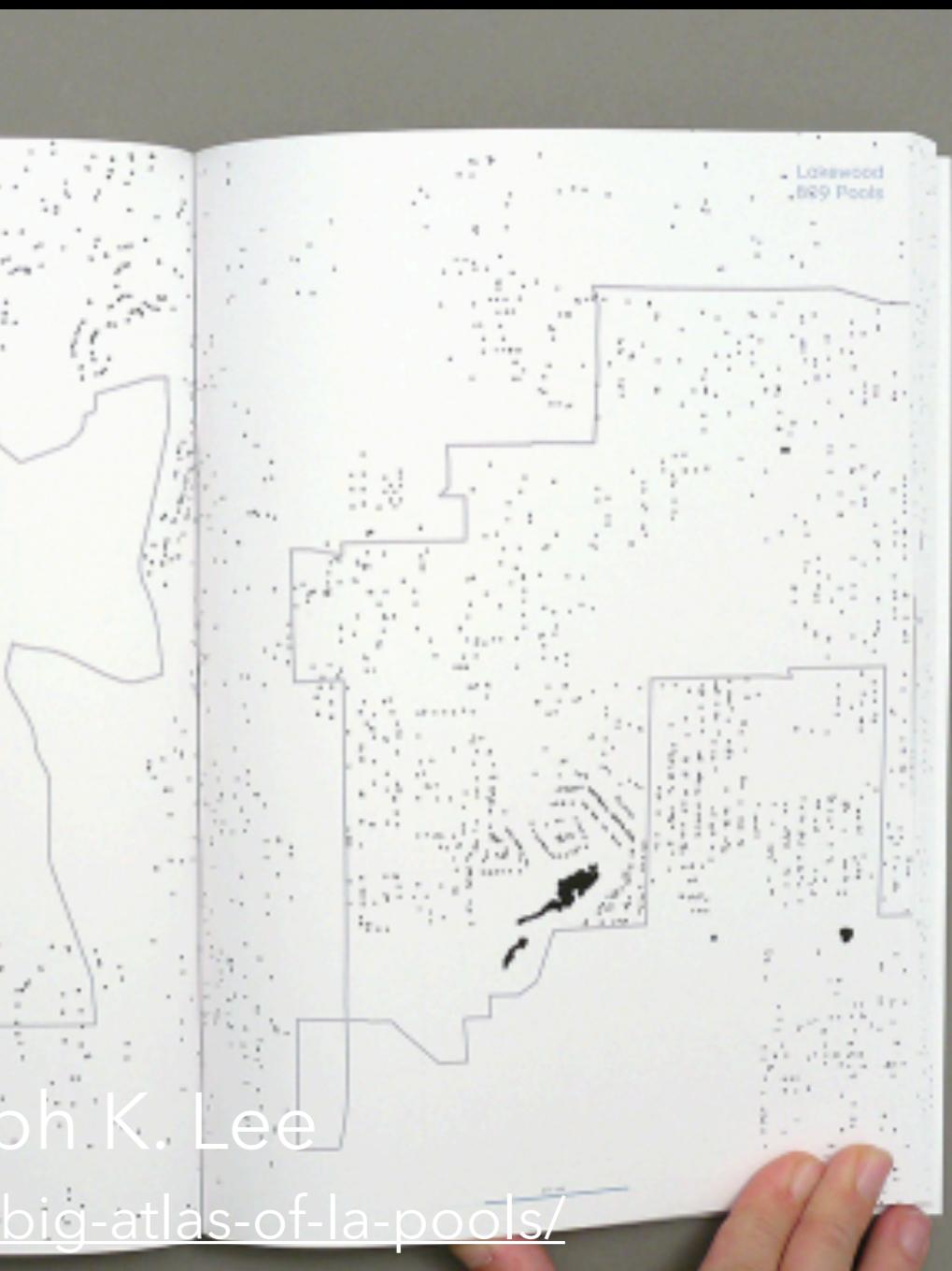
