Automatic Alignment of 3D Objects in Augmented Reality

Augmented Reality (AR) is a user interface paradigm to seamlessly integrate virtual information into the real world view, whereby both the virtual and the real are spatially registered in 3D [1]. Thereby most AR applications additionally calls for precise alignment of the superimposed object to its real counterpart. Normally this is laboriously done by manual fine-graded adjustments in six degrees of freedom. While some approaches provide alignment by simple user interaction [2], other approaches introduce autonomous snapping techniques using physical constraints of the real world view [3]. The objective of this work is to implement an automatic alignment approach to bring a 3D virtual object in line with the real object as precisely as possible.

<table>
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<tr>
<th>Literature Project (LP): Alignment of 3D Objects in AR</th>
<th>- review and describe existing approaches for automatic alignment of 3D objects in AR [2, 3]</th>
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| Software Project (SP): Snapping AR Objects to Reality | - implement the snapping approach of Nuernberger et al. [3]  
- evaluate the snapping technique  
- identify weaknesses and discuss improvements |
| Master Thesis (MA): Automatic Alignment of 3D Objects in AR | - implement an automatic alignment approach based on the results of the software project  
- evaluate the resulted alignment accuracy  
- discuss the constraints, disadvantages and advantages of your alignment approach |

Qualifications:

- Good programming skills (C++, Unity)
- Interested in computer vision and computer graphics
- Ability to work independently

Literature:


Contact: Daniela Markov-Vetter, daniela.markov-vetter@uni-rostock.de