.

Two separate programs were developed to achieve this. The first featured a user interface that allowed for hands-on scanning of the image, while the second automated the process, eliminating the need for manual scanning. Both programs were designed to provide flexibility and convenience in assessing printhead performance.

Key Technologies Used:

- Python
- Visual Studio Code
- Libraries: TKinter, Pillow, NumPy

Why Two Programs?

As the development process progressed, it became clear that eliminating the need for scanning would improve efficiency. Additionally, with modern technology providing instant results at the click of a button, any program should be simplified for the user whenever possible without compromising efficiency or speed. For this reason, the second program was developed as an additional option.

Learning Opportunities

During the creation of these programs, I encountered multiple difficulties. First, this was my first time working with a User Interface. I asked questions throughout the process and was ultimately able to figure out how to create one and use it efficiently. Furthermore, I found it difficult to code the specific actions the computer had to take upon each click and release of a button. However, I learned a lot as I continued. This project has helped me immensely in providing me with experience and knowledge of User Interfaces.

Future Opportunities

This company can use these programs in the future to create an efficient and accurate schedule for when to order new printheads and ultimately save overall costs of printheads as a result. This is good for business and business practices.

By Scanning Program Example:

