

A Robust Hybrid Tracking System for Outdoor Augmented Reality

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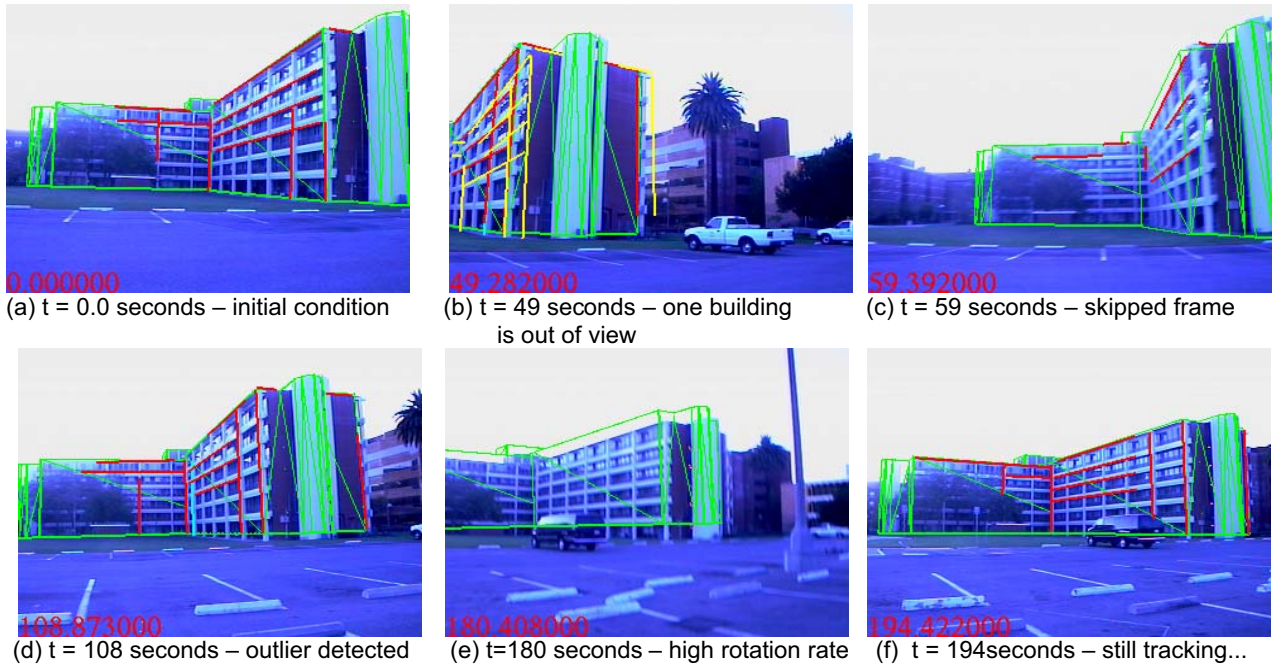


Figure 5 - Images from off-line experiments. Green wire-frame model is the 3D augmentation. Red lines are the 2D lines detected in camera images. The left-bottom number is the time stamp. (a) Two buildings are in view at the beginning. (b) One building moves out of view during tracking. The yellow lines show lines from prior frame to illustrate image displacements. (c) Vision processing is skipped after low evaluation score for 2D line detection. (d) An outlier (cyan line) is culled due to the close proximity of vertical lines. (e) Vision processing is skipped due to large rotation rate. (f) Continued tracking after 194 seconds.



Figure 7 - Images from the first real-time tracking experiment. Green wire-frame model is the 3D augmentation. Red lines are the detected lines. Left-bottom corners have frame number: time stamp. Tracking sequence lasts about four minutes. (a) Tracking starts. (b) Middle of sequence. (c) Tracking continues successfully although a near-field pole occludes the building features.

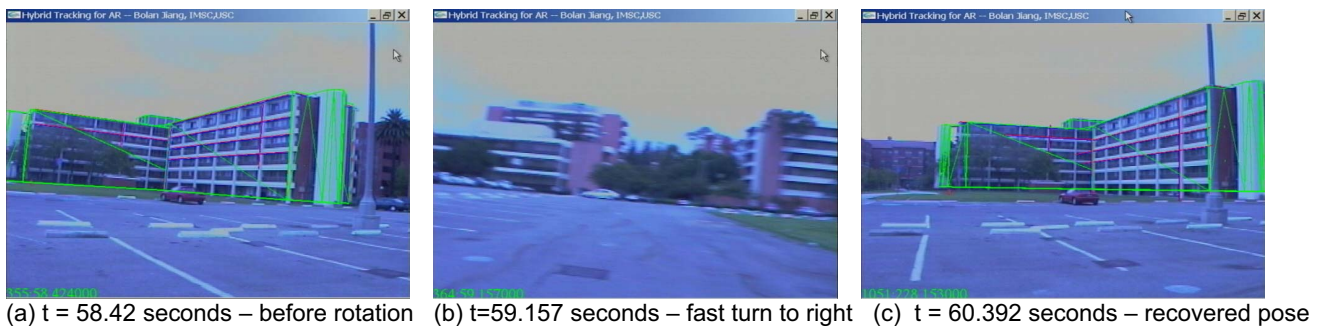


Figure 8 - Images from the second real-time experiment. The camera rotates away from the buildings. The green wire-frame is the 3D augmentation. Red lines are the detected lines. Left bottom corners show the frame number: time stamp. The whole sequence has multiple rotations in different directions and lasts about 104 second. (a) Before rotating away. (b) After the modeled buildings are out of view. (c) Rotation back and automatic recovery of accurate pose.