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Leiden**
The Netherlands

Machine learning and computer vision for urban drainage inspections

Meijer, D.W.J.

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Propositions accompanying the thesis

Machine Learning and Computer Vision for Urban Drainage Inspections

- I It is critical to consider how a model will be utilized in practice when deciding what metrics to measure its performance by. Resorting to any widely used metric by default means we are not assessing actual performance. [Chapter 4]
- 2 Convolutional neural networks have not made “classical” computer vision and image processing methods obsolete, although some have been reduced to educational stepping stones. [Chapter 3]
- 3 Unsupervised (and semi-supervised) machine learning techniques should not be overlooked just because labels are available. We can do more than simply predict a target. [Chapters 3, 5]
- 4 Limiting ourselves to using available data (as opposed to collecting new data) perpetuates existing biases and can thereby stifle progress. [Chapter 4]
- 5 Task performance is not necessarily the most important quality of a machine learning model.
- 6 Overfitting starts at data exploration; preregistration should be practiced more widely in data science if we want results to translate out of a lab setting.
- 7 The recent surge in accessibility of state-of-the-art data science tools has not yet been accompanied by enough knowledge transfer for other domains to benefit optimally.
- 8 Perceived source code quality standards can present a barrier for computer science researchers to meet reproducibility standards.
- 9 The urban drainage field is receptive to the idea of innovation but resistant to change, an unlucky combination for the innovator.
- IO Instead of simply answering a question with relevant data, a data scientist should always try to understand why the question is asked and determine whether it is the correct question.
- II Automation of manual labor (such as may result from this thesis) requires international oversight to ensure the end result benefits society at large, rather than only leading to an increase in corporate profits through a downscaling of the labor force without compensation.