How to Capture Street Photos for Mapillary

Introduction to Mapillary

Mapillary is a computer vision platform that turns street photos into 3D maps for extracting geospatial data. Photos taken with mobile phones or consumer-grade cameras can be stitched together and reconstructed within minutes of upload to Mapillary. Mapillary provides tools to extract data from street photos, including enhanced GPS positions, automated detection of objects like traffic signs, and optical character recognition (OCR).

Mapillary offers a street view alternative for projects that require recent photo coverage, frequent updates, and quick turnaround. Inspectors or GIS teams can navigate streets through Mapillary photos instead of conducting multiple inspections or deploying high-end imagery vendors over the course of months. With Mapillary data extraction tools, manual workflows can be automated to track assets and infrastructure more efficiently.

Mapillary for ArcGIS is an app which allows you to:

- view your ArcGIS layers in street photos
- mark locations of features as you navigate
- edit feature properties
- sync all changes back to ArcGIS Online.

Before you start using Mapillary, determine which photos you will be using for your project(s) and how you will obtain them. Since Mapillary can process geotagged photos from any source, you can use street photos that:

1) you obtain directly by deploying street inspection teams and/or other resources (e.g., garbage haulers, postal service trucks, contracted surveying teams) using the Mapillary app on mobile phones or other devices
2) citizens in your community contribute using the Mapillary app on mobile phones or other devices, as part of a civic engagement effort
3) are from other sources (e.g., older coverage from ground imagery or LiDAR vendors), that you have a right or license to reuse (Mapillary can help with importing)
4) may already exist in Mapillary's crowdsourced database on Mapillary.com

For (1) and (2), please follow these guidelines so your photos will be easy to process and yield the best results.

After uploading the photos, you will receive an email notification when the imagery is ready to view on Mapillary. For more information on how to use Mapillary for ArcGIS once your imagery is available, please refer to the *How to Use Mapillary for ArcGIS* guide

Capturing Street Photos using the Mapillary App

1. Download the Mapillary app on your iOS or Android phone.
2. Ideally, set out to capture photos when traffic is at its low point.
3. Avoid rain or low-light, which will degrade the quality of the photos.
4. After capturing, upload the photos to Mapillary from the app once you have established a wi-fi connection.

Capturing modes

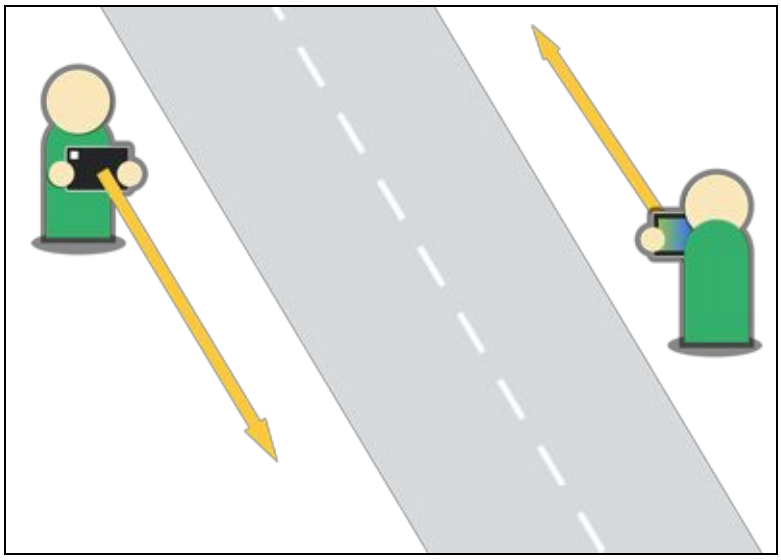
Use the walking mode for capturing photos on foot. You can carry the phone in your hand or mount it on a monopod or selfie stick to attach to a backpack. To start capturing with the Mapillary app, tap the "+" icon to start a new sequence then tap the camera icon. The camera will start taking photos at regular intervals until you tap the camera icon again.

Use the riding mode for capturing photos while driving or biking. The best way to capture photos in riding mode is to use a mount. (Please see our mount section for recommendations). To start capturing, tap the "+" sign to start a new sequence then tap the camera icon. The camera will start taking photos at regular intervals until you tap the camera icon again.

