

An aerial photograph of a city skyline, likely New York City, featuring numerous skyscrapers and buildings. The foreground shows a mix of urban structures and green spaces with trees displaying autumn foliage. A semi-transparent white rectangular box is centered over the image, containing the text "Generate a National Building Inventory" in a large, white, sans-serif font.

Generate a National Building Inventory

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- 1. Motivation**
 - 2. Our Work**
 - 3. Creativity & Contribution**
 - 4. Future Work**

1. Motivation

- Important!

- Emergency Management
- Mitigation Planning
- City Planning

- Limited Resources

- attributes, spatial coverage, aggregated data

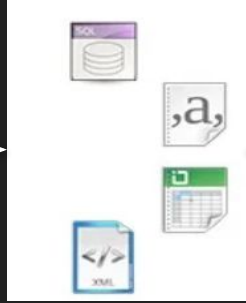


Emergency Management

2. Our Work (pipeline)



Web Scrap
from websites



Data Cleaning &
Merging



Missing Value
Prediction with
ML & AI tools



User Friendly
Interface

2. Our Work (web scrap)

Web Examples:

The screenshot shows the Centris.ca website with a search bar at the top. Below the search bar, there are navigation tabs: GALERIE, LISTE, CARTE, and SOMMAIRE. A search filter is set to 'Trier par'. The main content area displays a grid of property listings, each with a photo, a title, a description, and a price. The listings include:

- CONDO À VENDRE: 2 CAC, 2 SDB, 869 000 \$
- LOFT / STUDIO À VENDRE: La Haute-Saint-Charles (Vill-Belair), 153 900 \$
- TRIPLEX À VENDRE: Mercier / Hochelaga-Maisonneuve (Hochelaga-Maisonneuve), 700 000 \$
- MAISON À VENDRE: L'Île-Bizard / Sainte-Genève (L'Île-Bizard), 269 000 \$
- CONDO À VENDRE: Chomedey (Autres), 142 000 \$
- MAISON À VENDRE: 2 CAC, 1 SDB, 869 000 \$
- MAISON À VENDRE: 4 CAC, 2 SDB, 700 000 \$
- MAISON À VENDRE: 2 CAC, 1 SDB, 869 000 \$
- MAISON À VENDRE: 4 CAC, 2 SDB, 700 000 \$
- MAISON À VENDRE: 2 CAC, 1 SDB, 869 000 \$
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- MAISON À VENDRE: 2 CAC, 1 SDB, 869 000 \$
- MAISON À VENDRE: 4 CAC, 2 SDB, 700 000 \$

<https://www.centris.ca/>

The screenshot shows the 'LIST OF PROPERTY ASSESSMENT UNITS' website. It features a 'Data Explorer' section with a 'Download' button. Below this, there is a table with the following data:

| Update (file or link) | 2019-09-11 15:46 UTC |
|----------------------------|---|
| Initial broadcast | 2017-07-31 17:27 UTC |
| Type | Data |
| File size | |
| Compliance with guidelines | |
| Format: | CSV |
| License: | Creative Commons 4.0 - CC BY Attribution |
| Description of fields: | Absentee |
| Consideration files: | Separator other than comma. Encoding other than UTF-8. Projection other than EPSG:4326/32198. Compressed file |
| Considerations given: | Unknown values not empty. C08969 not applied. Non-compliance with the Guidelines at the number level. Non-compliance with the Boolean Guidelines |
| Login | 2b0dfc3d-9b43-4b5e-832c-a2a6f947079 |
| Source (URL) | http://donnees.ville.montreal.qc.ca/dataset/4ad5baea-4d2c-460f-a88f-5ab000db4887?resource/2b0dfc3d-9b43-4b5e-832c-a2a6f947079/download/unitevaluationfonciere.csv |

List of Property Assessment Units

The screenshot shows the Emporis.com website. It features a 'Building Directory' section with a 'World Building Map' and a 'Statistics' section. Below this, there is a detailed view of the 'Tour Montréal-Paris' building, including its location, identification, and technical data.

