The accuracy of vehicle locating systems based on Global Positioning System is limited when used in small area. This study aims to improve the performance based on manhole covers, one of the road characteristics that is hardly considered before. In this dissertation, the work contains dataset establishment, image processing and evaluations. The manhole covers will be detected based on the image segmentation according to texture feature and ellipse fitting and filtering. Laplacian of Gaussian filter and Gabor filter has been used respectively to extract texture features. K-means algorithm, in which the number of clusters is determined by elbow method according to Sum of Square Error, is adopted to divide pixels in the image into different regions and LeastSquares method is used in ellipse fitting processing.

The results based on two kinds of filters have been evaluated and compared using evaluations including Recall, Precision, Accuracy and F_1 score. The performance of the method with Laplacian of Gaussian is better than the other one, and for images in which the ratio of the area of manhole cover to the image size is between 8% to 20%, the method proposed performs best. The study could be improved by selecting or combining more filters in the process of feature extraction and using better- performed clustering algorithms. The reliability could be improved by the expansion of the dataset.