Use panorama mode when you want to capture a panoramic view of a specific spot. In panorama mode, stand still and take as many photos as you like while panning the camera around. Tap the "+" icon to start a new sequence and then manually tap the camera icon to capture photos.

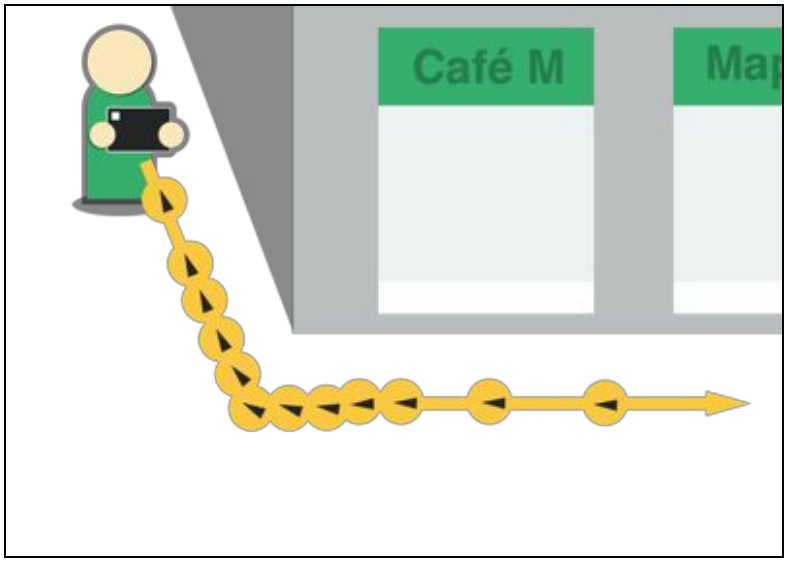
Best Practices for Capturing Photos

Streets and roads



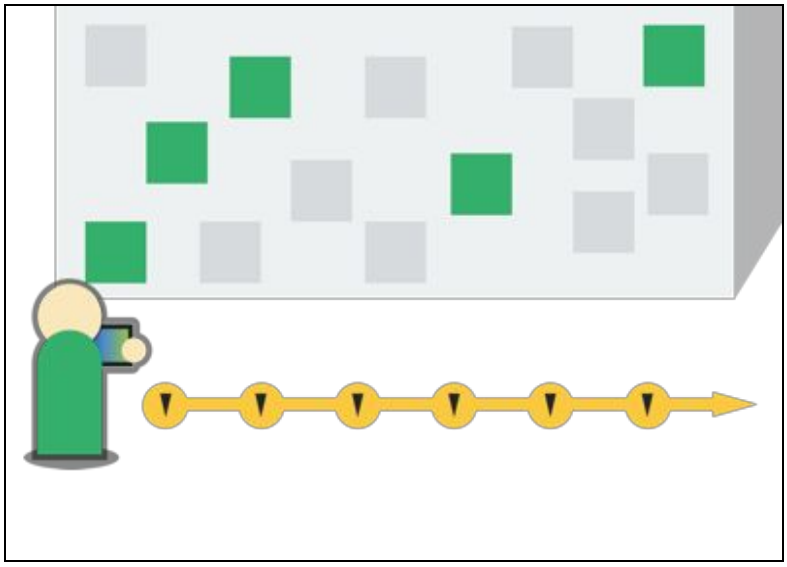
Point the camera in the direction of the street. First cover one direction, then the other. Capture more angles by pointing the camera to the left or right of the direction of the street.

Corners



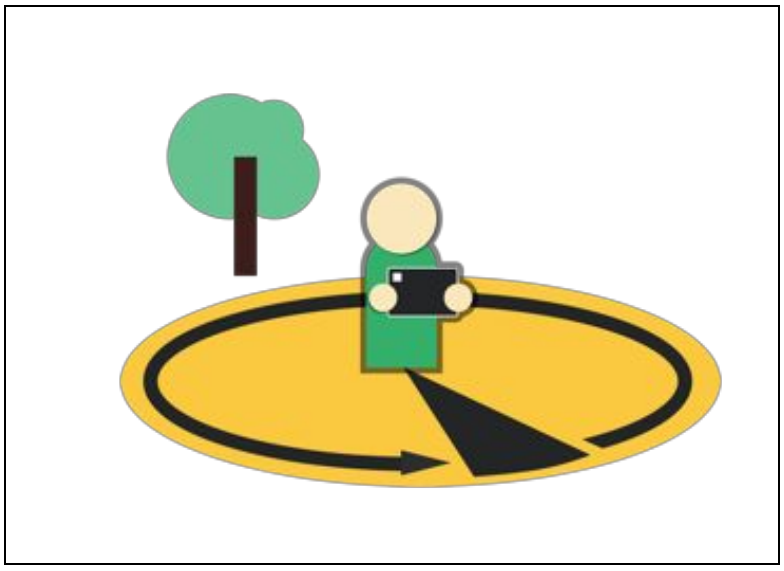
When taking corners, take more photos with lots of overlap to create smoother transitions. Select manual mode or adjust the frequency of the automatic capture to improve transitions.

