

Evaluating Authenticities of Photogrammetry Models

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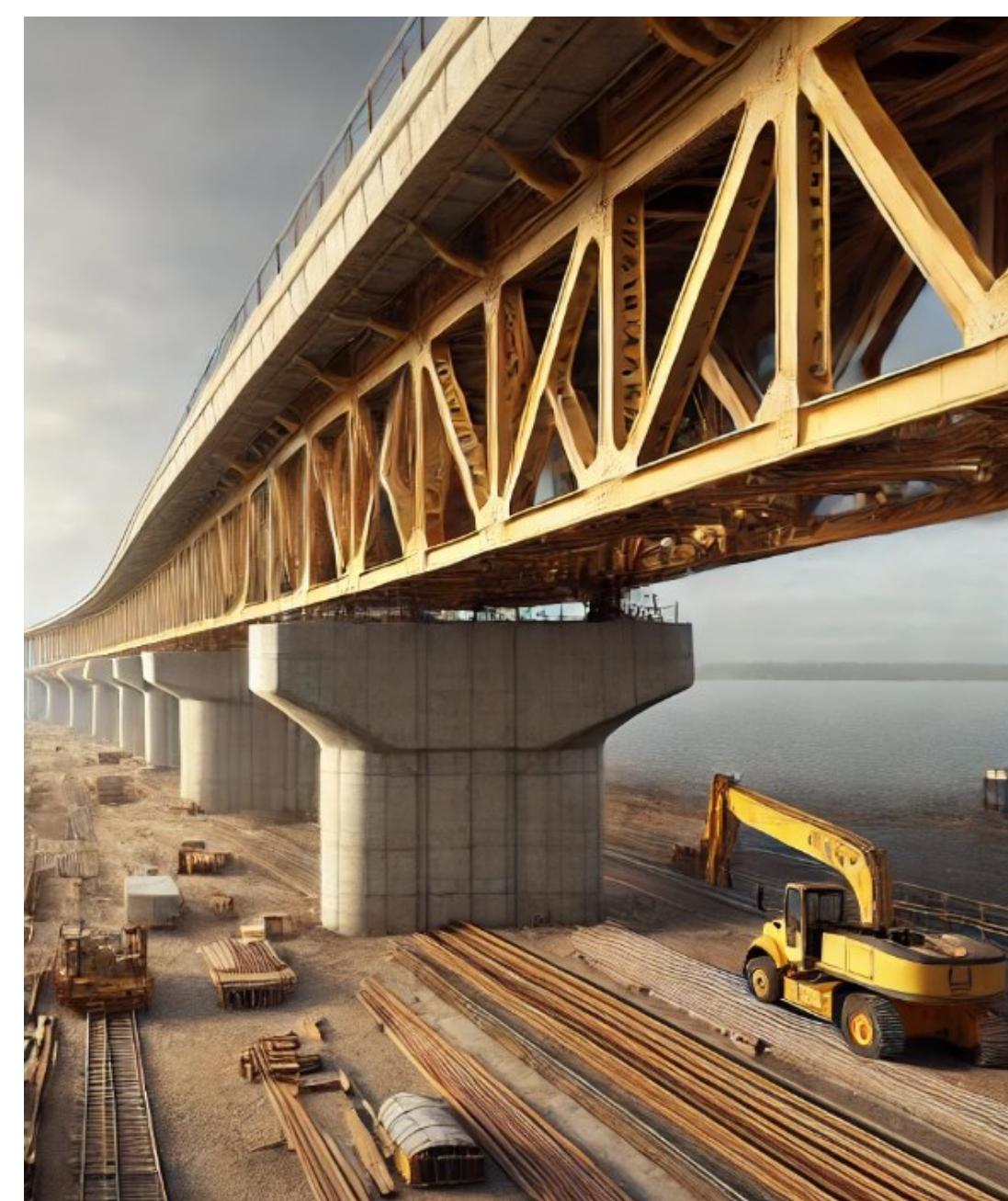
Faculty Advisor: Dr. Xiangxiong Kong

