# Open Source Economic Image Processing

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## Background

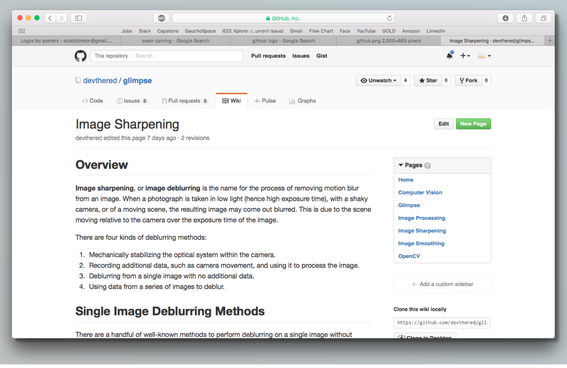
OpenCV provides a useful and flexible toolset for developers to experiment with image processing algorithms. However, developing an OpenCV application can be tedious and lack the truly desired functionality. Glimpse provides a plug-and-play framework for quick and easy video processing applications.

Glimpse features:

- Tutorials
- One line video processing
- Custom seam carving algorithm

## Open Source

Glimpse is completely open-source, the source code and detailed documentation, is hosted on Github. The documentation provides example applications, algorithm descriptions and explains hardware setup for use in the Raspberry Pi. By contributing to the open-source community, we make video processing more accessible for those who don't have a background in the subject.

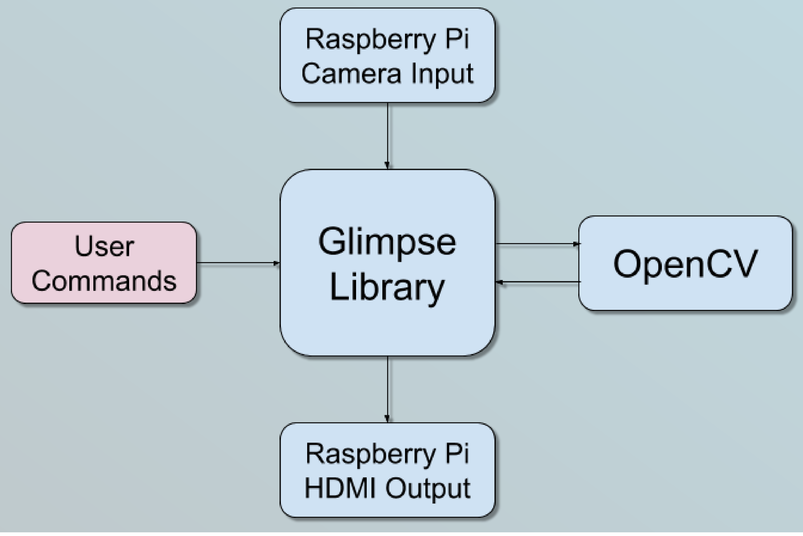



## Overview

Image processing and computer vision have many applications, including face recognition for home security, artificial intelligence for robots, self-driving vehicles, and medical imaging. The topic is still being explored because it's one of the keys to the technology of the future. However, developing image processing and computer vision software requires a tremendous amount of knowledge.

The goal of Glimpse is to reduce the startup effort for live video processing so that developers can focus on the other core aspects of their applications.

## System Diagram




## Seam Carving Algorithm

When we change the aspect ratio of an image, we either must distort the shape or crop out important information. Seam carving preserves information-rich portions of an image, without distorting them or cropping them out. In order to evaluate the "path of least resistance" through the image, a cost function is applied to the image. Many different cost functions are possible, but here we use a squared gradient cost map, where C is our cost matrix and I is the image.

$$C(x,y) = \sum_{RGB} [|I(x,y) - I(x+1,y)| + |I(x,y) - I(x,y+1)|]^2$$

## Other Features

**Live Video Processing**

Abstracted video processing provides a platform to transfer single image processing methods into live video.

**Color Inversion**

One line color inversion allows for quick implementation.

**Sharpening/Blurring**

Single line method calls allow users to create live video sharpening or blurring.

**Image Transformations**

Our image transformations (translation, shear, scale, rotation) allow easy adjustment of a live video stream.

**Color Histogram Equalization**

Our custom color histogram equalization feature allows users to broaden the dynamic range of a live video stream.

**Acknowledgements:**

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