In recent years, the interest in quadcopters as a robotics platform for autonomous photography has increased. This is due to their small size and mobility, which allow them to reach places that are difficult or even impossible for humans.

This thesis focuses on the design of an autonomous quadcopter videographer, i.e. a quadcopter capable of capturing good footage of a specific subject. In order to obtain this footage, the system needs to choose appropriate vantage points and control the quadcopter. Skilled human videographers can easily spot good filming locations where the subject and its actions can be seen clearly in the resulting video footage, but translating this knowledge to a robot can be complex. We present an autonomous system implemented on a commercially available quadcopter that achieves this using only the monocular information, and an accelerometer. Our system has two vantage point selection strategies: 1) a reactive approach, which moves the robot to a fixed location with respect to the human and 2) the combination of the reactive approach and a POMDP planner that considers the target's movement intentions.

We compare the behavior of these two approaches under different target movement scenarios. The results show that the POMDP planner obtains more stable footage with less quadcopter motion.

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Approved for distribution by Gita Sukthankar, Committee Chair, on April 3, 2015.

The public is welcome to attend.