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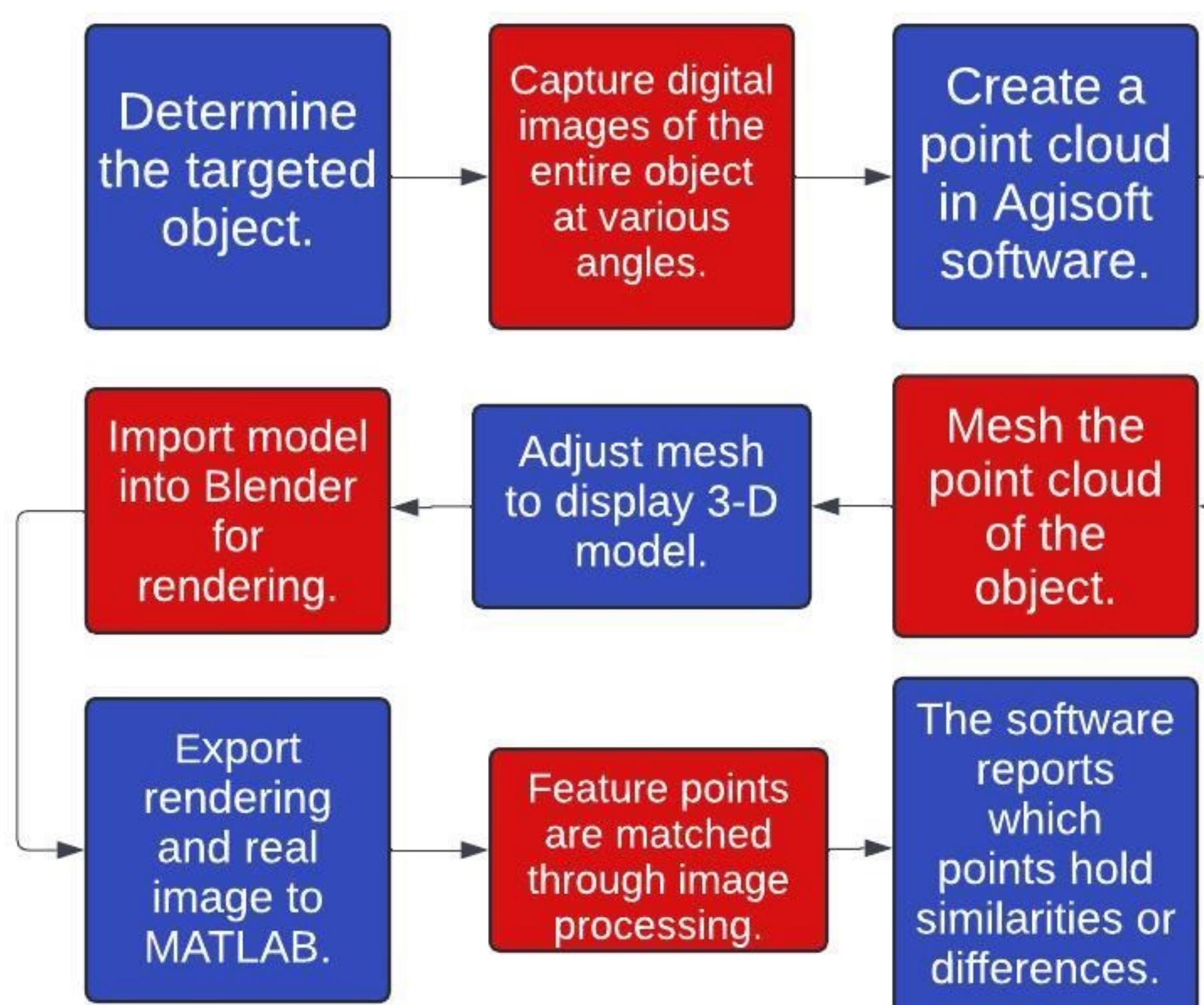
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Abstract

This research aims to determine the level of precision between a virtual model rendered from a computer graphics engine and its physical entity in the real world. The findings of this study may be helpful for engineering applications such as inspecting civil infrastructure in a virtual environment.



