

VBASR: The Vision System
Vision-Based Autonomous Security Robot
By
Kevin C. Farney

Advisor: Joel D. Schipper

The goal of this project is to develop a computer vision system that enables a robot to navigate the hallways of Bradley University's engineering building using a generic webcam as the only sensor. Using OpenCV2.0 programmed in C++, three algorithms were developed to identify the center of the hallway and guide the robot in the correct direction. The first uses vertical lines, the second uses the trapezoidal shape formed by the corners of the floors and walls, and the third utilizes the color differentiation between the floor and walls. Test data indicates that none of these algorithms is singularly sufficient; however, combining their results they can identify the direction a robot must turn to remain in the center of the hallway with 96.6% accuracy.