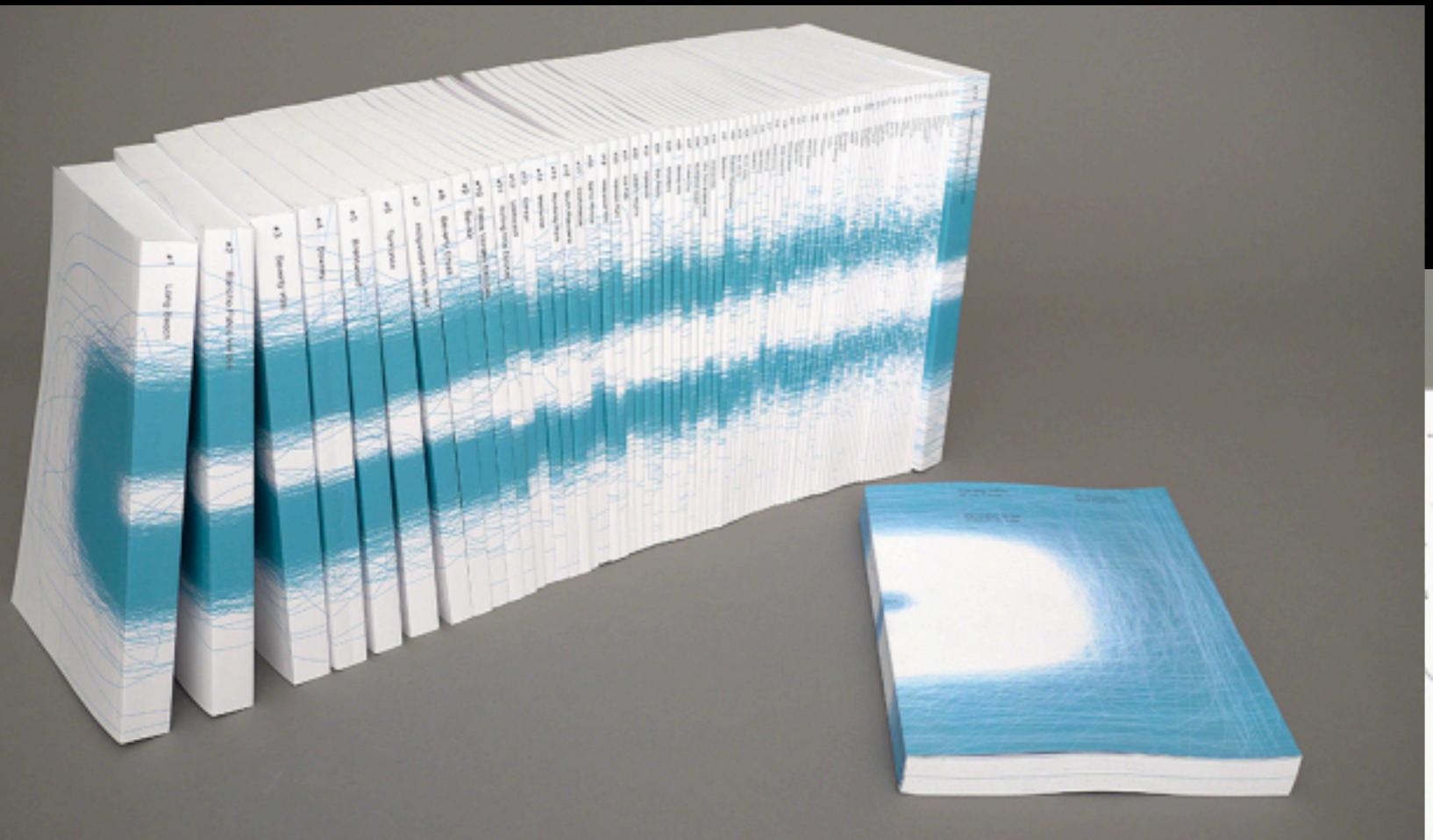


