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PerformingRobots / syllabus.md



michaelshiloh short cuts

 History

 1 contributor

 365 lines (286 sloc) | 15.5 KB

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Shortcut to [today's assignment](#)

Shortcut to [today's lecture](#)

New York University Abu Dhabi

Interactive Media Program

Course title: Performing Robots

Course number: IM-UH 2117

Credit Hours: 4

Prerequisites: None

Course website: <https://github.com/michaelshiloh/PerformingRobots>

Instructor: Michael Shiloh mshiloh@nyu.edu

Office hours: By appointment

Meeting times:

11:20-2:00 Monday

12:45-2:00 Wednesday

Session: Fall 2022

[Discord](#) [Zoom](#)

This is subject to change

This file: syllabus

Course Description

Intelligent robots living amongst ordinary people used to be a storyline relegated to the world of science-fiction. However, from military organizations and manufacturing companies to mobile devices and maid services, the 21st century has witnessed a rapid adoption of automated machinery in both the private and public sector.

Assuming robotic technology continues to proliferate, what will it mean for us to live amongst robots? What will these robots look like and how will they behave? How can we meaningfully effect their development and impact? If the history of predicting the future has taught us anything, it's that predictions are often inaccurate. We shouldn't expect that our future with robots will look or act very much like most science-fiction depictions. However, as new technologies are developed, it tends to be artists who are the first to apply these technologies in surprising, unanticipated, and often enlightening fashions.

Thus, in this course, students will explore the significance of robots through the context of art by learning about and building experimental robots for theatrical performance. We will define robots broadly and consider a wide range of machines, both autonomous and remote-controlled, for the purpose of creative expression and performance. Fundamental questions we will attempt to address include:

- Why make robotic performances?
- Beyond the element of novelty, can robotic performances be compelling?
- How can we create robots that convey meaning and emotion?
- What can robotic performers do that human performers can't? And is that important for a performance?

Course material will incorporate both theoretical and practical components. Students will be exposed to critical analysis regarding the historical and contemporary use of machines in the context of art and theatrical performance. In parallel, students will also learn about electronics, programming, robotics and mechanical construction techniques. Over the course of the semester, students will iterate through multiple robotic projects culminating with their own performative robot. The course will finish with a public performance by the robots.

You do not need to prove your brilliance, but do prove your intellectual engagement and curiosity.

Learning Outcomes:

When the course is finished, students will:

- Develop a conceptual model for the role and significance of robots in daily life
- Develop a critical understanding of the historical and contemporary use of robots in the performing arts
- Establish a basic understanding of electronics, programming, mechatronics, and simple robotics
- Gain the ability to identify, compare, and contrast examples of robotic interactivity, autonomy, and remote control
- Gain the ability to conceptualize, design, construct, program, and debug a performing robot
- Become empowered to produce a Minimum Viable Project (MVP) and adapt product dependencies (e.g. scripts) to changing abilities

Teaching Methodology

This is a production-based course that involves programming, electronics, and mechanisms work both inside and outside of the classroom. Examples will be presented and discussed throughout, and students will be required to write code, build circuits, build mechanisms, ask questions, and engage in both creative and technical discussion. The course embraces a process-oriented philosophy believing that programming, electronics, and mechatronics development are best learned by doing.

In a way, this class has three tracks:

1. Readings and discussion
2. Skills
3. Projects

Grading

10% Attendance

15% Participation

10% Journal

30% Assignments **35%** Final Project

Grading Rubric

Assignments

- 30% Technical Operation
- 30% Creativity
- 30% Clear Interaction (if applicable)
- 10% Above & beyond

Midterm and Final projects

- **Functionality: 35%** The robot must function as you have described
- **Construction: 30%** Your robot must be robust and well constructed. For example, you must be able to move it around or bump into it without it falling apart. It must not be delicate. Any movement must have sufficient power to do so reliably.
- **Creative appearance 15%** Appearance should evidence experimentation and creativity, but final result is not so important, by which I mean I don't really care how it looks as long as you've experimented
- **Intentional behavior: 20%** This is a course in performing robots, and so your robot, as an actor, must be able to act in an intentional, repeatable manner. By this I mean that if the performance calls for a certain sequence of events, your robot must be able to perform that sequence reliably.

