

Interactive comment on “KLT-IV v1.0: Image velocimetry software for use with fixed and mobile platforms” by Matthew T. Perks

Anonymous Referee #2

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General comments

The author presents a new software for the determination of river surface flow velocities and river discharge using videos. It is based on a combination of optical flow and automated corner point detection algorithms. The underlying detection algorithm used is the Good Features To Track and the tracking is done by using the Kanade Lucas Tomasi method.

The software is freely available, it has a clean and intuitive graphical interface. It has a very good set of options for camera calibration / stabilization. To my knowledge there is no freely available software which uses the same method, hence it is a good addition to the already available tools. The author has also done a good work on keeping the amount of parameters to a minimum and giving default values for them.

The paper is clearly written, with a good description of the software functionalities.

Specific comments

My main comments are related to the validation and limitations of the software and of the algorithms implemented in it.

The author presents two case studies, the first one, the River Feshie where 10 videos taken from a fix camera and 4 videos from UAS were processed. The results are used to fit a rating curve, the deviations between the reconstructed rating curve and the measurements is mentioned to be 4%. However, it would be desirable to have a comparison against a different methodology e.g. ADCP. Has the author performed such comparison?

In Figure 4 it can be observed that the measured discharges deviate the most from the rating curve at low flows. It seems that the implemented method gets less accurate results for lower velocities. This brings me to my second comment. The paper is missing a section where the software limitations are explained, for example what are the minimum velocities? Are there a minimum set of characteristics to be fulfilled, e.g shadows, glare, type of flow, minimum camera angle, minimum video duration, etc.?

The results from processing a video recorded with a fixed camera and with an UAV at the same river stage are shown in Figure 5. The trajectories are qualitatively different, what is the reason for that? Is it because of the angle of view of the fix camera? Is it related to the orthorectification process? What are the limitations?

It would also be nice to see some insights on the uncertainty of the model and sensitivity of the parameters. This would help to chose the right value for them.

Technical corrections

In line 140 it is mentioned that the free-surface image velocity measurements must be translated into a depth-averaged velocity, however it is never explicitly mentioned that the Alpha value in the GUI is meant for that.

Line 188. It is mentioned that the mode 'Single video' is the default one, but there no other modes. This should be mentioned here or, if possible, change this field in the GUI until another mode is implemented.

Lines 410-455 (discussion section) I think it would be better to focus this section on the limitations and accuracy of the software, or to add that to the discussion.

Line 479. Add the word "software"

I tried to ran some cases but I could only process one: /Feshie/FixedCam/Video_02, for all the other cases that I tried, the software crashed, without much information about the source of the crash. For the case that I was able to process, I got a value which was out of the reconstructed rating curve, probably one of the provided files is not correct.

Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2020-187>, 2020.

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Discussion paper