Mapping the solar panels of Switzerland

Application: how is it related to ecological consciousness?

Basile Bruneau

The Big Atlas of LA Pools



By Benedikt Groß & Joseph K. Lee

<http://benedikt-gross.de/log/2013/06/the-big-atlas-of-la-pools/>

Mapping the solar panels

- Unavailable today (OSM)
- Using satellite images
- Correlation to ecological vote (nuclear)?

Detecting the panels

CLASSIFICATION OF
AN IMAGE



WITH *WITHOUT*

WITH A NEURAL NETWORK

NEED TO TRAIN IT

MANUAL CREATION
OF A DATASET

WITH



WITHOUT



Manual creation of a dataset

BUILDINGS COORDINATES
through OpenStreetmap



DOWNLOAD OF SATELLITE
IMAGE
through Google Maps

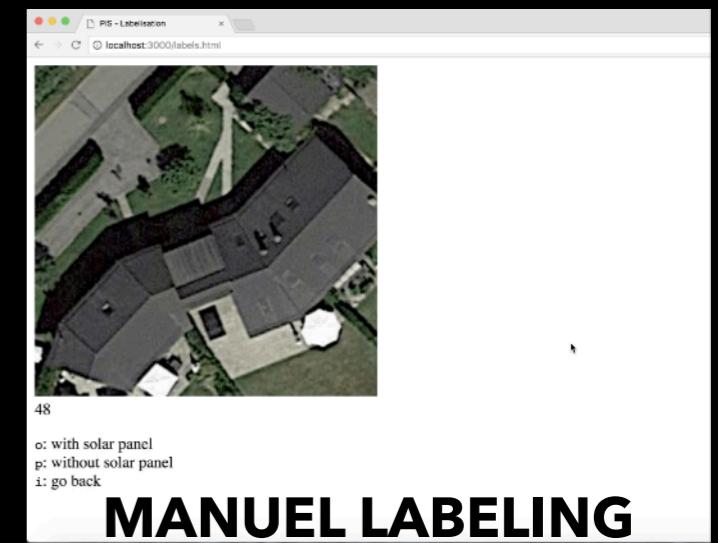


CROP TO THE BUILDING
DIMENSIONS



CLASSIFICATION
of new images

FINE TUNING OF A NEURAL
NETWORK



Training with the dataset