Methodology



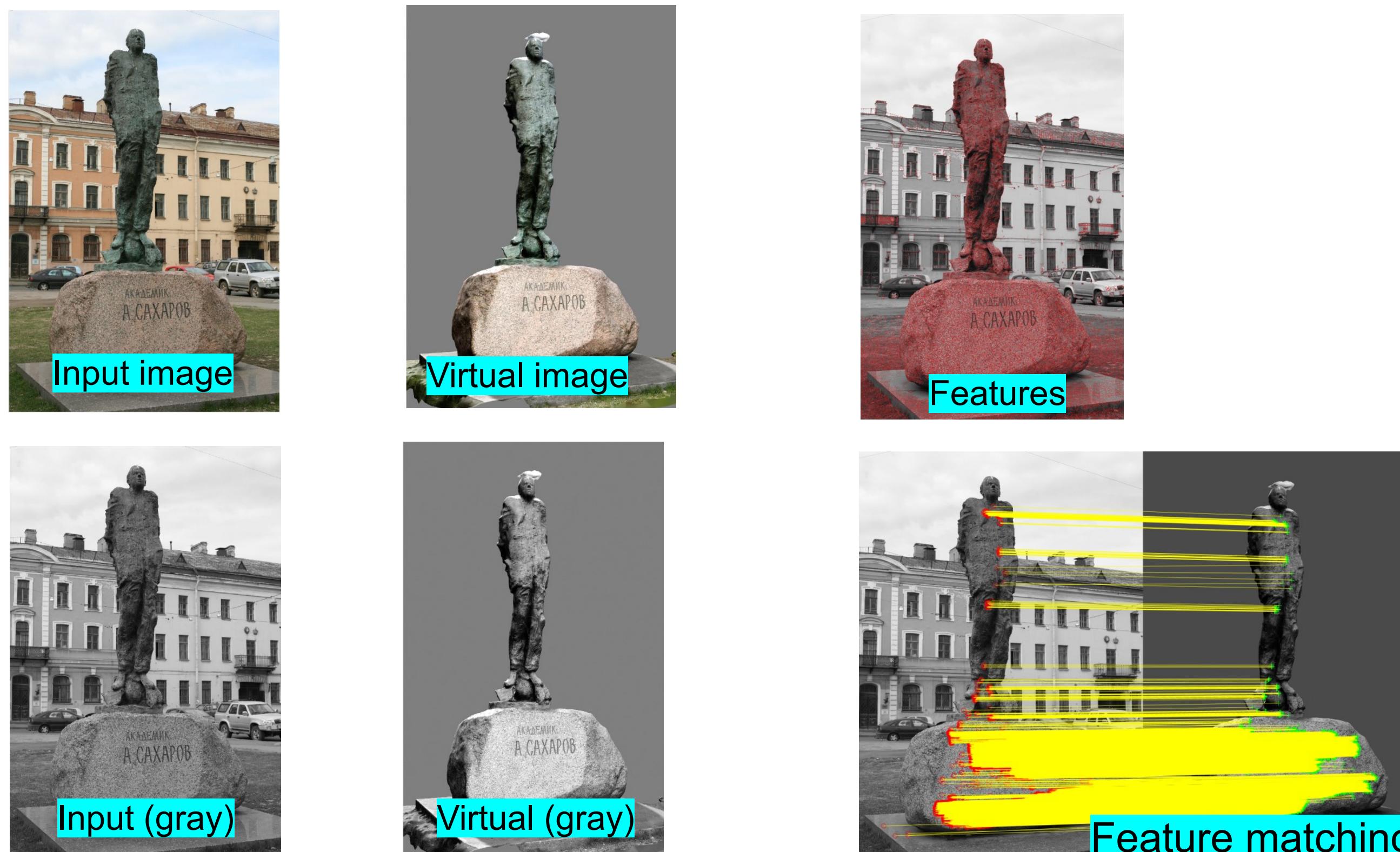
Introduction

- Photogrammetry is the science of gathering and analyzing information about an object or environment through processing digital images.
- Through the process of analyzing multiple digital photos from a variety of angles, the object in the real world can be digitally rendered in a 3D model.
- Although there are many photogrammetry applications in different engineering domains, whether a 3D model can accurately present its physical entity has not been studied.

Small-Scale Photogrammetry Test



Full-Scale Validation: MATLAB Processing



Conclusion

Small-scale validation of the cactus shows the capability of the photogrammetry technique for creating a 3D model.

Full-scale validation of the monument further shows virtual images rendered from a computer graphics engine have similar camera positions with input images. Furthermore, image processing in MATLAB indicates that matched features can be found between virtual and input images.

