Predicting Bike infrastructure from Google StreetView using ViT

Jiahua Chen, Department of Geography
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High Comfort Bikeways are low stress routes comfortable for most people, including those of all ages and abilities, with a record as best for safety.

Local street bikeways

Cycle tracks

Bike paths

Medium Comfort Bikeways are low or medium stress routes comfortable for some people, but whose safety requires careful design.

Multi-use paths

Low Comfort Bikeways are high stress routes comfortable for few people, with little or no additional safety compared to no bicycle facility.

Painted bike lanes

Can we use ViT to help classify bike infrastructure from google Streetview?

Dataset (n=1489)

Images

Pull from Street view Static API

Labels

Volunteers classified the roads based on the online Street view (So they have more info than just the image)

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Dataset (n=1489)

	Train	Test
Bike path	32	50
Cycle Track	97	50
Local street Bikeway	73	50
Multi-use Path	274	50
Painted Bike Lane	190	50
No Infra.	523	50
	1189	300

Fine-tuned Transformer

1. Six classes
2. Four classes

Results

1. Six-classes: ~37%
2. Four-classes: ~58%

```
['Bike Path', 'Cycle Track', 'Local Street Bikeway', 'Multi-Use Path', 'Painted Bike Lane', 'no']
array([[ 0,  0,  0,  0,  1,  1],
       [ 2,  9,  2,  1,  1,  4],
       [ 4,  2, 18,  0,  1,  2],
       [21,  8,  3, 33,  2,  5],
       [ 4, 15,  1,  1, 25,  4],
       [19, 16, 26, 15, 20, 34]])
```

```
['Local Street Bikeway', 'Multi-Use Path', 'Painted Bike Lane', 'no']
array([[21,  0,  1,  2],
       [ 2, 30,  3,  8],
       [ 3,  3, 27,  3],
       [24, 17, 19, 37]])
```

Limitations and future work

1. Class imbalance
2. Dataset quality