# FrameGrabber

A simple video4linux2-based video frame grabber plugin for the open-ephys

[plugin-GUI](https://github.com/open-ephys/plugin-GUI/). It retrieves frames

from any device supported by [v4l2](http://linuxtv.org/downloads/v4l-dvb-apis/)

and displays them using [opencv](http://opencv.org/). Moreover,

frames can be saved to disk (in jpg format) together with open-ephys hardware

time stamps making it easy to synchronize frames and recorded data later on.

Depending on your camera this approach should be useful for most

(behavioral) tracking experiments. In case the experiment requires very precise

time stamps, e.g., high-speed whisker tracking, it might be a good idea to use a

camera that can send TTL pulses for each frame.

Currently, the plugin only runs under Linux. However, contributions to make it

also run under Windows (e.g., using directshow) are highly welcome.

What should work:

- capturing frames from any v4l2 supported camera (using mmap; pixel formats: YUYV, MJPG)

- saving frames in jpeg format; the file name format is "frame\\_{frame\\_index}\\_{experiment\\_number}\\_{recording\\_number}.jpg"

- saving frame index, experiment number, recording number, and hardware/software time stamps to a separate csv file to make post-processing easier

- basic controls via ui (image quality, color, recording mode, frame counter resetting, frame directory name)

- saving/loading parameters

To-do:

- add further video APIs, e.g., directshow

- python/matlab functions to read frames and timestamps (including optional interpolation)

## Dependencies

This plugin requires the following libraries

- video4linux2 (i.e. libv4l-0 and libv4l-dev under Ubuntu and Linux Mint)

- opencv (version 2.4.x; core, dev, and highgui packages)

## Installation

Copy the FrameGrabber folder to the plugin folder of your GUI. Then build

the all plugins as described in the [wiki](https://open-ephys.atlassian.net/wiki/display/OEW/Linux).

\*\*Important\*\*

It seems that there is a data type clash between JUCE and opencv in the [master branch](https://github.com/open-ephys/plugin-GUI/tree/master) of the plugin-GUI. Replace all "int64" by "juce::int64" in the following files:

[CoreServices.h](https://github.com/open-ephys/plugin-GUI/blob/master/Source/CoreServices.h)

[CoreServices.cpp](https://github.com/open-ephys/plugin-GUI/blob/master/Source/CoreServices.cpp)

[GenericProcessor.h](https://github.com/open-ephys/plugin-GUI/blob/master/Source/Processors/GenericProcessor/GenericProcessor.h)

[GenericProcessor.cpp](https://github.com/open-ephys/plugin-GUI/blob/master/Source/Processors/GenericProcessor/GenericProcessor.cpp)

Note that this does not affect the rest of the GUI as it is using the juce namespace anyway. This issue has been resolved in the current version of the [development branch](https://github.com/open-ephys/plugin-GUI/tree/development) so better check if it made it into the master branch.

## Changing camera parameters

The v4l2 library comes with some tools that can be used to control camera

parameters. The easiest way to see all available v4l2 controls is to use the

v4l2-ctl tool from cmdline:

\*v4l2-ctl --all\*

An alternative is to use [guvcview](http://guvcview.sourceforge.net).