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The proposal of **Brightway**

An app endeavors to boost residents' confidence in night-time walks around Chicago Public Housing Projects and beyond

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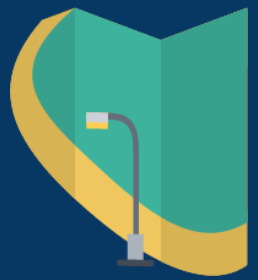
Why a lighting map matters?

When we talk about the public housing projects in Chicago, safety problems are always a huge concern. As claimed by current residents, open air crime activities are mainly drug trade and gang conflicts. It is obviously impracticable to completely get rid of crime on the street, but folks strive as much as possible to avoid it. On the internet, residents barely reach an awkward consensus about the key to protect themselves: mind your business.

But how? It is never easy to convince criminals that you have ignored their existence, especially in a dark environment where everyone is afraid of their own shadow. Walking alongside the light way may be a good idea to get away from offenders. Criminals don't like bright lights - according to a recent lights research. The rigorous study based on randomized controlled trials conducted by University of Chicago Crime Lab suggested that improved street lighting could significantly reduce crime that happened outdoors at night in public housing projects.



Sticking to the bright way - sounds like a easy move. However, in the practice, there are many obstacles impeding you from moving forward. For example, sometimes the bright path unexpectedly ends and people don't know which way to go ahead. Or the street lights are not bright enough. Thus, a map that illustrates the location, brightness and other properties of street lamps matters.

Existing Products Analysis

Commercial Map Apps:

So far, street lighting layer is absent in any mapping service. In Dec 2019, there was a rumor indicating that Google Maps would have introduced this function. For some reason, the plan was put on hold.

OpenStreetMap:

OpenStreetMap has a feature point that represents street lamp. User could manually add a street lamp to the map as a feature point via tedious input work. On the other hand, it contains information on only a small percentage of street lamps since there are numerous ones. Besides, most of the existing street lamps data are located in downtown Chicago.

Safety apps:

Citizen and Neighbors are two of the leading mobile apps that focus on community safety. Neither of them includes lighting information alongside streets.

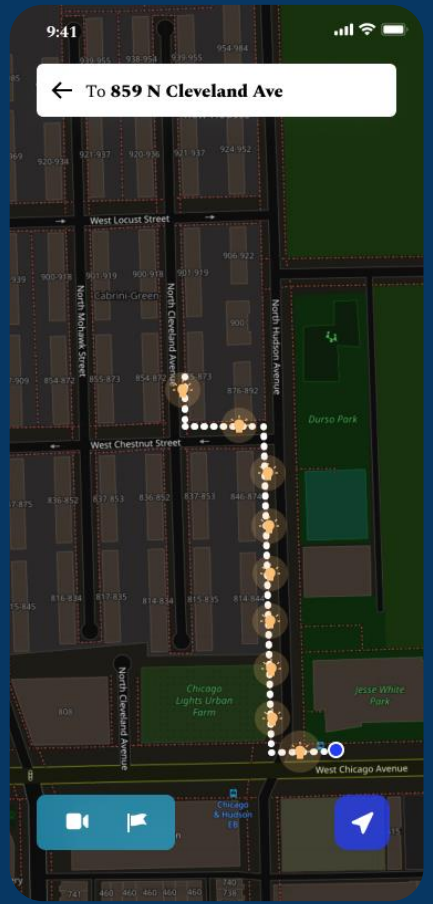
Brightway is a collaborative app to easily create, edit or view street illumination based on OpenStreetMap

User input

Data processing

Import to OSM

View



User input
(1/2)

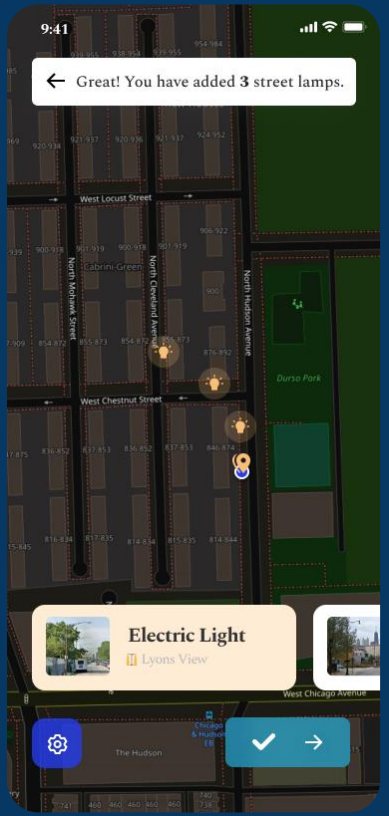
Marking Mode

I. User sets up some street light types for later.

I. Drops a pin on the location of the street light.
   A. Pin the current location
   B. Pin another location

I. Drops more pins.

I. Before user submits his work, he could review all the pins he just added and correct offset pins.



User input
(2 / 2)

Recording Mode

I. User shoots video alongside streets via Brightway mobile application.

I. The Brightway app also records real-time locations and the movement trajectory of the user.

I. The video with its exif data (including created time, lens model, exposure time, ISO, geographical information, etc.) is automatically uploaded to the server for further processing.

Data processing

Data from marking mode

I. The server use the pins dropped by the user to generate a list of points of interest (POIs).

Data from recording mode

I. Deep learning models (i.e. algorithms based on Convolutional Neural Networks) are applied to detect and classify street lights from the video.
II. A POI is created for each street lamp. Their geographic coordinates are determined by the user's movement trajectory when shooting the video.

Import to OSM

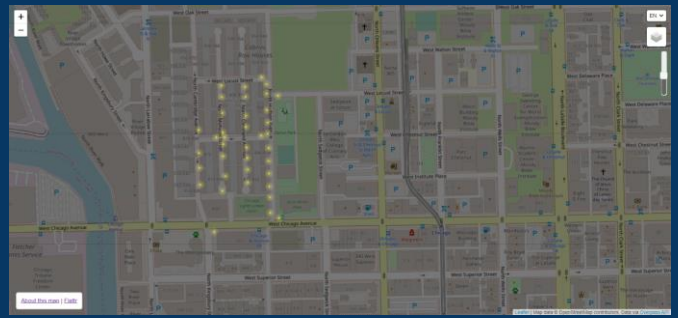
I. Convert the list of points of interest (POIs) into an .osm file.

I. Then the .osm file could be imported to OpenStreetMap with an API

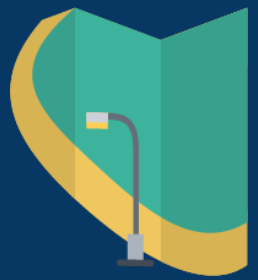
View

I. Users could view the lighting layer on Brightway app.

I. Other map clients using the OSM database and supporting lighting layer also work.



Summary



Target users:

1. Residents of nearby neighborhoods
2. Citizens who are unfamiliar with a new environment
3. Cartophiles
4. Researchers
5. Municipal officers and workers

Advantages:

1. Provide the most straightforward way to view and utilize a lighting map
2. Lower the barrier of editing map to encourage every user to contribute
3. Help different groups of users to achieve different goals
4. Could be extended to larger areas and other cities

About the author

Hehuan Zhong strives to leverage the strength of technology to make our communities better places to live. He has a huge passion for public housing projects in Chicago. The author proposes this project aiming to boost residents' confidence in night-time walks around public housing developments.

Professor Jacob Thebault-Spieker inspired the author to come up with this project.

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