14 170 labeled
total

5 000 / hour
speed

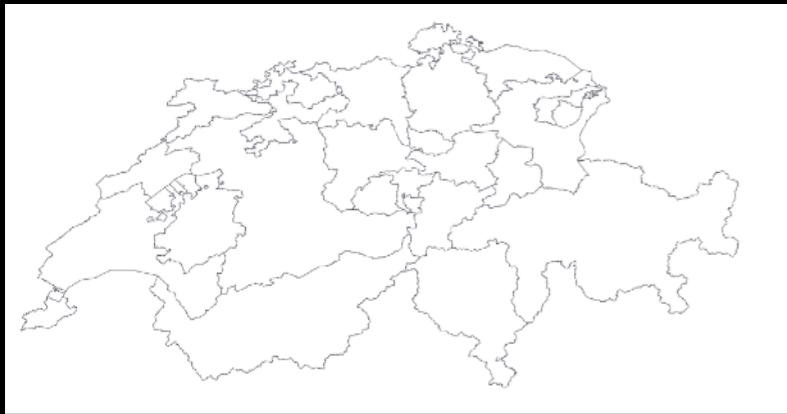
10%
proportion of panels

85% accuracy

fine tuning ResNet-50

Classifying the country

CANTONS' COORDINATES



BUILDINGS COORDINATES

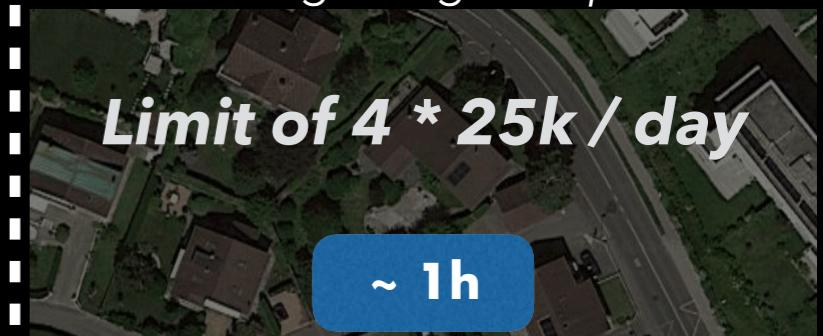
Canton by canton

Using OSM



DOWNLOADING SATELLITE IMAGES

Using Google Maps



STATISTICS

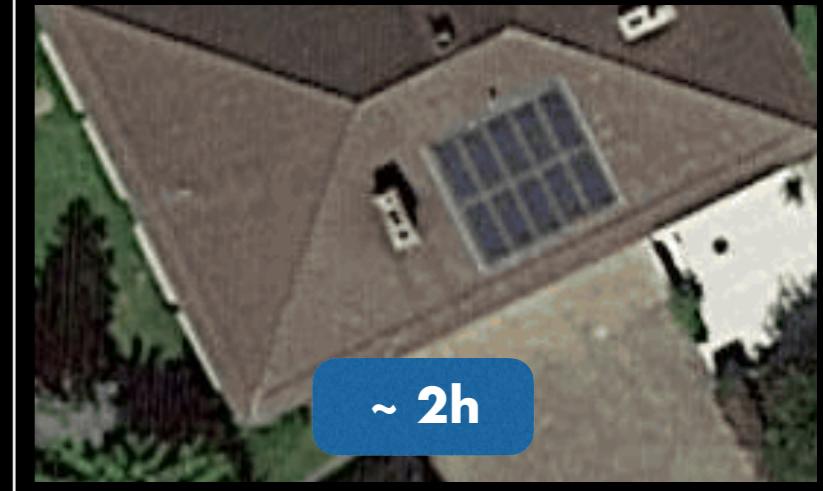
Canton by canton

Municipality by municipality

CLASSIFYING IMAGES

~ 12k / h

CROPPING IMAGES



Classifying the country

1.5M
buildings

100k / day
speed

15 full days
and counting

500 GB
satellite images

1 GB
final data size

Ecological data

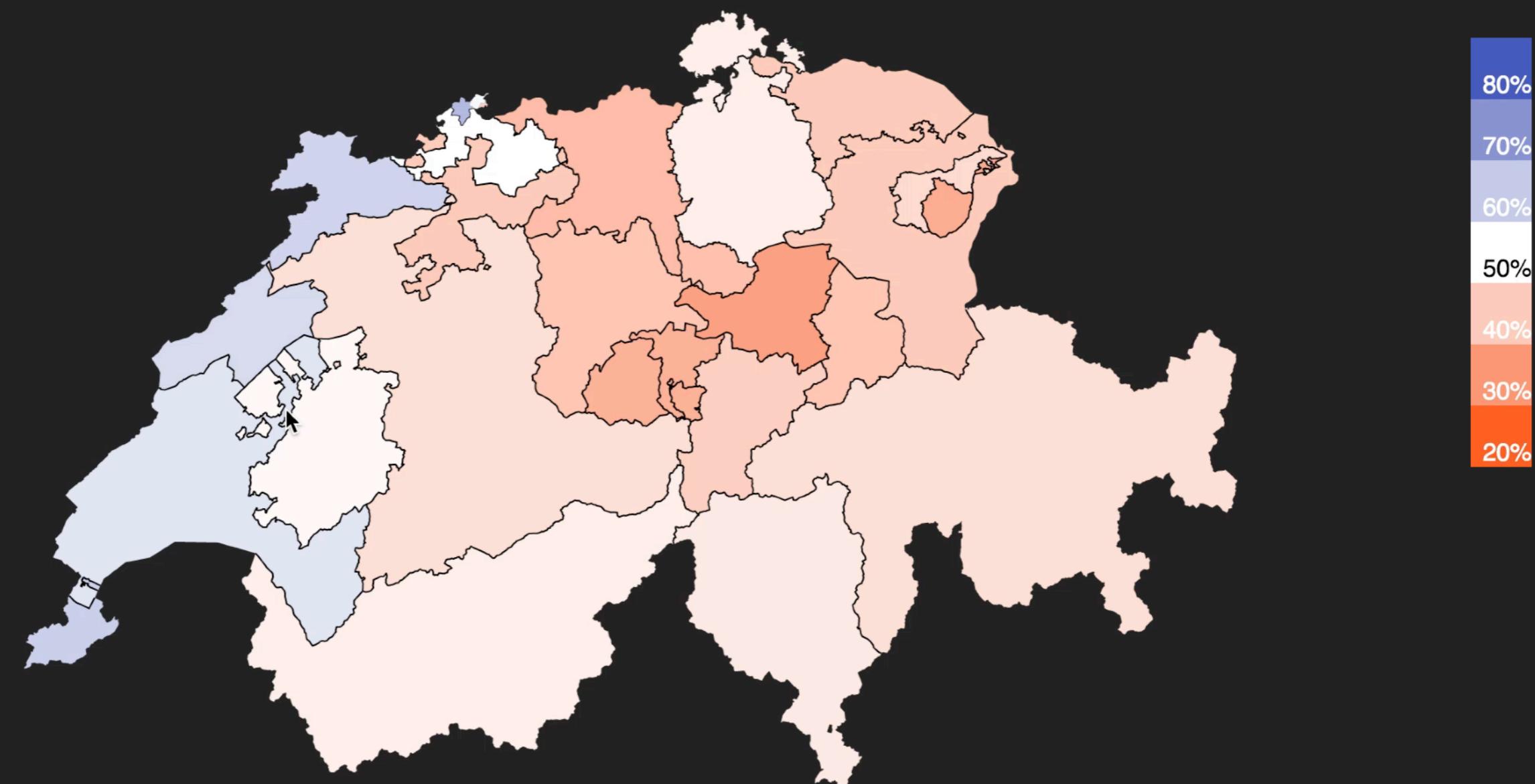
- Swiss votes by municipality
- 2016 vote: "Exiting nuclear energy"
Forbidding new plants, limiting existing ones

