Research Plan
Cameron Maurice Smith
Parasol Lab, HRBB 407
Andrew Giese
Dr. Nancy Amato
Computer Science
CSE@TAMU REU
1 Research Title

Multi-robot Caravanning.

2 Description

For a group of robots with differing cababilities, the purpose of Multi-robot Caravanning is to enable the robot with more knowledge of the environment to lead the other robots.

3 Purpose

Given a group of robots with differing degrees of knowledge, their capabilities are likely to vary. Multi-robot Caravanning is useful in differentiating which robot, in a group, has the greatest capability of leading the others through an unfamiliar environment, with the addition of creating a collision-free path for the rest to follow.

4 Project Goals and Implications

The goal of this research is to enable one robot to lead additional robots through an environment with few obstacles.

5 Personal Goals

- Learn about Motion Planning.
- Gain an understanding of Multi-robot Caravanning.
- Develop skills in coding and programming under C++.

6 Approach

1. Map the 4th floor, using PRM.
2. Place markers around the 4th floor.
3. Generate a roadmap.

4. Have a robot traverse the roadmap.

5. Equip the first robot with markers, such that a second robot will be able to use the first for localization.

7 Methods and Materials

- C++
- ArUco
- OpenCV
- Player
- Asus Eee PC Netbook
- iRobot Create

8 Work Schedule

Monday through Friday, 10:00am to 6:00pm.

9 Deliverables and Dates

- Research Plan – 06/06
- Initial Website – 06/13
- Ethics Training – 06/15
- 5 Week Evaluation – 07/06
- Progress Report – 07/09
- Abstract – 07/25
- Student Poster Presentation – 07/30
• Poster Session – 07/31
• Research Paper – 08/01
• Final Website / Final Evaluation – 08/02
• Attend Brown Bag sessions (REU) – 06/07 - 07/31
• Attend mandatory workshops / seminars (USRG) – 06/04 - 07/30

10 Mentor’s Project Goals

The end goal of this research is to enable one robot – or several, depending on our progress – to be able to follow another around the 4th floor of HRBB.

11 Mentor’s Goals for Student

• Follow instructions.
• Work effectively as a team member.
• Complete all reading assignments.
• Be inquisitive.
• Provide positive feedback.
• Develop a solution capable of being expanded.