Identification

| Name | Tour Montréal-Paris |
|------|---------------------|
| EBN | 1231956 |

Location

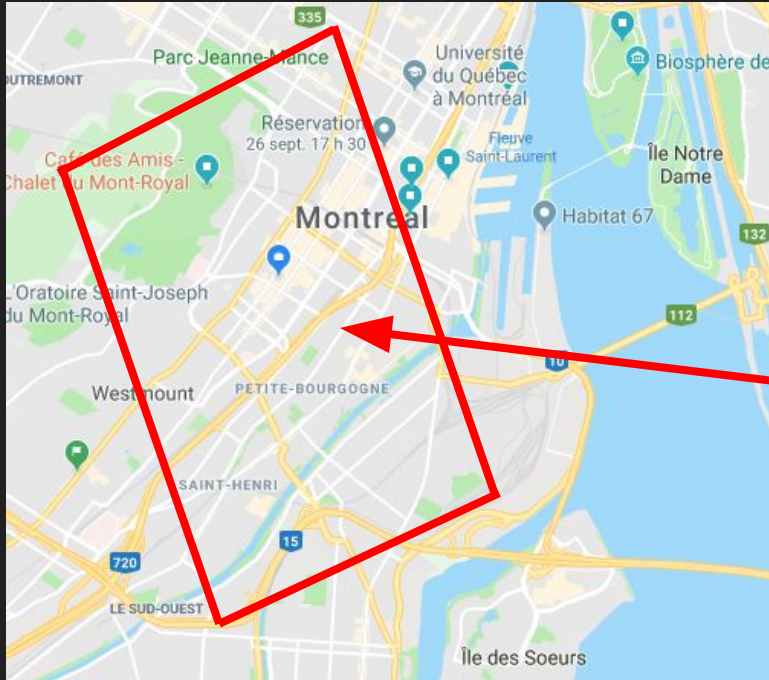
| Address as text | Île Sainte-Hélène |
|-----------------|-------------------|
| Borough | Ville-Marie |
| City | Montréal |
| State | Québec |
| Country | Canada |

Technical Data

| Height (architectural) | 1,066.27 ft |
|------------------------|-------------|
|------------------------|-------------|

<https://www.emporis.com/>

2. Our Work (data cleaning)



Region Selection

(45.508268, -73.571234)

(45.491339, -73.587941)

(45.488000, -73.582976)

(45.505211, -73.564860)

2. Our Work (data evaluation (1/2))

| | Area | Construction Year | Floors | Type | Units | formatted_address | latitude | longitude | postcode | Height |
|---|--------|----------------------|--------|-------------|-------|--|-----------|------------|----------|--------|
| 0 | 598.0 | 1880.0 | 4.0 | Residential | 8.0 | 215 Rue de la Commune O, Montréal, QC H2Y 3W8,... | 45.501999 | -73.553966 | H2Y 3W8 | 30 |
| 1 | 2041.0 | 1861.0 | 11.0 | Office | NaN | 1015 Rue St-Alexandre, Montréal, QC H2Z 1N9, C... | 45.503052 | -73.562862 | H2Z 1N9 | 110 |
| 2 | 378.0 | 1967.0 | 5.0 | Residential | 8.0 | 221 Rue de la Commune O, Montréal, QC H2Y 2C9,... | 45.501829 | -73.553948 | H2Y 2C9 | 37.5 |
| 3 | 681.0 | 1885.0 | 3.0 | Office | NaN | 321 Rue de la Commune O, Montréal, QC H2Y 2E1,... | 45.500698 | -73.553653 | H2Y 2E1 | 30 |
| 4 | 344.0 | 1925.0 | 5.0 | Residential | 8.0 | 1101 Rue St-Alexandre, Montréal, QC H2Z 1P8, C... | 45.504124 | -73.564819 | H2Z 1P8 | 37.5 |

2. Our Work (data evaluation (2/2))

| | latitude | longitude | Units | Construction Year | Area | Floors | Height | year |
|-------|-------------|-------------|-------------|-------------------|---------------|-------------|-------------|-------------|
| count | 1828.000000 | 1828.000000 | 1828.000000 | 1828.000000 | 1828.000000 | 1828.000000 | 1828.000000 | 1828.000000 |
| mean | 45.510088 | -73.578899 | 5.774617 | 1920.292670 | 298.315098 | 2.481400 | 18.762309 | 1.781182 |
| std | 0.012526 | 0.011593 | 35.810554 | 37.147736 | 2510.795005 | 1.783026 | 13.467225 | 1.714817 |
| min | 45.481468 | -73.596046 | 1.000000 | 1830.000000 | 8.000000 | 1.000000 | 7.500000 | 0.000000 |
| 25% | 45.499125 | -73.588238 | 1.000000 | 1900.000000 | 108.000000 | 2.000000 | 15.000000 | 1.000000 |
| 50% | 45.515403 | -73.583000 | 2.000000 | 1910.000000 | 189.000000 | 2.000000 | 15.000000 | 1.000000 |
| 75% | 45.520330 | -73.569229 | 3.000000 | 1947.750000 | 265.000000 | 3.000000 | 22.500000 | 3.000000 |
| max | 45.526096 | -73.553165 | 1351.000000 | 2015.000000 | 106022.000000 | 33.000000 | 247.500000 | 6.000000 |

2. Our Work (missing data estimation)

Google Street Images for Deep Learning
-- 4 images for each location



0 deg



90 deg



180 deg



270 deg

An example: (Latitude: 45.493075, Longitude: -73.582118)