Student-Led Discussion:

- 100% Engaged the class fully in critical discussion of the reading(s)

Documentation Posts:

- 100% Clear story told with pictures, text, code, video, sketches, etc.

Course Assignments

This course consists of theoretical readings and discussions; technical training in electronics, programming, and mechatronics; designing, fabricating, and programming a performing robot; and putting on a final performance.

Each week there's a "walk-through" element that will be covered in class, which you are expected to do on your own, and an improvisational aspect, where you take the lesson and make something unique and interesting based on the in-class review. We will spend time in each class reviewing your work, and using this as an opportunity to review concepts that are unclear, or investigate solutions to common problems. Expect to be asked to show your work every time we meet. Some classes everyone may demonstrate their work, other classes only a few students may, but always be prepared.

All of your work must be documented on your Github repository. Instructions will be given in class.

Project documentation:

You are expected to document your work on your Github repository. The purpose of this is twofold. First, it is a valuable way for you to communicate to me that you are keeping up with the work in the class. I read the site to see how you are doing. At a minimum, reference to your work is expected, as well as reference to the readings, and thorough documentation of any research. Secondly, it is a way to document your work for your own use and that of others.

You must update your repository weekly with the work you have done for class.

Document your projects thoroughly as you go; don't put it off until the end. Photos, video, drawings, schematics, and notes are all valuable forms of documentation. Explain the project at the beginning of your documentation, so that people who come to your site from outside this class can understand your work quickly.

Use pictures, drawings, and videos liberally to explain your work. Don't directly upload videos to WordPress. Use Vimeo, Youtube, or another video hosting site and embed the video in your post.

Always cite the sources of your code, the places you learned techniques from, and the inspirations of your ideas. Copying code or techniques without attribution is plagiarism. Few ideas come out of the blue, and your readers can learn a lot from the sources from which you learned and by which you were inspired. So be generous in sharing your sources.

Good documentation should include a description and illustration of your project. You should include what it looks like, what it does, what the user or participant does in response. When it's interactive, mention and show what the user does. Your explanation should give enough information that someone who's never seen the project can understand it.

You should also include a section describing how the project works, aimed at a more informed reader (your instructor, or next year's classmates). Include a system diagram to make clear what the major components of the system are and how they communicate.

The writing is expected to be well reasoned, grammatically correct, and written as if it were a paper being turned in. You should link to any relevant sources, and provide as much context as you can using images, video, audio, or other forms of expression. I'll set you all up with an account the first day of class.

Student-Led Discussions:

Throughout the semester there will be readings assigned to students to lead subsequent discussion regarding the readings (or videos).

Instructions to participants:

- If a male and a female both try to speak, let the female go first
- Don't repeat what someone has already said
- Don't just say that you liked or disliked the reading. Offer critical insight. Why did you like or dislike it? What does it connect to? Did it change your mind about something?

Instructions to leader:

You have 15 minutes. Allow 3-5 minutes at the end to wrap up, so divide the remaining 12-15 minutes into your questions or topics (say 2-5 minutes each) and move on to the next question or topic even if there are still hands raised. Make sure you know what you think the key points of the reading are, and what is important for everyone to take away from the reading. Ask questions that engage the class fully in critical discussion of the readings. Lead people to the main points of the reading through questions, but don't tell people the main points.

Final Project

Details will be provided in class

Attendance

Attendance in all classes is mandatory. Be on time and ready to start work at the posted start time. Arriving more than ten minutes late to class will count as an unexcused absence. Unexcused absences or habitual lateness will negatively impact your final grade for the class.

