



RESEARCH PRESENTATION

**Nathanael Rackley**

Student Union Building, Ballroom A

Thursday, April 7, 2016 10:10 am - 10:25 am

## **A Customizable Frogger-based Benchmark for Planning with Dynamic Obstacles**

Path planning in dynamic environments is critical in robotics applications such as self driving cars and aerial vehicles. While several algorithmic solutions have been proposed, comparisons between these methods are difficult to obtain. In this paper, we propose a standardized, yet customizable, benchmark for evaluating algorithms for moving obstacle avoidance. This task-specific benchmark is based on the environment presented in the familiar video game, Frogger, in which a frog (robot) must traverse multiple lanes of vehicles (obstacles) in order to reach a goal location. The parameters of the environmental setup allow for tunable difficulty and a concise set of metrics for evaluating and comparing algorithm performance. To demonstrate the benchmark, we compare seven existing planning methods under conditions of varying difficulty. We define several environmental parameters including number of lanes, obstacle density, obstacle spacing, obstacle speed, interlaced lanes, stochastic obstacle speed, and dynamic goal positioning. Parameter settings provide classifications of environment complexity (Easy, Medium, and Hard). The impact of these parameters on algorithm success rates and planning times are quantified and compared. Through the comparison of output metrics, we provide a direct and quantitative evaluation of the methods within the benchmark framework.

2016  
UNMCS