

The thesis addresses the vast problem of mobile robot localization in the dynamic environment of a robotic contest. Method based on particle filters is developed, using only the image of a catadioptric visual sensor as its input. The advantage of this approach is an easy portability thanks to independence on other systems of the mobile robot and robustness to external influences such as robot collisions. This new method employs the composition of fast color thresholding, look-up coordinate transformation, vision-based motion prediction and Monte Carlo Localization to gain robust and reliable pose tracking using a color map of a delimited environment. Since the method uses visual data both to determine the relative motion and to verify the current location, it can cope with an unexpected events such as wheel slippage or collision.