



*Bachelor's Thesis*

# Designing and Implementing a Rephotography Application for iOS

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## INTRODUCTION

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Rephotography denotes the retrieval of the precise viewpoint used for taking a — possibly historic — photograph and capturing another image from the same spot, ideally with the same camera parameters. This allows for documentation and visualisation of changes which the scene has undergone between the two or more captures. For instance, one can present progress of construction, restoration efforts or changes in the surroundings in a visually striking manner, for instance by blending the photographs together. Figures [Figure 1](#) and [Figure 2](#) show examples.

When done manually, the photographer must attempt to find the original viewpoint usually by visual inspection of the original image and trying to match the current camera parameters — camera position, camera rotation, focal length, possibly principal point — to the original. The procedure is often carried out by placing the camera on a tripod and comparing a printout of the original image with what can be seen through the viewfinder or the camera screen. The number of parameters to match as well as the difficulty to estimate them purely from comparing images makes the process error-prone and tedious.

The advancement of mobile phones or tablet computers with integrated cameras and larger screens presents the opportunity to develop applications which can assist in this endeavour, which is impossible on digital cameras due to their closed infrastructure not permitting running user programs.



Figure 1: Residenzschloss in Dresden, destroyed during World War II, © Sergey Larenkov



Figure 2: Frauenkirche in Dresden, destroyed during World War II, © Sergey Larenkov