RoboticsCourseWare.org: An Open Repository for Robotics Pedagogical Materials

By Aaron M. Dollar, Daniela Rus, Paolo Fiorini

During the latter part of 2007, with funding from the IEEE Robotics and Automation Society's "New Initiatives" program, we developed RoboticsCourseWare.org, an open repository for robotics pedagogical materials. We created this site primarily for providing a resource to faculty to facilitate the creation of new robotics courses and the improvement of existing ones. The repository is a free and open educational resource for faculty, students, and hobbyists throughout the world. By providing easy access to teaching materials, we hope to facilitate the introduction of robotics courses everywhere from large institutions with established robotics programs to small colleges, ultimately transforming robotics into a core component of computer science and engineering academic programs.

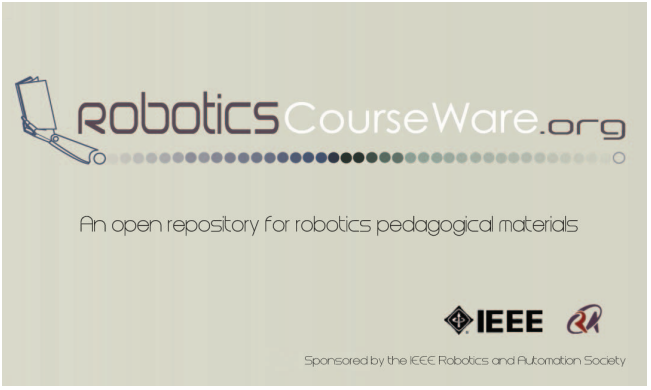
We developed the repository based on feedback from participants at the Robotics Education Workshop at the 2005 Robotics: Science and Systems Conference. More than 30 robotics faculty members from a wide range of institutions and backgrounds met for a day of presentations and discussions focusing on the key issues of integrating robotics in an undergraduate curriculum. A key outcome of the meeting was the general agreement as to the need for an open repository of robotics course materials to enable, support, and coordinate the teaching of robotics across universities. More on the outcome of this workshop can be found in the March 2006 "Education" column of *IEEE Robotics and Automation Magazine*.

Structure and Contents

RoboticsCourseWare.org is similar to MIT's OpenCourseWare (OCW) initiative, which has since expanded to more than 100 institutions worldwide (http://www.ocwconsortium.org). However, unlike the majority of OCW sites, our repository is subject specific and contains materials from many universities.

The repository is searchable, browsable, and open for downloads. No registration or login is required for accessing the posted materials. Materials are typically made available under a Creative Commons License (http://creativecommons.org), under which the end users are free to copy and distribute the content, as well as adapt it for their own uses, provided proper attribution is given and the material is not used for commercial purposes.

In developing and populating the site, we have prioritized providing materials in formats that can be easily modified and reused. These materials are intended to cover the range of primary areas of robotics pedagogy, including robot mechanics, control, motion planning, vision, and localization, with less emphasis on secondary areas and courses in which robotics is used as platform to teach concepts in other academic areas.



As of the writing of this column, we have published materials for four courses: Introduction to Autonomous Mobile Robots (Roland Siegwart, EPFL); Robotics: Science and Systems (Daniela Rus, Nick Roy, and Seth Teller, MIT); Introduction to Robotics (Rob Wood, Harvard); Motion Planning and Applications (David Hsu, National University of Singapore). Materials available for these courses include lecture slides and notes, course exercises, examinations, laboratory projects, code repositories, videos, and other media.

We also created a user forum associated with the site to allow the end users to communicate with each other. Among other things, this capability will serve as a help forum for users to assist each other with questions concerning the posted course materials.

Contributions

We are actively seeking high-quality course materials for posting on the site. Currently, we are limiting the scope of potential contributions to university-level courses created by established robotics researchers. Final published materials must conform to the terms of an open-access license such as that described earlier. Interested parties should contact one of the authors of this article or send e-mail to submissions@roboticscoursesware.org. The editors will collaborate with potential contributors to ensure that the published materials meet appropriate accessibility and quality standards, such as the removal of copyrighted material.

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It is our ultimate hope that RoboticsCourseWare.org will become a hub for robotics education that will expand to incorporate many additional resources. Along these lines, we encourage members of the robotics community who have developed resources related to robotics pedagogy that may be of interest to educators in higher education to contact us about the possibility of cross-linking materials or other similar collaborations.

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