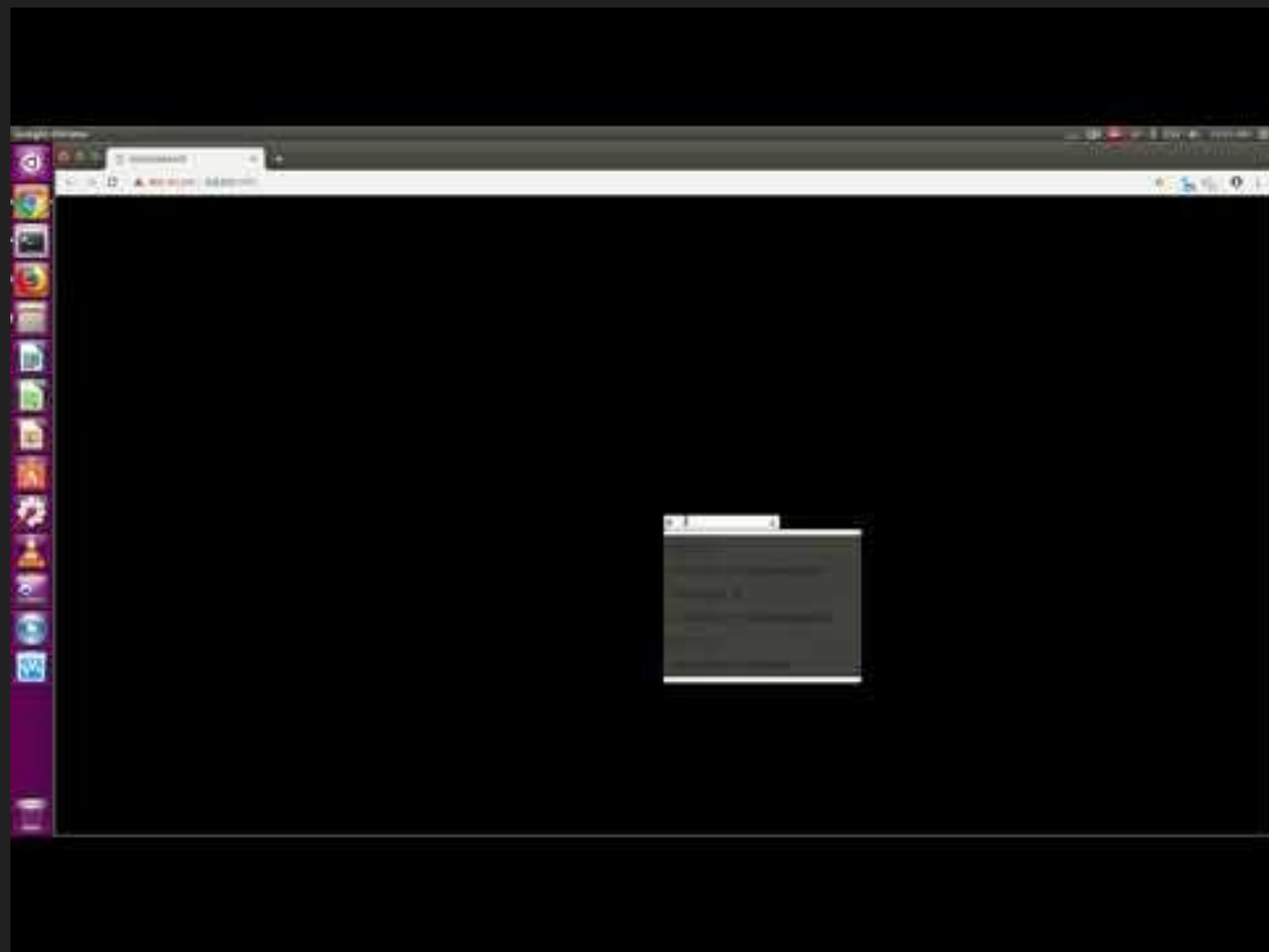
2. Our Work (missing data estimation)

Attributes:

Distance(from centre), Area, Construction year, Units.

Prediction Accuracy:

| zones | Floors | Type | Year | Height | # Units |
|-------|--------|------|------|--------|---------|
| 95% | 72% | 98% | 27% | 98% | 8% |



3. Creativity & Contribution

- 3000+ records
- 10 Attributes for each building
 - longitude, latitude, height, units, type, living area ...
- Missing Data Prediction with ML
 - Scraped Images + Deep Learning
 - Semi-labeled Data + Machine Learning
- User Friendly Interface

4. Future Work

- Complete the dataset with the help of Google Maps
- Missing values
- Extension: Small Area --> Whole Canada
- Web Design



Thank You ! Questions?



Government
of Canada

Gouvernement
du Canada