

UTR: QR Code Reading System



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1. Summary

The QR Code Reading System is a Python based script developed to recognize and record data and time associated with QR codes using web cameras. This code was originally developed to support timekeeping efforts during the Underground Transportation Restoration (UTR) Operational Technology Demonstration (OTD). Specifically, the system was used to track the movements of personnel within the contaminated structure, and to measure the amount of time it took personnel entering the facility to perform their duties. The system uses USB-interface webcams along with the open-source python-based software called Zbar [1]. The system was designed to read 8-1/2 x 11 inch laminated QR codes attached to personnel donned in PPE. QR stations (consisting of a laptop and webcam) were staged at various entry and exit points, and recorded each passerby's name and time spotted. The resulting entry and exit times were later used to estimate entry durations.

In addition to the uses listed here, the QR Code Reading System source code could be expanded to serve other purposes. The code is being released as open source and is fully customizable. The following sections describe how to install and operate the QR Code Reading System. For troubleshooting, refer to the contact information listed in Section 4.

2. Install Instructions

The QR system was developed using the Python programming language. Zbar, the bar code scanning package, was developed by Jeff Brown (spadix@users.sourceforge.net) [1]. Both software packages must be installed in order for the QR Code Reader to operate as intended. For installation details, refer to each software's documentation. Note that the software must be installed in the order listed below.

1. Python 2.6 (python-2.6.msi): Windows runtime for Python
<https://www.python.org/download/releases/2.6.9/>
2. Zbar (zbar-0.10-setup.exe): software for reading bar codes
<http://zbar.sourceforge.net/download.html>
3. Zbar Python (zbar-0.10.win32-py2.6.exe): Zbar python extension
<https://pypi.python.org/pypi/zbar>

3. Operating Instructions

The following steps describe how to operate the QR Code Reading System.

1. Once everything is installed, double click the "QR Camera Script.py" file. A command window will appear that looks similar to Figure 1 below.

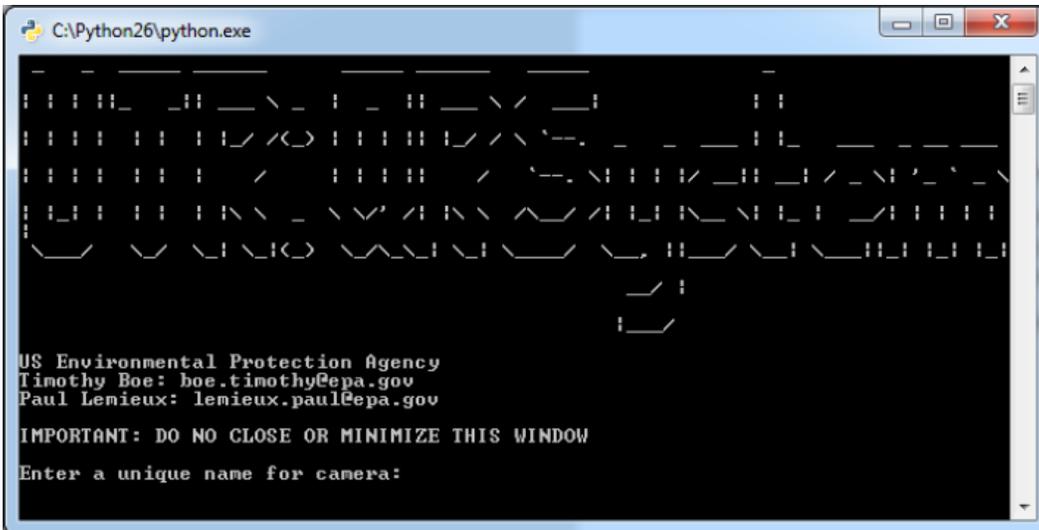


Figure 1. QR Home Screen

2. Enter a unique name for the camera (this will be added to the filename) and hit **ENTER**. Note that a file extension should not be included with the name.
3. The "Browse for Folder" dialog box will appear as shown in Figure 2. Select a folder where the QR results should be saved and select **OK**.

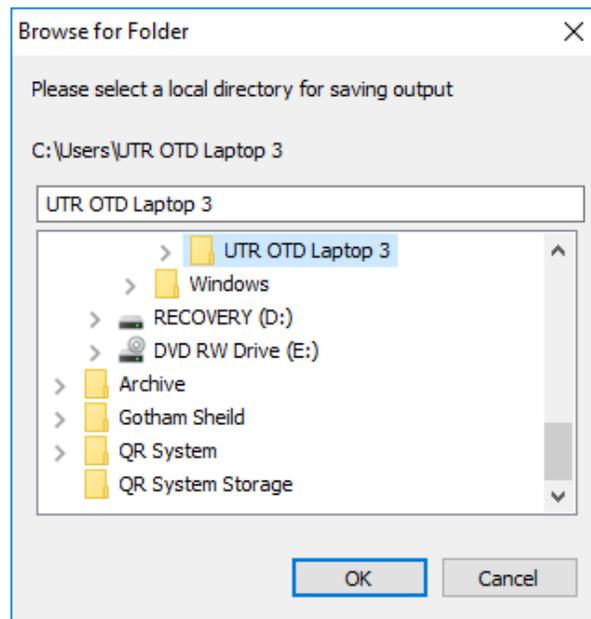


Figure 2. Browse for Folder Dialog Box

4. Another "Browse for Folder" dialog box will appear. The QR System has the ability to save QR results in two separate locations. This was done in the event the user wanted to store data in a local directory as well as a network directory. This step is optional – repeat step 3 if necessary; otherwise, click **Cancel**.

5. Lastly, video source dialog box will appear. Using the dropdown box, as shown in Figure 3, select the video source (i.e., webcam) and press **OK**.

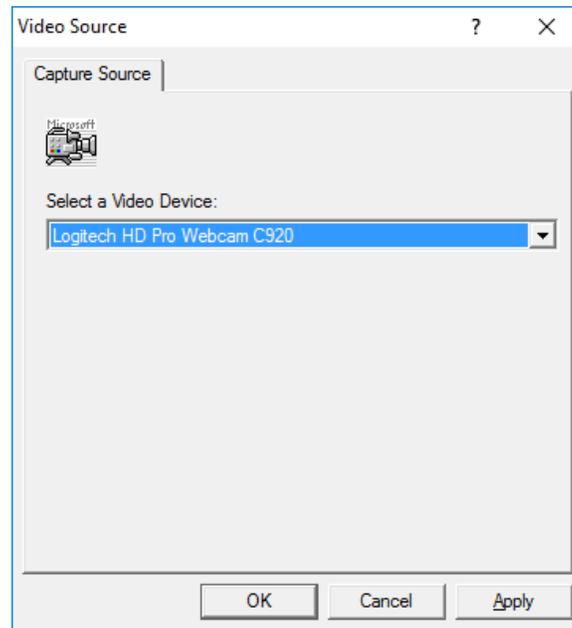


Figure 3. Video Source Dialog Box

6. The camera feed will now launch. Note that this may take up to 10 seconds. The command window will remain open. The software is now operational and will recognize and store QR codes until closed.
7. When the software spots a QR code, a green square will be placed around the code and the data the QR code represents and date and time information will be displayed in the command window. The resulting data are stored in a csv file in the save location specified in steps 3 and 4.
8. To close the system, click the close button located on the command window's title bar. The camera window will automatically close.
9. For more information or troubleshooting, refer to the contact information listed in the following section.

4. Acknowledgements/Contact information

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5. References

1. Brown, J. (2011, July 15). ZBar bar code reader. Retrieved August 05, 2016, from <http://zbar.sourceforge.net/>



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