

A key feature of a mobile robotic system is the ability to determine its exact position. Solutions using digital cameras to accomplish this task play a major role in the current research. This thesis studies the topic of vision-based localization, proposes a solution and verifies its characteristics in series of experiments. An annealed particle filter is used to track line segments of known 3D models. The selected method of evaluation based on control points uses just the necessary part of image data and allows efficient implementation. Real-time performance, resilience to erratic motion and partial occlusion has been achieved, allowing the system to perform motion tracking over large viewpoint changes. A mapping feature is proposed as a possible extension and implemented by combining a particle filter with robust optimization.