One-degree grid-size labelling

WordLynx – human-readable geocoding

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Background

Postal addresses with place names or numbers, street addresses, and postal codes are used in countries around the world to enable identification of homes, businesses, schools, hospitals, government services, etc. Although this system serves rich countries very well, many poorer countries throughout the world do not have established postal addressing systems, which are burdensome and expensive to create and maintain.

Any location can be accurately identified using latitude and longitude, but these long strings of numbers are very human unfriendly. For example, you probably don't know your current latitude and longitude. Two newer geocoding addressing systems that have been launched with the goal of addressing the world include "what3words" and Google's Plus Codes (integrated into Google maps). However, both systems have limitations.

We have combined the best features of these two systems to create **WordLynx**, a hierarchical, iterative, and intuitive addressing system that is simple, human-friendly, and free.

Materials and Methods

WordLynx is a base-10,000 hierarchical alphanumeric geocoding system that directly correlates decimal longitude and latitude coordinates with an iterative labelling system based on 10,000 common English words and the numbers 1 to 8.

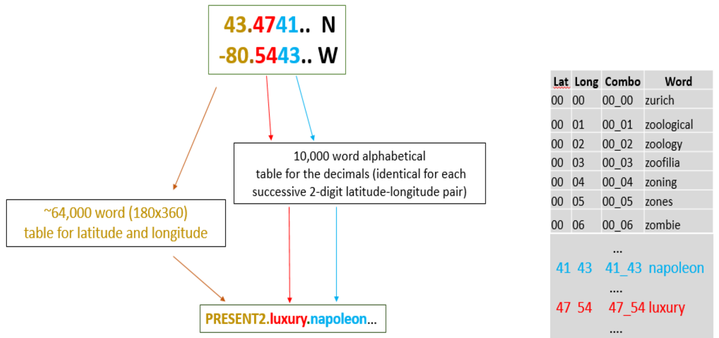
To produce location labels, we first divided the earth's surface into grid squares of one-degree latitude x one-degree longitude. This creates 64,800 grid squares of approximately 110m x 110m. Beginning with the grid square at the top left of the world map, each square was labelled alphabetically from left to right using the 10,000 words repeatedly and appending a number in ascending order each time the word was used to enable the creation of the required 64,800 unique grid square labels. For example, "ABANDON1" represents the first grid square in the "top left" of a world map, with further grids progressing alphabetically from left-to-right and top-to-bottom (as English is read); the University of Waterloo is located in the square labelled "PRESENT2". For quick reference, the numbers 1–4 and 5–8 have been assigned to the Northern and Southern hemispheres respectively.

Further resolution is achieved by iteratively subdividing each grid square into 10,000 grid squares (100 x 100 grid) and repeating this process to the desired resolution. The word list is used as before to alphabetically name each set of 10,000 grid squares at every level of resolution.

With this system, a three-word label can be systematically generated for each 11m x 11m grid square (at the equator) of the globe's surface. For example, the **WordLynx** address for the Science Teaching Complex at the University of Waterloo is "PRESENT2.luxury.napolean".

WordLynx geocoding

For Example: 43.4741 N, -80.5443 W



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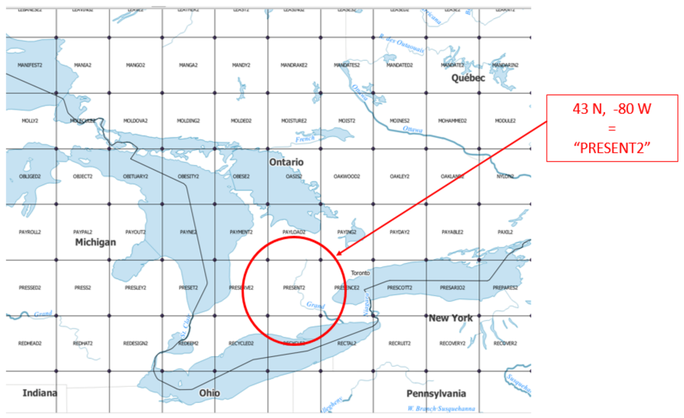
Iterative naming example



Incorporating open data sources

We have downloaded the open database of buildings and the geographic attribute file:

- https://www.statcan.gc.ca/eng/open-building-data/open-database
- https://www150.statcan.gc.ca/n1/pub/92-151-g/92-151-g2016001-eng.htm

These databases provide the locations of every building, as well as larger geographic attributes, such as blocks, parks, lakes, etc. for BC and Ontario. We plan to link latitude and longitude identifiers in these databases to their **WordLynx** address to generate single address labels that can serve in place of postal addresses. This functionality will be incorporated into our app.

WordLynx geocoding

Feature	what3words	Google plus codes	WordLynx
Resolution	Fixed at 3m x 3m	Variable to 3m x 3m	Variable to any desired size
Hierarchical	NO	YES	YES
Navigational clues	NO	YES	YES
Unambiguous	YES	Global: YES Local: No	YES
Easily translated into latitude and longitude	NO	Global: YES Local: Partially	YES
Non-proprietary	NO	Global: YES Local: NO	YES
Easily memorable	YES	NO	YES
Available in multiple languages	YES	N/A	NO*

*Currently available in English only, but word lists in other languages could easily be developed

Results to date

We currently have a draft word list and a prototype app utilizing open source mapping software. The app shows the globe split into grids to the three-word label resolution and has a search function that generates **WordLynx** addresses.

Conclusions

The **WordLynx** addressing system is a simple, hierarchical, linguistic-based addressing system that combines the multi-resolution and spatial relation capabilities of Google's plus codes with the memorability and human-friendly aspects of what3words.

WordLynx offers simpler geocoding with enhanced utility compared to Google's Plus codes or what3words. The technology will be made freely available and can easily be integrated into other platforms.

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