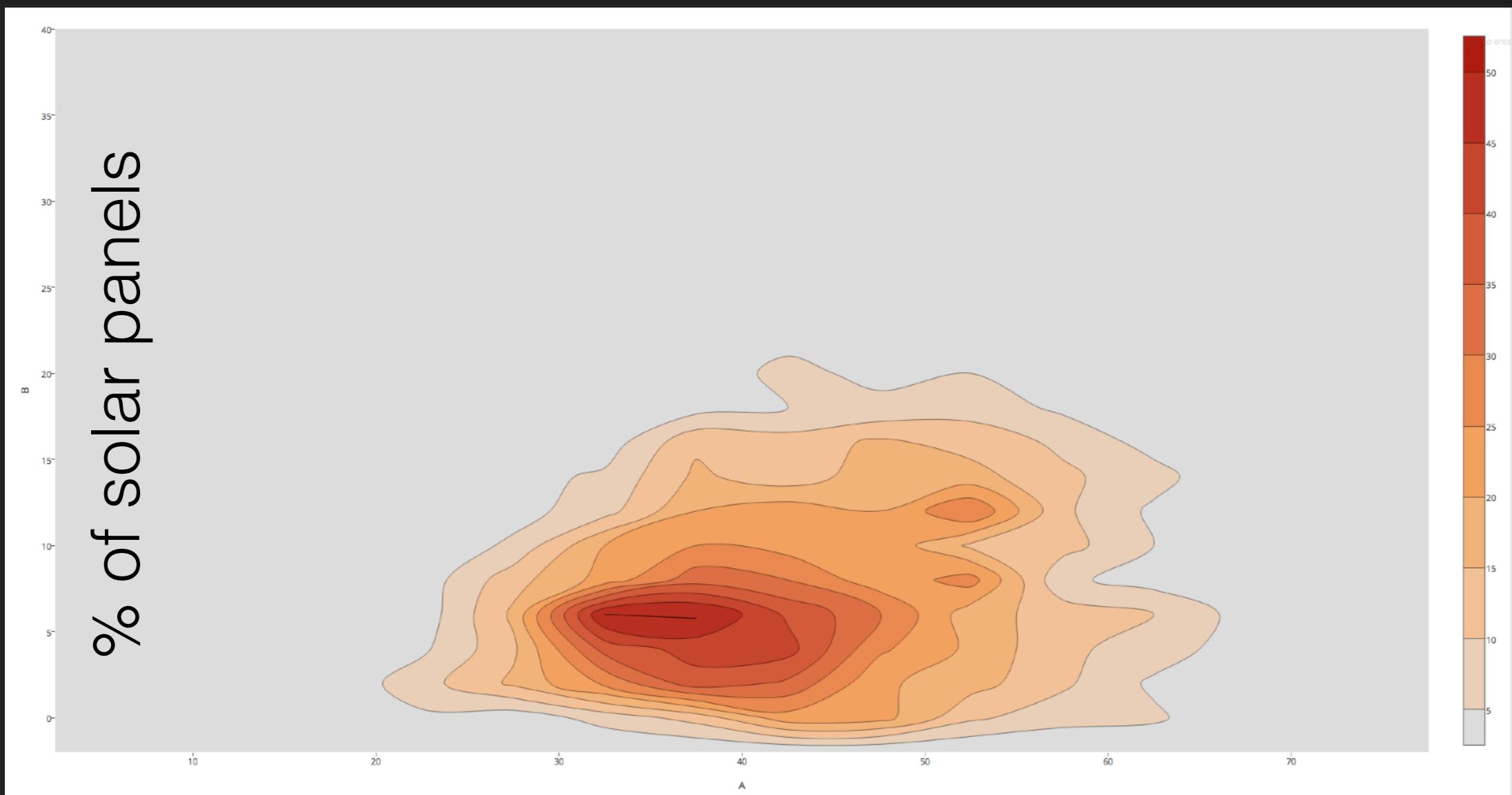
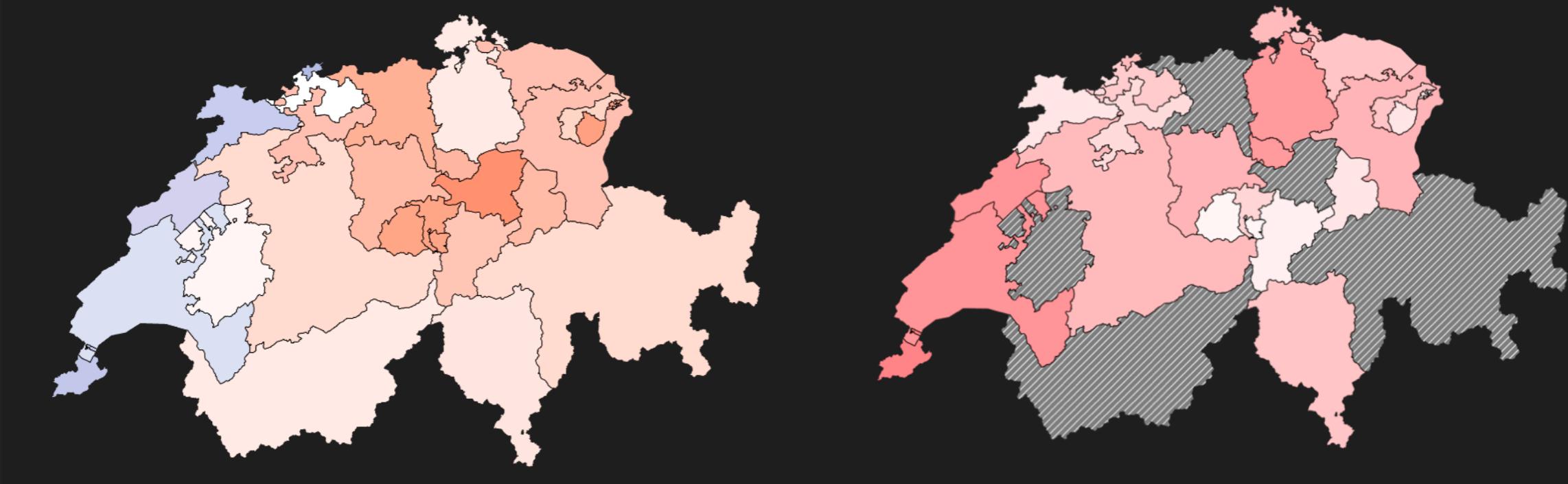
Displaying the data

- SVG map
- Huge number of objects
- Server: loads everything in RAM (~ 1min)
- Client: on-demand loading
 - Canton, Municipality

DEMO

[Display with](#) [Display without](#) [Display roads](#) [Fill buildings](#) [Change visualisation](#)





% of yes to the vote

Outcome

- Unique map
- First comparison
- Important cantons missing
- Recent vote not including
- Full map layer

Future development

- Finish classification
- Use user input to **improve neural network**
- Compare to other data
- Display more information (cities, altitude...)

Credits

- <https://github.com/interactivethings/swiss-maps>
- <http://work.interactivethings.com/nzz-swiss-maps/index.html>
- <https://bost.ocks.org/mike/map/>
- <https://www.bfs.admin.ch/bfs/fr/home/statistiques/catalogues-banques-donnees/donnees.html>
- https://github.com/m2dsupsdlclass/lectures-labs/blob/master/labs/03_conv_nets/Fine_Tuning_Deep_CNNs_with_GPU_rendered.ipynb
- <http://benedikt-gross.de/log/2013/06/the-big-atlas-of-la-pools/>