University
Name and Logo

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RBE101: Introduction to Robotics
Fall-Term 2018
Instructional Material

Philosophers claim that Life is a game of chess; if so, then what are we protecting? What is the "King" in our game of chess? Money? Property? Family? There is no incorrect answer to this question, yet many people are unsure about their answer. However, the insight to this answer can bring meaning to life and can guide an individual to their nirvana. The "King" in my life is the next generation in whose hands we are going to pass on the responsibility for continuing the existence of the human species. As a part of our duty towards the "King", it is important to educate the next generation while making sure the correct information is being passed on to avoid any possibility of a checkmate.

If today's children are the future of the humanity, then robots are the future of the technological world. A robot can be identified as any machine with little or more intelligence for making human lives better and secured. Robots are not meant to replace humans as envisioned in Sci-Fi flicks or fictions. They are meant to assist humans and act as their Knights and Rooks in this colossal game of chess. The robots in future will be a reflection of the thinking of their creators, and hence, it is very important to carefully guide the future players to use this knowledge responsibly. To nurture the best roboticists, it is vital to make them great thinkers for tackling the problems and not become robots themselves. This can be achieved with more hands-on activities and discussions on open-ended problems.

Just like any other game, it is very important to outline the rules of the game with a complete explanation. For my course of Introduction to Robotics, my syllabus[1] serves this purpose of compiling the structure of the class(Syllabus[1], Course Description). Robotics is the youngest child of science, born from the union of various scientific fields. I want my students to touch base with all the parent fields, Electronics, Computer Sciences and Mechanical Sciences through a hands-on learning strategy (Syllabus[1], Course Objective). Promoting hands-on learning, this course consists of 2 lab sessions along with 3 lecture sessions each week throughout the 14-week semester (Syllabus[1], Course Structure). Coming from a country with a student to teacher ratio of 60:1, I understand the importance of student interaction and to encourage outside class communication. I have fixed two

office hours per week and additional hours as per requests (Syllabus[1], Instructor Information). My end goal of the class is to make students capable enough to compete in their own game of chess.

A description of the game is as clear as the information in the rulebook. Key points and rules are often emphasized by using bold fonts along with examples of the test cases. Similarly, in my lectures, the topics are to introduced with a real-life analogy or usage of the principles of the topic to help students understand and absorb knowledge better (Refer Video Lecture[2] for example). Every new principle/topic that is introduced in the lecture are strengthened through a comparable lab activity (Refer Instructional Material[3], Sample Lab). A player's game is not only improved by reading rules or through few sample cases, but also through reading and discussing game plays of other renowned players. On similar lines, once every week, my lectures are divided into two halves; one half with lecture session where I speak and another where students present and moderate a discussion of renowned scholarly articles in the field. This empowers students with latest trends and makes them proficient in their presentation and group discussion skills. Occasionally, I also invite my fellow colleagues and friends to deliver guest sessions on their research work and lab activity to acquaint and inspire students with advancements around them. This enables my students to think of solutions over the horizon of their current skill level and find answers on their own for a hardcore in-depth knowledge.

A game strategy can only be improved through practice and repetitive challenges. And the most important learning is through evaluation of student performance and possible ways to improve or modify the strategy to ensure victory for future games. My class evaluations contain three minor projects and one major final project (Syllabus[1], Evaluation Methods, Course Rubrics). The three minor projects are small parts of the final project and are improved through evaluations given for each minor project. Along with individual practical knowledge, a team effort is essential to fully explore and achieve a collaboration. Hence, the course projects is a joint effort between three students. With the final project submission, students have to submit a project report to explain their strategy taken to formulate a solution for the project. No knowledge is useful if it cannot be passed on or explained to an audience, therefore a final project presentation is of equal importance along with the written project report (Syllabus[1], Evaluation Methods). This teaches the students to make their project reproducible for their peers.

As an instructor, I encourage my students to not only work in a group but also against each other through a healthy competition. And to support this I like to organize a 12-Hour Dawn to Dusk Hackathon competition for competing for extra credits so that no student is left behind (Syllabus[1], Extra Credit Opportunities). Hackathon is a one or more day event where teams participate to complete a project in the given time frame. Hackathon ends with a competitive demo between teams and best-performing team wins. This hackathon takes place in the second half of the course by which time students are able to self-evaluate their grade for the course and can choose to work for extra credits. I choose to favor all my "kings" and give them various opportunity to rise in the class.

A game of chess is not only about moving forward but is also about taking a step back when required for re-strategizing towards a guaranteed victory. It is very important, but not easy, to analyze one's own blemishes. Therefore, I ask my "kings" to give me an anonymous evaluation of my teaching style, student-teacher interaction, time utilization and course organization. These evaluations are filled by students on reaching the midterm and at the end of the course. In my final evaluation, I request my students to comment on the changes in my teaching style after the first evaluation. This evaluation helps me re-strategize my teaching methods and help me work towards my dream of nurturing the best roboticists. Moreover, I plan to update my teaching capabilities by completing the Certificate of College Teaching through College of Worcester Consortium. I also plan to update my technical skills by participating in Robotics Conferences and publishing articles with my associates.

The game has just begun and I wish to help nourish my "kings" while updating myself with latest trends and skills. I believe with the teaching methods described in my statement and portfolio, I will be able to dodge all checks that come my way.