Supplementary Material for: Camera Elevation Estimation from a Single Mountain Landscape Photograph

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1 Introduction

In this supplementary material, we provide additional images (Figures 1, 2, 3), and the details about dataset acquisition (Section 2) and user experiment (Section 3) that were left out from the main publication for brevity.

2 Dataset

The following negative tags were used while querying Flickr service during the dataset acquisition:

-birthday -party -parties -portrait -bw -abstract -macro -me -wedding -indoors -fun -kid child -children -graffiti -prom -concert -friend -family -dog -cat -face -cameraphone -woman -women -girl -lady -boy -guy -nude -fraternity -frat -gay -lesbian -live -baby -stilllife

The complete list of positive categories used to filter out inappropriate images from the collection using Places $[\square]$ classifier was as follows:

butte chalet crevasse mountain mountain_snowy pasture sea_cliff ski_resort ski_slope sky snowfield valley volcano castle wheat_field field field_wild forest_road forest_path creek river pond badlands sandbar swamp bayou marsh corn_field rock_arch

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3 User experiment

To gather the experimental data, we implemented a custom web-based application shown in Fig. 1. The task of each participant was simply to assess the elevation of the camera in meters using the slider and proceed to the next image by clicking the button. The images (Fig. 2) were presented in randomized order and the observer had unlimited time to finish the experiment. The complete set of 50 test photos which were shown to participants during the user experiment is shown in Fig. 2 along with the camera elevation and coordinates.

The experiment instructions presented to the participants prior to the experiment were as follows: Welcome and thank you for agreeing to participate in the camera elevation estimation experiment. The experiment will take approximately 15min to complete. Please, wear your prescription glasses, if you would normally wear them to work with a computer or if they improve your vision. Please read the following instructions carefully before starting the experiment. The purpose of the experiment is to assess the elevation of the camera from visual information captured in the image. During the experiment, you will see 50 images of an outdoor environment captured in various elevations. Your task is to assess the elevation of the camera for each of 50 images using the slider. When you are satisfied with your guess, click the "Next image" button to proceed to the next test image. Please notice again, that your task is to assess the elevation of the camera (i.e., the photographer), not the altitude of objects depicted in the photo. Thank you!

Additionally, each participant of the experiment completed the questionnaire. We queried about the age, sex, number of trips in the Alps, highest reached elevation, and practiced outdoor activities. From those, only the age and sex were obligatory. They revealed that 14 participants were female, 86 male, 11 to 61 years old, and the mean age was 33 years. The other queries were optional and not everyone filled them in. However, more than 60% subjects did, and we learned that our participants were rather sporty persons with a profound experience in outdoor activities. The maximal reported reached elevation was 7000m, the mean personal maximal reached elevation was 3300m.

References

 B. Zhou, A. Lapedriza, J. Xiao, A. Torralba, and A. Oliva. Learning Deep Features for Scene Recognition using Places Database. *NIPS*, 2014.

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Next image

Figure 1: The web-based interface of the user experiment.



Figure 2: Full set of 50 test photos used in the perceptual experiment (Section 4 in the main paper).



Figure 3: Test videos used in evaluation of automatic elevation prediction algorithms (Section 6 in the main paper). #V1: summit of Schuhflicker (2.215m), #V2, summit of Stubacher Sonnblick (3.088m), #V3, summit of Großglockner (3.798m).