Completing the Map with Street-level Imagery
#CompletetheMap

What is it?

- Web application for image capture tracking
- Grid-based tracking of task or challenge
- Leaderboard for community coordination, recognition, and competition
- Measurement of progress based on OSM road distances

Why?

- Targeted image collection
- Dashboard for community leaders
Phase I: Uganda

- April 2017
- Over 100k images from YouthMappers
- University chapters organised Mapillary photo walks
- Leaderboard showed user progress
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Phase II: Ottawa

- August 2017
- Over 450k images from Bike Ottawa
- Open source app, zzptichka heavily contributed (Yaro Shkvorets)
- First grid-based system, metro area
- Unified leaderboard and map
- Resulting data used for OSM and bike stress map
<table>
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<tr>
<th>Challenges</th>
<th>Solutions</th>
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</thead>
<tbody>
<tr>
<td>A better way to fetch and display contributor stats</td>
<td>Leaderboard API (open)</td>
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<td>A better way to visualize progress</td>
<td>Simple grids, 5 quantiles</td>
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<td>A better way to see temporal change</td>
<td>Mapbox JS GL - filtering vector tiles by date, uniqueness</td>
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<td>A better way to measure completion</td>
<td>Distance APIs -- unique and redundant (open)</td>
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<td>Reduce server load</td>
<td>Run API calls hourly from preset GeoJSON shape</td>
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<td>A DIY method to create a challenge</td>
<td>Grid generator tool and modifiable settings script</td>
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Phase III: Brasilia

- November 2017
- Simplified layout
- More precise progress measurement
- Local users helped spread the word
- Over 86k images from OSM community
- 335km of OSM ways mapped
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Mobile version

- Web address redirects on mobile
- Compact layout
- Location icon
- Useful for mapping on the go
- Best with an external camera
Creating a grid

https://mapillary.github.io/mapillary_greenhouse/grid-generator/

- Draw rectangle, upload geojson, or choose center point
- Indicate network type, cell units
- Indicate cell size, and number of columns
- OSM Overpass API - road distances
- Variation of Geoff Boeing’s OSMNX
- Geoprocessing with Turf.js
Creating a task

- Choose a city size area or smaller
- Add `grid.geojson` to directory
- Choose start and end date
- Edit `settings.js` to add details
- Submit to Mapillary for server-side hourly processing
Verify the results

Teaching the computer

- Users can help improve algorithms
- Validating detections as accurate
- Traffic signs that are validated can be precisely positioned with computer vision
- Thousands of verifications ensure world class data quality
- Traffic signs detected in > 1 photo are added to traffic sign tiles in OSM iD
Back to the map

Using images in OSM

- **OSM iD**: resize viewer
- **JOSM**: 360 degree image support
  - Traffic sign overlay - precise positions due to computer vision
  - 326 million photos worldwide
  - More new features on the way
Enhanced Editing

Placement Tools

- Click in image to add map points
- Planned for OSM iD
- Available now in open-source library: Mapillary-JS

```html
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8"/>
<title>title</title>
<meta name="viewport" content="initial-scale=1,maximum-scale=1,user-scalable=no"/>

<link rel="stylesheet" href="https://unpkg.com/mapillary-js@2.12.1/dist/mapillary.min.css"/>
<link href="https://unpkg.com/leaflet@1.0.1/dist/leaflet.css" rel="stylesheet"/>

<script src="https://unpkg.com/mapillary-js@2.12.1/dist/mapillary.min.js"></script>
<script src="https://unpkg.com/leaflet@1.0.1/dist/leaflet.js"></script>

<style>
html, body { margin:0; padding:0; height: 100%; }
#map { position: absolute; width: 60%; height: 100%; }
#map { position: absolute; width: 40%; height: 100%; right: 0; }
</style>
</head>
```
2018 Global Challenge

- 1 - 31 May, 2018
- Ballerup, Denmark - 65k images/100km
- Kyiv, Ukraine - 52k images/109km
- Washington, DC, USA - 72k images/70km
- Funchal, Madeira - 63k images/81km
- Heredia, Costa Rica - 15k images/79km
- San Donato Milanese, Italy - 30k images/40km
- Myanmar, Hungary, Spain, Scotland, Canada, Lithuania, and more
Next Global Challenge

- 1 - 31 August, 2018
- Tweet to @mapillary using hashtag #CompletetheMap to nominate your city
- Current participants include Norway, Sweden, Brunei, Costa Rica, Colombia, Uzbekistan, Australia, Denmark, Russia, Germany, Belarus, Falkland Islands/Malvinas, Spain, USA
- Top 3 mappers receive a GoPro Hero 5 Black
- No setup required, we’ll make a dashboard
Building better maps

- Better measurement of OSM edits from images
- Better OSM editing tools for street-level imagery
- Better data extraction using computer vision and structure from motion
- Better access to machine learning data layers