Project name	Semantic segmentation of urban point clouds
Description	One of the responsibilities of a municipality is to maintain an up-to-date record of large-scale topographical objects such as buildings, roads, and waterways, but also smaller objects such as street signs, street lights, and vegetation. In The Netherlands this is the “Basisregistratie Grootschalige Topografie (BGT)”. Maintaining this record is labour-intensive and susceptible to human error. Nowadays, accurate data sources are available to aid in this task. We have previously used panorama images to locate objects and to enhance the 3D city model, however, our recently acquired street-level 3D Point Cloud allows us to extract more accurate location, height and width details for various objects. Through heuristics and dataset fusion techniques, we can already extract ground points and buildings, reducing the size of the point cloud and making it easier to further separate the remaining points and detect objects of interest. Using deep learning models for semantic segmentation of point clouds seems to be the most promising approach, however, implementing and tuning these models for our specific data is already a challenge in itself. For this project we have a large labelled training set, as well as example train / test code for one specific semantic segmentation model. Most importantly, we have two dedicated members of the AI Team that will be working with you on a daily basis to guide you during your graduation internship.
Work environment	Within the City of Amsterdam, the student will work with experts from the Chief technology office, and more specifically the dedicated AI Team. More AI specialists and engineers will be available for occasional brainstorming sessions and workshops. Once a week all AI, CS & Data Science students gather for more in-depth technical support. What we offer: ● Freedom and responsibility ● Working in a team of experienced people ● Successful outcomes are directly implemented ● A possibility to contribute to (your own?) smart city development ● A monthly internship compensation From students, we expect the following: ● An independent work ethic ● Machine learning knowledge (including deep learning) ● A keen interest in working with point cloud data

	● Python programming skills ● And most importantly: a passion for their field, an ambition to learn, and a drive to make Amsterdam even more beautiful, safe and sustainable!
Expectations	The most important thing is to be eager to explore and learn together and step out of the comfort zone. The aim to achieve results directly applicable and relevant to the municipality. (i.e. not merely an academic paper). In addition to the delivery of useful predictive models, relevant results also include byproducts of the whole data analysis/processing pipeline that could be turned into insightful reports.