

# **A GMM-based Method For Dynamic Background Image Model Construction with Shadow Removal**

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## **Abstract**

In this thesis, a robust and adaptive Background Subtraction algorithm is proposed and implemented. This system mainly consists of three stages. In the first stage, we build a dynamic background image model based on Gaussian Mixture Model method and estimate the model parameters using Expectation Maximization Algorithm. Then, a hierarchical method with color and gradient statistical information to separate background and foreground is proposed. The parameters of background model are updated according to the results of separation and variation of sequence images so all events happened are recorded in the background model. The changes of environment or moving object may cause brightness variations in background scene. These effects will deteriorate the performance of system. Therefore, a shadow removal algorithm combining long-term model with short-term model is proposed. Lastly, the methods are experimented in various indoor conditions. Discussion and comparison on the results are given.