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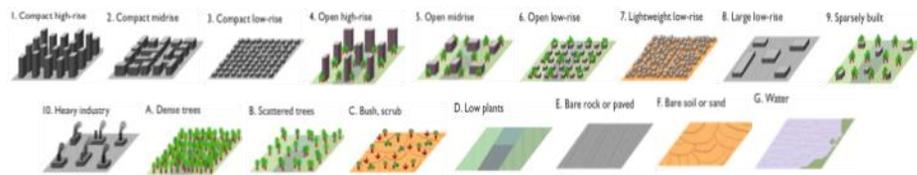
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Motivation and Objectives

- **Motivation:** Automatic production of repeatable indicators from remote sensing data in Africa.
- **Objectives:**
 - Creation of an automatic method for Local Climate Zone (LCZ) mapping for urban area in developing countries : Ouagadougou (Burkina Faso) and Antananarivo (Madagascar).
 - Reflection on the impact of LCZ on population (child health, mortality, household characteristics)

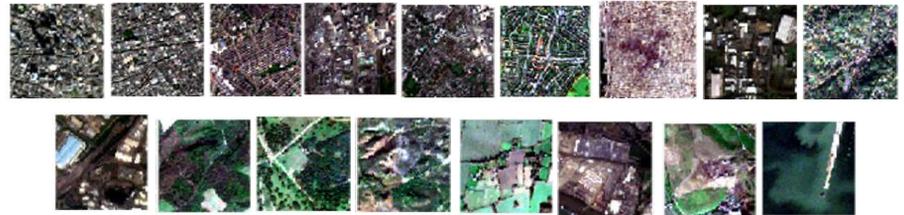
Local Climate Zone (LCZ) [1]

- **Classification scheme** to standardize methods of observation and documentation of the physical nature of cities
- **17 types of zones** based on properties of surface structure



So2Sat dataset [2]

- Dataset of local climate zone (LCZ) labels of about half a million Sentinel-1 and Sentinel-2 image patches in 42 urban agglomerations (plus 10 additional smaller areas) across the globe.
- Labeled by 15 domain experts.



Building our dataset

- By using the LCZ classification scheme, [3] found **seven city types** (clusters) that capture the global diversity of spatial urban configurations.
- Antananarivo is in a cluster with **Hong Kong** and **Islamabad**; Ouagadougou is in a cluster with **Cairo** and **Karachi**.
- Those cities are selected in the So2Sat dataset.

Model parameters

- **Resnet34** pretrained on ImageNet
- Training-validation-test split : 60% - 20% - 20%
- **Learning rate** : 0,00001
- **Batch size** : 64
- **Epochs** : 99

Preliminary results

Label	1	2	3	4	5	6	7	8	9
Accuracy (%)	95	99	98	97	98	97	99	99	99
Label	10	11	12	13	14	15	16	17	
Accuracy (%)	97	99	96	99	98	98	99	99	

Overall accuracy : 98 %

Perspectives

- Reflection on the embedding of **spatial relations**, and **temporal consistency** of the result.
- Reflection on the **impact of LCZ on population**, using administrative data / demographic surveys (for example on child health, mortality, household characteristics).

[1] Stewart & Oke. (2012). “Local Climate Zones for Urban Temperature Studies”. Bulletin of the American Meteorological Society. 93. 1879-1900. 10.1175/BAMS-D-11-00019.1.
[2] Zhu & al. (2020). “So2Sat LCZ42: A Benchmark Dataset for Global Local Climate Zones Classification”. IEEE Geoscience and Remote Sensing Magazine. PP. 10.1109/MGRS.2020.2964708.
[3] Taubenböck & al. (2020). “Seven city types representing morphologic configurations of cities across the globe”. Cities. Volume 105. 102814. ISSN 0264-2751