

***Interactive comment on* “Scalable Flood Level Trend Monitoring with Surveillance Cameras using a Deep Convolutional Neural Network” by Matthew Moy de Vitry et al.**

Anonymous Referee #1

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Overall, this is a thoroughly interesting and relevant piece of work. The lack of existing techniques to quantify urban flood distribution in a quantitative manner provides significant challenges for urban drainage engineering, and as the authors themselves note, acquisition of data is nigh-on-impossible using conventional techniques.

This paper presents a unique alternative, the capture and utilisation of CCTV imagery, to track the distribution and depth of flood events and via the implementation of a Deep Convolutional Neural Network, provides scope to automate the process through a machine learning procedure. This would be an exceptional contribution to the literature in this area and I would definitely like to see this published.

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Several areas perhaps need some addressing before the paper were to be published, but I hope these are relatively minor comments! Given the target audience will primarily be hydrologists, I find the description of the methodology (particularly the software development and computational methodology) to be very complex and in-depth. I'm sure for some in the community this will be fairly easy language to interact with, but certainly to someone that doesn't design, code or work the tools such as this, I found much of the section passed straight over my head.

The presentation of some of the figures are a little poor - while the matrix of images used to highlight how the model has been trained are undoubtedly a worthwhile addition to the paper, I definitely found them a little illegible due to their size - even zooming right in to the PDF rendered some of the images unclear as to what was going on. Furthermore, I originally elected to print a copy of the paper to review while travelling and the images do not translate to black and white or greyscale, perhaps highlighting an accessibility issue.

Appreciating the author's comments about copyright and third party ownership of CCTV imagery, I do feel a specific case study may have aided the paper rather than just the catalogue of training videos presented in section 3.1. I understand this may not be an option for the authors, based on the nature of the copyright imagery they had access to, but it would have been useful to see an example using real data and images from an observed urban flood event.

Finally, I found the discussion section to be a little too focused on the technical aspects and challenges of the methodology. What would have been nice, was a slightly more "big picture" discussion that highlight the impacts and possible extensions of this work in an urban setting. Some of the findings here would be significant for urban drainage managers, infrastructure managers (particularly transport etc), quantifying economic risks associated via damage etc and future policy creation around climate change scenarios and drainage dimensions. I acknowledge the authors touched on some of these issues in the introductory section, but it would have been a nice conclusion to the paper

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to discuss how some of their results may help remove some of the challenges that they identified in the introduction.

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