Earth Surf. Dynam. Discuss.,
https://doi.org/10.5194/esurf-2020-96-RC1, 2021

Earth Surface Dynamics Discussions

Interactive comment on "Automated quantification of floating wood pieces in rivers from video monitoring: a new software tool and validation" *by* Hossein Ghaffarian et al.

Anonymous Referee #1

Received and published: 11 January 2021

General comments: This manuscript presents a framework to automatically detect floating large wood in video records. A software has been developed and its performance has been evaluated comparing the automatic detection with manual identification, which is very time consuming. Applying this promising method would make wood transport monitoring much easier in any river. Therefore, the work is of high interest and provides an important contribution to river science and within the scope of Earth Surface Dynamics. I have several comments and suggestions, though. Firstly, the general structure of the manuscript is a bit confusing, with several sections about methodological aspects (i.e., section 2, 4.1. . .) and several of them mix methods with results and discussion. I would recommend structuring the manuscript in a better way,

by splitting methods, from results from discussion. Secondly, some details are needed for some unclear parts, some figures need to be edited (or even removed) and some misunderstanding about modelling need to be clarified. Specific comments: In the Abstract, authors claim that their approach may work potentially in real time, this is a very promising challenge and the post process which seems to be required makes the real time analysis a bit less realistic. . .so, maybe this is something to be discussed in the discussion, but smoothed in the abstract. What do the authors mean by human-month? Line 43: you may replace the cited conference paper by Ruiz-Villanueva et al., 2018, by the journal paper: Ruiz-Villanueva, V., Mazzorana, B., Bladé, E., Bürkli, L., Iribarren-Anacona, P., Mao, L., Nakamura, F., Ravazzolo, D., Rickenmann, D., Sanz-Ramos, M., Stoffel, M., Wohl, E., 2019. Characterization of wood-laden flows in rivers. Earth Surf. Process. Landforms. doi.org/10.1002/esp.4603 Related to that, I was also wondering about the wood transport regime, which may play a role. In the Ain river, wood is transported as uncongested flow, sometimes maybe some cluster appear, as in semi-congested transport, but how the software would work with congested wood fluxes? Line 43 and several places throughout the manuscript: I could not find the reference: Zhang Z, Ghaffarian H, MacVicar B, Vaudor L, Antonio A, Michel K, Piégay H. 2020. Video monitoring of in-channel wood fluxes: critical events, flux prediction and sampling window. Earth Surface Processes and Landforms Is this a recently accepted/published paper, or is it under review? Or is it this one?: Zhi Zhang Z, Ghaffarian H, MacVicar B, Vaudor L, Antonio A, Michel K, Piégay H. 2020. Video monitoring of in-channel wood: from flux characterization and prediction to recommendations to equip stations. Earth Surface Processes and Landforms Please, correct it. Lines 91-107: this discussion about the use of computer science in general to detect wood is really interesting, and a question I was asking myself while reading, but it would go better in the discussion section. The same applies to the challenges of applying machine learning or deep learning approaches to images from rivers (lines 103-107), so, authors chose a different approach; but I think that the incredible and unique database from the Ain river, could indeed be used to develop Machine learning and deep learning algorithms that

can be applied to wood monitoring, right?. So, it could be useful to discuss about that in the discussion. The same about lines 201-204 and 208-209 (this statement about the good performance of the approach should better go to the discussion after the results are shown and can support that). The final step related to the wood characterization in terms of size and location is not very clear to me (Lines 210-218). Is the step manual? How the software can select the better view (e.g., when wood is less submerged)? Section 2.3 should start by explaining the image rectification, why this is necessary and how it was done, rather than discussing the loss of quality by warping (lines 220-222). Line 222: explain what the particular characteristics are of the images topology. Line 223: what other characteristics? Line 226: add a reference to the toolbox Line 241: a reference is needed here Line 259: the use of terms like “is intended to work” or “the idea is to load a video” sound like the software is currently not doing that. . .if so, I think it should be better to describe what the software actually does and discuss in the discussion section the prospects. I would structure Section 3 in a different way, following the order in which the work should be done. By describing in the first place the annotation, then learning and finally the automatic detection. Lines 278-285: are the different annotation methods all implemented in the software? What is the difference between them? How the use of one influence the results? Line 287: what do the authors mean by “as fine annotation as they wish”? I think the comparison of the annotation methods with other approaches should go in the discussion. In a previous line (line 249) four modules are mentioned (detection, annotation, learning and performance), but nothing is explained about learning later. Or is this training? Line 359: this is the first time that wood discharge is mentioned, please provide the units in which is measured 8only provided in Line 524). It could be useful to define also here wood flux. Table 3: total is the mean? Table 4: are all the correlations significant? If not, authors could use bold font to highlight the statistically significant ones. Lines 488-496: the use of post process matrices is not very clear to me, and neither the graph shown in Figure 15. In addition, in Figure 15 the x-axe label is cut. Section 4.3.2. modelling here is unclear, I think authors mean estimating or predicting. . . Line 501: the software works

or worked well. . .but, what do the authors mean by well? Line 504: model? What type of model? Although explained later, it sounds just like a threshold that is set up based on the manual annotation. This is related to my previous comment about modelling. I think better using estimation. Lines 508-509: not clear The conclusion section is just a summary of the previous content, while it should provide an outlook and state the most important outcome of your work. Do not simply summarize the work, but instead, interpret your findings at a higher level of abstraction. Further specific comments on Figures: Figure 5: is (a) really needed? Not sure about the additional information it conveys. Figure 6 to 8; are they really necessary? Figure 6 probably not. . .and 7 and 8 could be merged into one. The number of figures in the manuscript is really large. In order to reduce the number of figures I would suggest the following: âĂć Figure 11 could be merged to Figure 9 (study site and studied period). âĂć Figure 12 and 13 could also be merged. Figure 14: why e and f plots have different area? The same question about k and l. Figure 16: using only colours (especially red and green) could be an issue for colour blind readers, consider using also different line types. Figure 17: use different shapes for the two dot groups.

Interactive comment on Earth Surf. Dynam. Discuss., https://doi.org/10.5194/esurf-2020-96, 2020.