Facades



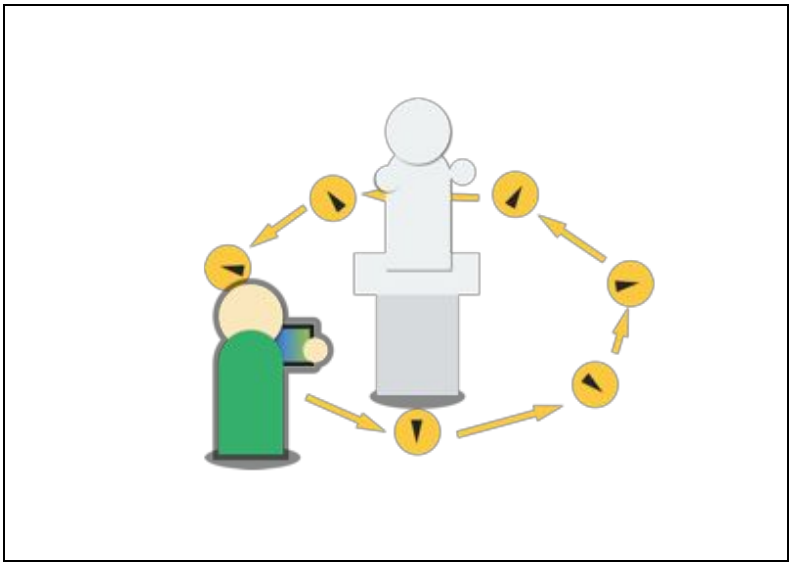
Move slowly and point the camera to the left or right of the direction of travel. This works best when the street is wide enough so large parts of the facades are visible.

Specific locations



Panorama mode is useful for capturing street intersections (and spectacular views!).

Objects



To capture a single focal point such as a statue or a small structure, orbit around it taking pictures at different angles.

Capturing “Mapillary-Ready” Street Level Photos Using Other Devices

Using action cameras with internal or external GPS trackers is a good option for capturing while biking or driving. Action cameras are better at handling motion blur and require less attention when capturing. You can upload the photos to Mapillary using our manual web uploader. Please contact sales@mapillary.com if you need assistance uploading.

Garmin Virb

The Garmin Virb has built-in GPS which removes the need for an external GPS receiver.

1. In the camera settings, set the capture mode to timer (2 seconds) and repeat ON.
2. Set the aspect ratio to 4:3 (Mapillary default; Garmin default is 9:16).
3. Turn on automatic straightening so you get less of the "fisheye” effect.
4. Check the preview in the viewfinder so that the camera is straight.
5. When driving, you can create your own dual camera setup by using your phone as the in-car capture device, positioning the Garmin externally to capture different angles.
6. For biking, keep in mind that most bike mounts designed for the GoPro should also work with the Virb.

GoPro

Current GoPro models do not have a GPS to record your location. You will need use an external GPS tracker or run a GPS app on your phone while capturing photos.

1. Set the date and time on your camera.
2. Set the capture mode to time lapse (2 second intervals).
3. There are two wide angle settings, "medium" and "wide". Medium takes better photos with less distortion.
4. Older GoPro cameras do not have any display to preview the photos. Take a sample photo first or use the GoPro app for your phone to check before you start.

360 Cameras

The following is a list of consumer-grade cameras capable of taking 360 photos or videos:

- 360fly
- 360cam
- v360
- Sphericam
- Panono
- Ricoh Theta360 or Theta S

We are actively investigating 360 camera options to evaluate the best results on Mapillary. If you are interested in 360 imagery, please contact us at sales@mapillary.com to get up-to-date information.

