Hole Centering Tool Documentation

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1 Introduction

The Hole Centering Tool is a real-time vision-based application designed to assist in precisely aligning circular holes with a crosshair on a screen. This tool utilizes computer vision techniques to detect circular shapes (holes) using a webcam and provides visual feedback to adjust the device so that the hole is centered on the crosshair.

2 Installation

To install and run the Hole Centering Tool, follow these steps:

1. Clone the repository:

```
git clone \url{https://github.com/Pick-and-Place-Robot/Hole-Centering-Tool.git}
cd Hole-Centering-Tool
```

2. Install Python (version 3.7 or compatible).

3. Install dependencies using pip:

```
pip install -r requirements.txt
```

3 Usage

To use the Hole Centering Tool:

1. Run the application:

```
python hole_aligner.py
```

2. Place the device such that the circular hole is visible to the webcam.
3. Follow the visual feedback provided by the tool to adjust the device position.
4. Aim to center the detected hole with the crosshair displayed on the screen.
5. Press `q` on your keyboard to close the application and release the webcam.

4 Dependencies

The Hole Centering Tool requires the following Python libraries:

- `python==3.7`
- `opencv-python`
- `numpy`

Ensure these dependencies are installed before running the tool.

5 License

This project is open-source and available under the MIT License. See the `LICENSE` file for more details.

6 GitHub Repository

The source code for the Hole Centering Tool is available on GitHub:
`https://github.com/Pick-and-Place-Robot/Hole-Centering-Tool.git`