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Towards opensource LOD2 modelling of urban spaces using an optimised machine learning and rules-based approach.

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In order to enable community groups and other interested parties to evaluate the effects of flood management, water conservation and other hydrological issues, better localised mapping is required. Although some maps are publicly available many are behind paywalls, especially those with three dimensional features. In this study London is used as a test case to evaluate, machine learning and rules-based approaches with opensource maps and LiDAR data to create more accurate representations (LOD2) of small-scale areas. Machine learning is particularly well suited to the recognition of local repetitive features like building roofs and trees, while roads can be identified and mapped best using a faster rules-based approach.

In order to create a useful LOD2 representation, a user interface, processing rules manipulation and assumption editor have all been incorporated. Features like randomly assigning sub terrain features (basements) - using Monte-Carlo methods - and artificial sewage representation enable the user to grow these models from opensource data into useful model inputs. This project is aimed at local scale hydrological modelling, rainfall runoff analysis and other local planning applications.

The goal is to provide turn-key data processing for small scale modelling, which should help advance the installation of SuDs and other water management solutions, as well as having broader uses. The method is designed to enable fast and accurate representations of small-scale features (1 hectare to 1km^2), with larger scale applications planned for future work. This work forms part of the CAMELLIA project (Community Water Management for a Liveable London) and aims to provide useful tools for local scale modeller and possibly the larger scale industry/scientific user.