HDR Image Calibration Tool

Free, open source tool for creating High-Dynamic Range (HDR) images from photographs.

ARCHITECTURAL DESIGN RESEARCHERS NEED CALIBRATED HDR IMAGES

Low Dynamic Range (LDR) images are constructed out of a single picture. This makes their brightness relative to the exposure of the camera (the amount of light that the shutter takes in). To capture details in low light, an LDR image might lose details in bright light, and vice versa.

A calibrated High Dynamic Range (HDR) image keeps details in all light levels by merging multiple LDR images. In addition, it is calibrated such that the level of light is an absolute measurement, and distortion from the camera (such as vignetting) is eliminated.

HDR images are used as lighting measurements in architectural engineering. They enable researchers to spot potentially dangerous glare or poor lighting.

HDR images can also be obtained using HDR cameras, however the cameras are expensive (tens of thousands of dollars) and may not be available to all researchers.

Other HDR merging apps exist, but they do not use the calibration software employed in our solution.

The calibration software used in our app is powerful but very complex, and researchers may struggle with learning the command line interface.
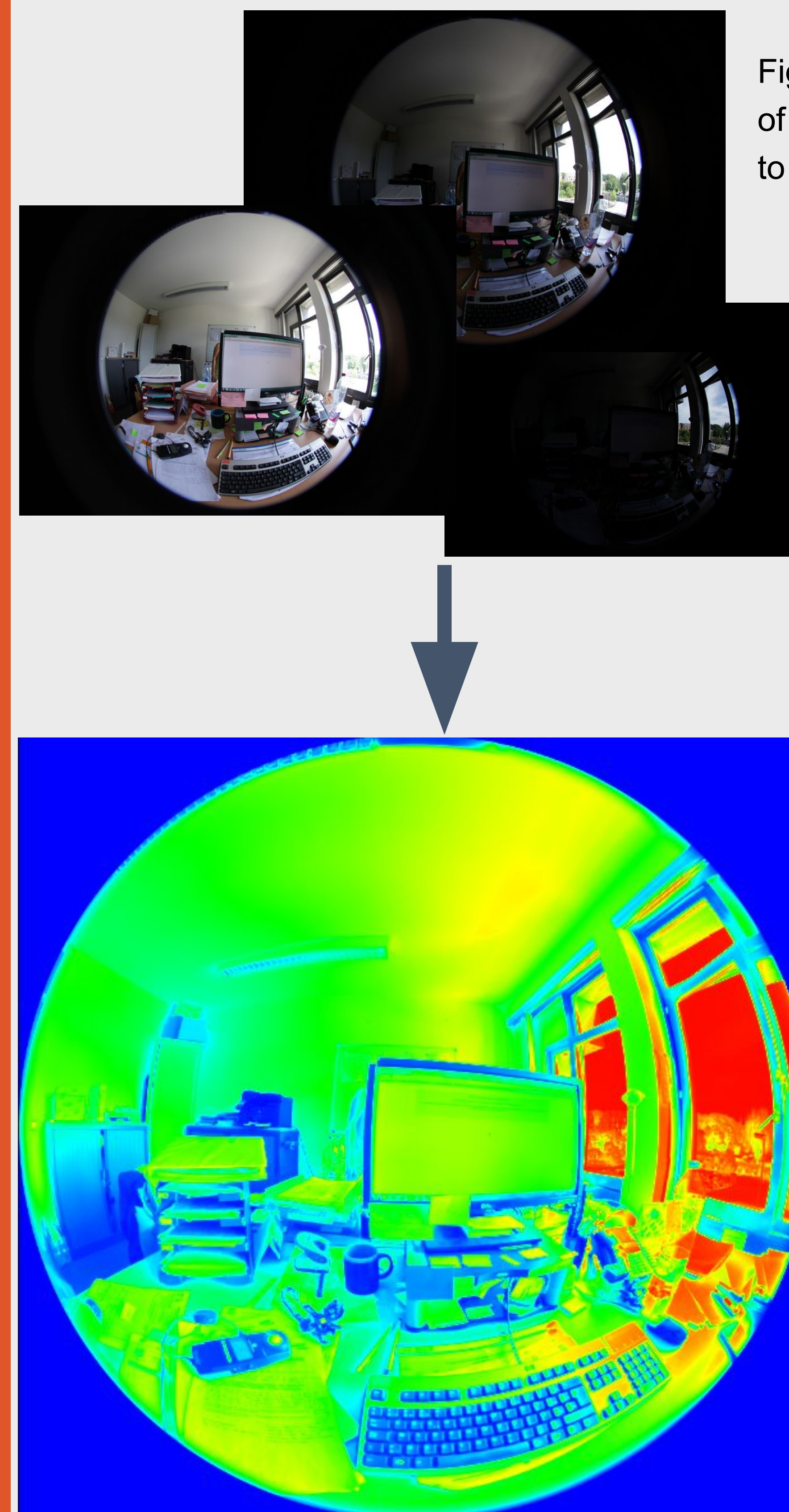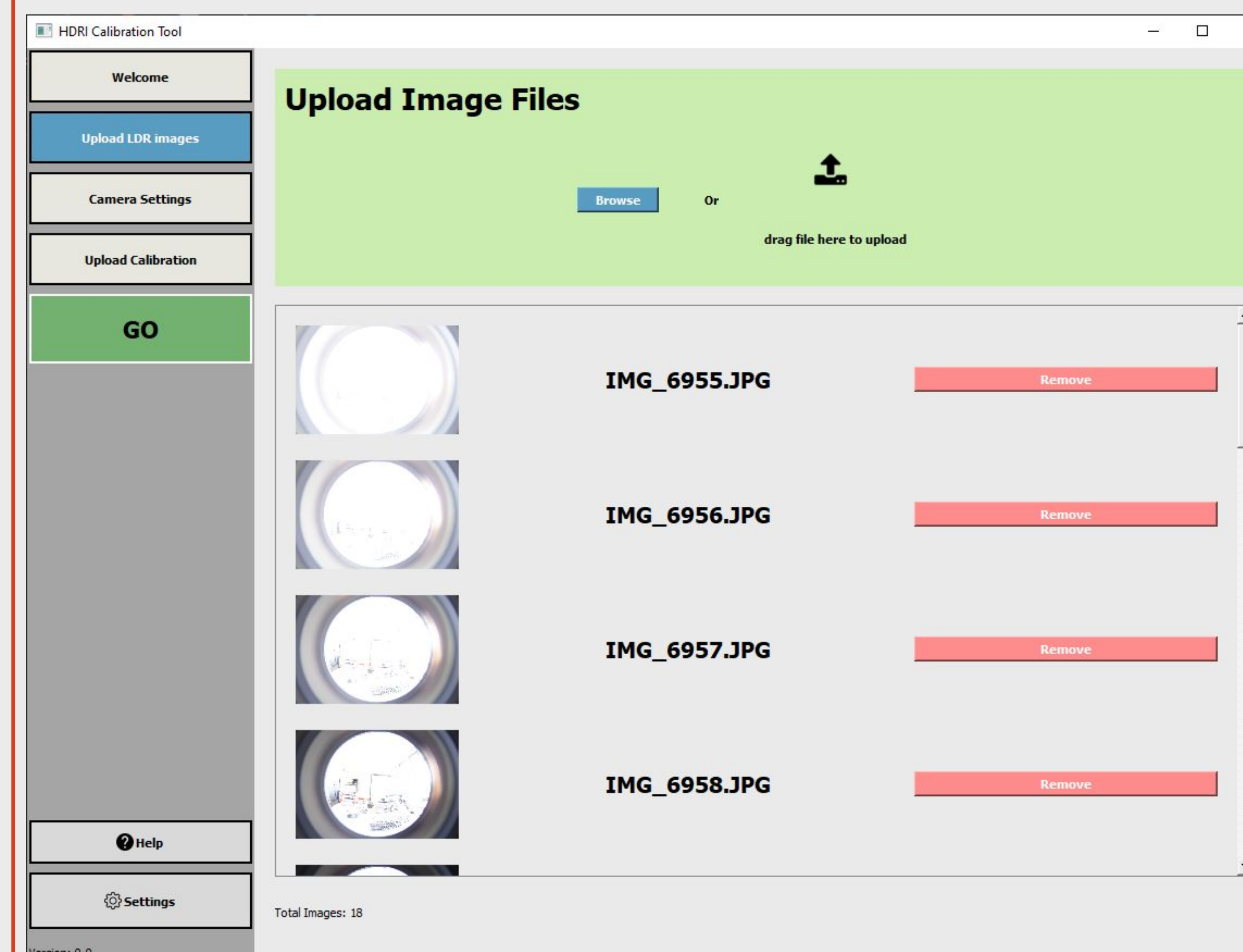

Figure 1: (Left): Three Low Dynamic Range images at varying levels of exposure, and the HDR image produced by using them as inputs to the application. The HDR image is shown in false color.

Figure 2 (Below): A screenshot of the application, on the step where the user uploads their Low Dynamic Range images to be merged

OUR SOLUTION

Our tool is a graphical user interface that allows users to upload their images and calibration data, then automatically merges and calibrates their data using the free and open source Radiance and the researcher-built HDRGen.

The application is free and open source. It is tested on and supports the three major operating systems.

The application was user-tested for usability. Our aim is to make the process as clear and accessible as possible.

HOW IT WORKS

We have created an easy-to-look at, easy-to-use interface that sits on top of pre-existing software called Radiance, which is used to generate these HDR images.

Our application takes all of the necessary user input required to generate an HDR image and automatically sends that info through a pipeline, greatly simplifying the process for the user, enabling them to be more efficient.

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