

Supplementary Material for Learning to Segment Publicly Accessible Green Spaces with Visual and Semantic Data

Jian Gao^{1,2}

j.gao@qub.ac.uk

Niall McLaughlin¹

n.mclaughlin@qub.ac.uk

Joanna Sara Valson²

j.valson@qub.ac.uk

Neil Anderson¹

n.anderson@qub.ac.uk

Ruth Hunter²

ruth.hunter@qub.ac.uk

¹ School of EEECS

Queen's University Belfast

Belfast, UK

² Centre for Public Health

Queen's University Belfast

Belfast, UK

1 Dataset Description

1.1 PlanetScope Data Specifications

We selected the top 18 most populated cities/towns in Northern Ireland, which are listed in Table S1 with details of image size, area in square kilometres and corresponding data split etc. An illustration of the geographical locations of each city/town is also given in Figure S1. Detailed coordinates of the areas are to be published alongside the manuscript.

1.2 OSM Data Specifications

Since the OSM data server is constantly updated by users around the globe, data acquired at different times may yield some differences. In Table S2 the green space related tags are listed. We extract polygon areas associated with these tags to create the OSM input for the model. The acquisition date for the OSM data is 13 Mar 2023.

2 Qualitative Results

We also show some additional qualitative results which are not included in the main paper due to page limit. Data sample, ground truth and PAGS prediction are plotted row wise in Figure S2. As we can see column wise for each sample, the OSM input (highlighted in blue) plays a crucial role in the overall model prediction as most of the predicted PAGS areas

City	Area(km ²)	Image size	Acquisition date	Data split
Antrim	140.52	4637x3367	20/4/2023	train
Armagh	73.30	3300x2468	4/6/2023	train
Ballymena	169.92	4836x3904	11/8/2022	train
Bangor	91.28	3621x2801	26/5/2023	train
Belfast	216.01	5142x4127	30/5/2023	train
Coleraine&Ballymoney	208.71	5445x4259	10/8/2022	test
Derry	117.21	4170x3123	30/5/2023	validation
Downpatrick	163.65	4790x3796	9/6/2023	train
Enniskillen	149.52	4924x3374	15/6/2023	train
Larne	186.88	5103x4069	18/3/2022	test
Lisburn	272.75	6290x4818	4/6/2023	test
Newcastle&Castlewellan	114.44	3904x3257	9/6/2023	train
Newry	187.05	5401x3848	4/6/2023	validation
Newtownabbey&Carrickfergus	294.16	6550x4990	28/11/2022	validation
Newtownards	29.19	2016x1609	1/10/2023	train
Portadown&Craigavon&Lurgan	198.56	5228x4220	20/4/2023	train
Strabane	9.81	1000x1090	25/10/2023	train
Warrenpoint	74.87	3401x2446	14/6/2023	train
LosAngeles	108.11	1561x7695	20/4/2023	test
New York	295.39	4287x7656	1/6/2023	test
Seattle	174.49	2540x7633	2/7/2023	test

Table 1: Details of N.I. and U.S.A. cities that we run our experiments on. *Note: area is calculated using image size and satellite pixel size, does not correspond to administrative city bounded areas.*

OSM land Category	Tag
natural	wood, moor, heath, grassland, fell, scrub, tree, tree_row, wetland
landuse	village_green, recreation_ground, meadow, grass, greenfield, forest
leisure	park, nature_reserve, garden, dog_park, common
tourism	camp_site, picnic_site
route	hiking, foot
building	greenhouse
highway	footway

Table 2: OSM tags included in our PAGES-NI dataset.

overlap with it. While there are also some cases, such as the 4th column where the OSM input only covers the boundary of an area, and the model learns from the greenness (visual) channels to predict not just the boundary.

Qualitative results for United States are also given in Figure S3. From the first row data sample we could see that the U.S cities are quite different from N.I the training regions with much denser and fine-grained land use divisions. Again OSM serves as a main contributing data source for the final predictions.

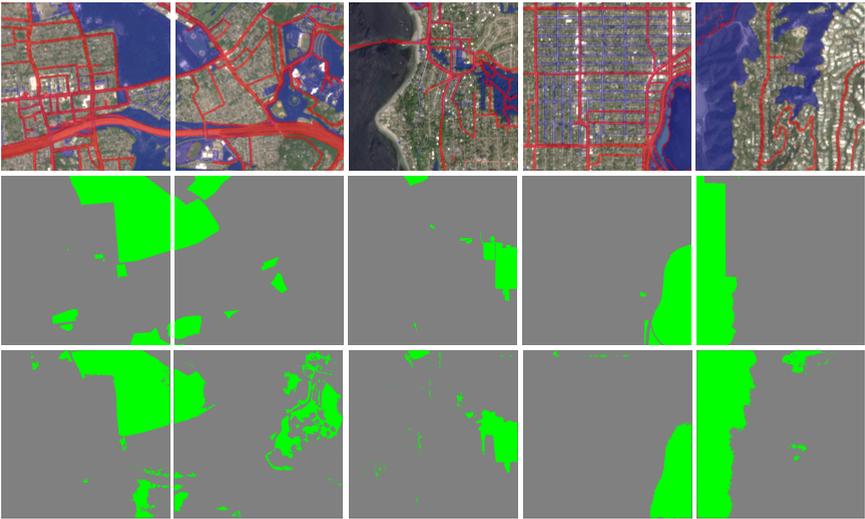


Figure 3: Qualitative results on the **United States** test set. 1st row: visual sample, blue highlights OSM and red highlights Activity; 2nd row: ground truth PAGES; 3rd row: prediction from our proposed model. Each column is for one sample. *Best viewed in color.*