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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Brief Communication: A low cost Arduino®-based wire extensometer for earth flow monitoring" *by* Luigi Guerriero et al.

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I have read the brief communication with great interest. I believe that a low cost device to measure landslide dynamics on relevant time and spatial scales is useful to the readership of NHESS. I will focus my review on the device itself and not on the landslide fieldwork since, although low cost devices used in geoscience are my expertise, landslides are not.

Interesting though the device presented is, the goal of brief communications about novel devices should, in my opinion, be to allow fellow geoscientists to successfully gauge whether the presented device is useful in their own research and if so, be able to successfully acquire or build and subsequently use it. In its current presentation the brief communication presented by the authors fails in this regard.

I would like to ask the authors to provide the following details, allowing the readership of NHESS to be able to reproduce the device:

1. Provide the code that runs on the Arduino. Figure 1 is a good start explaining the idea behind the code, but the authors should provide the actual code. Both for the readership as well as for the reviewers to be able to validate the work. In the open source spirit of Arduino, it seems that not providing the actual code to run the device was an oversight. The code can either be provided as supporting material to the paper, or it can be uploaded to Github and provided with a DOI through zenodo.org. This allows the authors to cite the code in this article.
2. Provide the design files needed to print the pulley that is attached to the potentiometer and provide details on both the specific 3D printer (including settings) and the material used in 3D printing.
3. Provide a Bill of Materials (BOM) for all the components that are used in building the device, including, if available, the (online) location where the authors purchased the component.
4. In Figure 1, I can spot a reference resistor being used with the thermistor. From the figure, I deduce that this is a 10kOhm resistor, but I'd like the authors to specify this. Also, please provide a schematic on how the thermistor and resistor are wired with respect to the ports (pins) of the Arduino.

Furthermore, to able to gauge whether the device is useful in fieldworks of the readership of NHESS, I would like the authors to clarify the following points:

1. The temperature is measured along with the displacement, however no details on the calibration used to infer temperature from recorded voltages are given: did the authors calibrate the thermistor themselves, or did they use factory provided

calibration constants. If so, how accurate are these? Can the temperature drift that is only gauged visibly be quantified?

2. The authors made a lot of choices in designing the device that are not made explicit in the paper. While most of these choices could be justified by arguments as simple as “familiarity with this type of component”, it would be beneficial for the readership if those were made explicit in the paper. For example:

   (a) There are a lot of different SD loggers available for the Arduino eco-system. Why did the authors choose the one they did?

   (b) The Arduino Uno has a broad power input range (recommended 7-12V, limit 6-20V). There may be valid reasons to use a DC-DC converter between the 12V power source and the Arduino, but those are not mentioned. Please elaborate on this.

   (c) On the topic of power: for most fieldworks power consumption is an issue and the Arduino Uno uses considerably more power than some of it relatives, such as the Arduino Pro Mini or the third party Alog (http://northernwidget.com/alog/). The same holds true for the SD logger compared to some other SD loggers such as the Sparkfun OpenLog. Since the authors focus on the low cost of their device, and since I guess that the solar panel and battery used would contribute significantly to this cost, any power saving choices would be interesting and thus need to be elaborated on. Again: familiarity with the Uno could be all the reason the authors had, but I’d like the authors to specify this.

Finally, I have a rather unusual request: if possible, I’d like to ask the authors to provide the readership with a step-by-step guide on how to build the device. This could be supporting material to the article, or it could be a guide uploaded on instructables.com and cited in the article. This is an unusual request and may be outside the scope of

NHESS. I leave it to the editor to decide if he thinks this last request would further enhance the paper.

Hoping to see an updated version of the article,

Dr. ir. Rolf Hut

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