

Virtual Shadow Theatre
Masters 2 Internship Proposal
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Shadow plays are performances made of the shadows of hidden actors projected on a screen. In its most basic form, a single actor (the storyteller) uses his own hands to create shadows in the shape of animals, objects or characters. Recently, methods have been proposed for creating virtual shadow plays using direct interaction (Shi 2011, Leite 2012), but they require skills that need to be practiced, as in real life. The goal of the internship will be to design and implement generative methods for *automatically animating virtual hands* and generating shadow plays driven by objective goals, such as reproducing a given shape or motion ; or visualizing a given story.

This can be posed as a motion planning problem (Hsu 2005, Li 2007). The geometry of shading is well understood, but reverse-engineering the 3D hand shape necessary to create a given shadow shape is an ill-posed problem. The related problem of planning hand motion that matches hand silhouettes has been addressed in computer vision (Tomasi 2003) but generating coordinated motion of two hands remains challenging. As an alternative, we propose to create a database of recorded hand motion (using a kinect or leapmotion sensor) together with its corresponding shadow, and to build a 3D animation system that can reproduce such motions and extrapolate them to novel shapes and motions using motion graph (Kovar 2002) and machine learning (Brand 1999, Agarwal 2004) techniques.

If successful, this Master's thesis will be extended towards a PHD thesis on the topic of interactive storytelling with a virtual shadow theatre.

References

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