

Undergraduate Internship Program Report - Spring 2017

Nuno Mendes

June 13, 2017

This report outlines the activities developed during my internship in Carnegie Mellon University (CMU), on the Computer Science department that occurred from 16th of January to 1st of April. Professor Manuela Veloso was my host in CMU and Professor Rodrigo Ventura was my sponsor in Portugal.

Throughout the internship I delved into solving probabilistic planning problems, more specifically, Markov Decision Processes (MDPs). In order to have a familiar sandbox, I made a python interpreter of Probabilistic Planning Domain Definition Language (PPDDL) [Younes, Littman; 2004], along with the appropriate visualization tools. This package will be published on GitHub as soon as some bugs are ironed out. It should be utilized whenever one wants to quickly test their planning algorithms and it can be used for Reinforcement Learning and Probabilistic Planning tasks. Future work should focus on introducing some missing features of the description language, cleaner API and making an automated parser.

Since my goal was to extend the SSiPP probabilistic planner [Trevizan, Veloso; 2012], I implemented a Reinforcement Learning strategy from the literature, called Policy Reuse [Fernandez, Veloso; 2006], which uses previously found policies on specific planning domains to find new ones on similar domains. Unfortunately, it was too slow to be used with the former. Since this approach did not get the desired results, a technique is being developed which tries to solve the SSiPP problem in a distributed and asynchronous manner.

Related to the university, CMU has a quite unique environment. Students are genuinely focused on always learning more and professors are always available to help them. Additionally, there are multiple seminars everyday on interesting research topics and they are fairly crowded. I personally recommend Artificial Intelligence and Robotics seminars. Another great aspect is the interaction between students and the industry: every week there are multiple companies (Google, Yahoo, NVIDIA, etc.) recruiting in the hall of the Gates building. Personally, I was able to attend a networking event about Machine Learning on Google's Headquarters in Pittsburgh.

To finish, I would like to thank CMU-Portugal and its staff for this amazing opportunity. Likewise, I would also like to issue a special thank you to my host in CMU, Professor Manuela Veloso, for all the hospitality, advices and support during my short visit. Also, a big thank you to Professor Rodrigo Ventura, my sponsor in Portugal. Lastly, a big thanks to CORAL group for every good insight they gave.