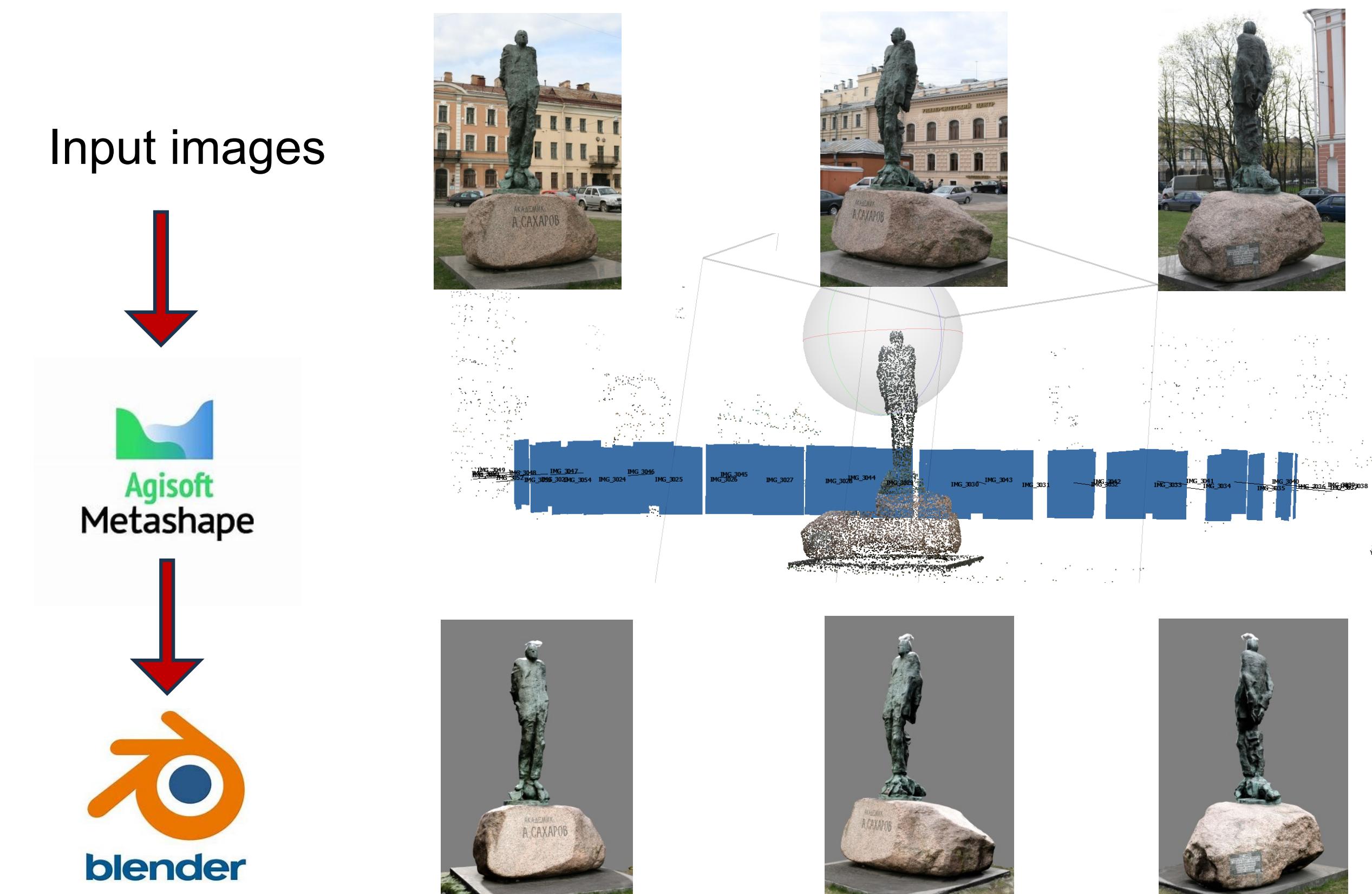
Research Question

The primary research question of this project is framed as below:

- Is a photogrammetry 3D model authentic compared with its physical entity in the real world?

Answering this research question would help researchers to better understand the applicability of photogrammetry in the virtual inspection of civil infrastructure.

Full-Scale Validation: 3D Model Reconstruction



Sponsors

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- The input images of the monument model were downloaded from Agisoft.com.
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