More than one unexcused absence will result in a 5-percentage point drop in your attendance grade per absence. After four unexcused absences, you will fail the class.

If you know you are going to be late or absent, please email me in advance. If you have an emergency, let me know as soon as you can. To receive an excused absence, you must ask in advance, and receive permission from me. Excusable absences include family emergencies, job interviews, vastly different time zones, presenting at a conference, and poor internet connectivity.

In order to receive credit for an excused absence, you must watch the recording and write about it. If you miss a discussion, you must write about the subject discussed. If you miss a lecture, you must write questions on the subject of the lecture.

Participation

Engaging in the class discussion, and offering advice and input in the class is a major part of your grade. Participating in class discussions is helpful for me to get to know you as an individual and keep track of your progress, but most importantly, it provides you and your classmates with the opportunity to share failures, successes, and insights on the work you are doing.

You are expected to show work in class. This includes working prototypes, failed assignments, things that don't work the way you expect, and so forth. Each week some time is given over to your work, expect to be called on and show something. Don't be afraid to volunteer to show what you did, or failed to do.

If you do not ask questions, I can only assume you understand the material completely. Asking questions about concepts you do not understand and showing work that did not function as expected is not a sign of failure, it is an opportunity to learn.

Laptops:

Laptop use is fine if you are using your laptop to present in class, or if we're in the middle of an exercise that makes use of it. Whenever classmates are presenting or we're in the midst of a class discussion, please keep your laptop closed. The quality of the class depends in large part on your attention and active participation, so please respect that and close your lid.

Zoom:

Have your camera turned on during class so we can all see each other. This really helps the cohesion of the class while we are doing remote learning. If you have a special reason why you need to have your camera turned off please email me with the details of why and we can discuss.

Mobile Phones:

Do not use your phone in class unless it is part of the lesson. If you have an emergency that requires you to answer your phone during class, please tell me ahead of time.

Homework exercises

Occasional homework exercises will be used to deepen understanding and familiarity with technical material such as electronics and programming. All material will be provided in the required course kit.

Projects

Details will be provided in class

Supplemental Textbooks

[Here](#)

Communicate

If you have any questions, would like extra help, or need further instruction, please reach out to me. You can communicate with me via email, sign up for office hours, speak with me before class, or after class. Please let me know if you have any concerns about the material or your progress in the course. I am very willing to help, but you have to take the first step of reaching out to me.

Academic Integrity

As set forth in NYU Abu Dhabi's Academic Integrity Policy, the relationship between students and faculty at NYU Abu Dhabi is defined by a shared commitment to academic excellence and is grounded in an expectation of fairness, honesty, and respect, which are essential to maintaining the integrity of the community. Every student who enrolls and everyone who accepts an appointment as a member of the faculty or staff at NYU Abu Dhabi agrees to abide by the expectation of academic honesty. The full policies and procedures relating to Academic Integrity may be found on the [NYUAD Student Portal](#)

Online Journal

Students must document all their work in their Github repository. This must include:

- a well organized repository with helpful file and folder names

- description of each assignment or project
- discuss what you chose to do and why
- document any resources/research/inspiration
- all code, well structured and commented
- schematics
- drawings of mechanisms
- highlight both successes and failures

The purpose of the journal is threefold. First, it is a valuable way for you to communicate that you are keeping up with the work in the class and that you are grasping the material. I read the journals to see how you are doing.

Second, the journal is a way to document your work for your own use. You must update the journal each week with the work you have done for class. You should use the journal as an opportunity to write clearly write your thoughts, questions, and analysis based on the class assignments. The writing is expected to be well reasoned and grammatically correct. You should link to any relevant sources, and provide context, such as images, video or audio, when appropriate.

Third, we all make extensive use of online resources generously created by others. By sharing our own work, we pay forward, making what we learned available in the hopes that others might benefit.