Mounts

The following car and bike mounts have been recommended by the Mapillary community:

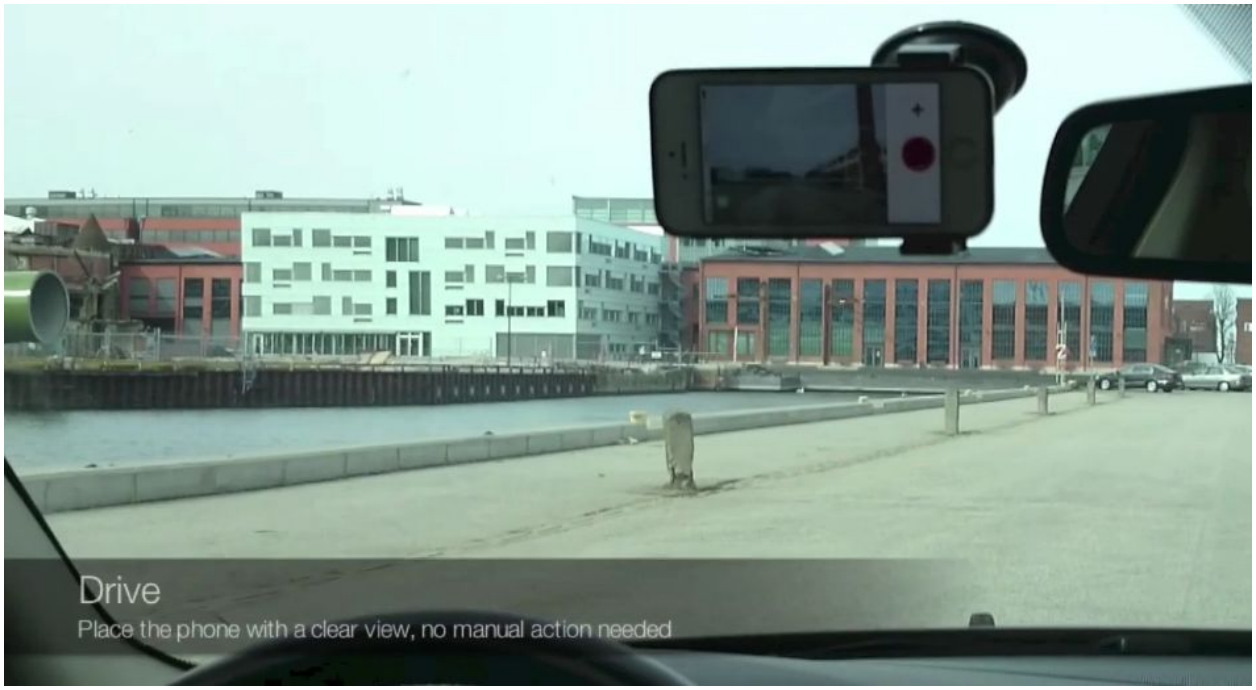
Name	Suitable For
Velocity Clip	Bike
Arcya Bike Mount	Bike
Universal Bike Mount	Bike
iPhone 6 Cykelholder	Bike
RAM Mounts	Bike, Car, Motorbike

Free Mount

Email us at mounts@mapillary.com and we will send you a free car or bike mount.


Best Practices for Mounting

Position the car mount so the phone has a clear view of the road with no parts of the car or mount showing:



The angle of your dashboard and the glass will alter the lighting and affect the glare on your capture device, so try a few different positions until you get it right for your car. (High up close to the rear view mirror is usually a good spot.) Make sure to remove bright, reflective objects on your dashboard.

Obtain a good mount for capturing while biking, since shocks absorbed by the bike can lead to blurry photos. Road bikes are more susceptible to this than mountain bikes so an action camera may be best if capturing from a road bike regularly. Ride slowly over surfaces like sand, gravel, and dirt roads

Drones

You can using drones to take photos if you fly the drone at low altitude. Photos taken below ~5 meters will blend well with photos taken at street level. Use a suitable camera that can handle vibration, e.g., GoPro or Garmin Virb. Mounting phones on drones is not a good idea because of the rolling shutter effects from vibration.

Contact

For questions and feedback on capturing photos, please email Mapillary at sales@mapillary.com.