Course Overview

6.S063 Engineering Interaction Technologies
Prof. Stefanie Mueller | MIT CSAIL | HCI Engineering Group
instructor: Stefanie Mueller
Assistant Professor, MIT EECS / MechE

Research:
Human-Computer Interaction & Rapid Prototyping
TA: Jared Counts
MEng, course 6.3
enrollment
admission:
at the end of this class, we will pass around a sign up sheet.
you must sign in today to stay enrolled in the class.
enrolled / waitlisted::

I will send an email today with enrolled / waitlist notifications.
goal of this course
#1

learn

- about different **fields of interactive technologies**
- how the technology evolved over time
- how the underlying engineering concepts developed

multi-touch technology, augmented reality, haptics, shape changing interfaces...
The calculated distribution of force vectors is shown here as a collection of arrows.

multi-touch technology
augmented reality
wearable computing
brain computer interfaces
sound interfaces
shape changing interfaces
natural user interfaces
telepresence systems
[...]

what would be the benefit of knowing how tech developed over the last 30 years?

<30s brainstorming>
what would be the benefit of knowing how tech developed over the last 30 years?

• be able to predict what comes next
• invent the next big tech
• useful if you want to have a startup or for research
#2

learn

- practical **engineering skills**
- required to build those interactive technologies yourself.

laser cutting, 3D printing, electronics, breadboarding…
laser cutting
```cpp
void setup() {
  serial.begin(9600);
  bot.attach();
  bot.debug(true);
  bot.setTurningSpeedPercent(80);
  pinMode(leftWhiskerPin, INPUT);
  pinMode(rightWhiskerPin, INPUT);
}

void loop() {
  if (bot.isManeuvering()) {
    bot.setSpeed(0);
    // call our navigation processors one by one, but as soon as one of them
    // stops maneuvering we stop the rest. If we bumped into something, we sure
    // don't need snoop to tell us we have a problem!
    navigateWithWhiskers() || navigateWithCam(); // // ....
  }
}
```
computer vision with openCV
camera - projector calibration
signal processing
learn

• about how to **showcase your work**
• either for a research paper or an industry demo

photography, rotoscoping, video recording / editing,
webpage design, press training
roto scoring and information graphics
Meet the new Hue app

Designed around you, your home and your everyday life. Play around. Explore. Feel the control but let go every once in a while. Quickly and conveniently control your lights with the Philips Hue app.

Learn more >

Create rooms  Quick Control

Scenes  Daily Routines

Home or away  Wake up

Set the Scene  Widgets + Apple Watch

Download on the AppStore  GET IT ON Google Play
Freehand laser cutter creates instant flat-pack design

Video: Interactive table lets you make a jar holder
By Colin Barras

You could call it the rebirth of the 2D printer. A new device generates flat pack-like designs in seconds using a laser pointer and a laser cutter – the latest addition to the new field of "Interactive fabrication", which promises to further help ordinary consumers become product designers.

Laser Origami

One of the highlights from the Computer Human Interaction conference recently in Paris was laser origami. Among the delegates showing off the latest in interfaces and gesture control was a group demonstrating...
open ended project
you will **build** an interactive device…

and **present** it ‘kickstarter style’
Smart Cup

Amy Pavel
Steve Rubin
Elliot Nahman
Sean Chen

- empty
- coke
- water
- peppermint tea
- snapple peach tea
- san pellegrino orange
- black coffee
- coffee & cream

- Too much Coke today
- Almost at your Water target
- 6 oz. of Coffee today

Consumption
Set goals
flow
Zach Wasson
Jackie Leverett
Tim Lee
HELLOS
Keeping Firefighters Safe

- Thermometer
- Compass
- Infrared Camera
- Gas Sensor
- HD Camera
- GPS
- Tank Pressure
- Thermal Image
- HD Video
- Battery
- Temperature
- Compass/GPS
- Oxygen

Will Porter
Simon Scott
Yi Tong
Mitchell Karchemsky
open ended project: teams of 1-2 students

requirements for final prototype:
- must involve some laser cut / 3D printed parts
- must involve some custom electronics
- must involve some code you wrote and data via wifi
- must be interactive (senses user input + does sth with it)
- must solve real-world problem
deliveries #1:

- **everything required to replicate** your prototype
  - laser cut / 3D printable files
  - all electronics you used and where you bought them
  - the code that runs your prototype
deliveries #2:

- **a website** showcasing your work
  - a video in which you pitch your prototype
  - quality photos of your prototype
  - presentation graphics (e.g. a rotoscope)
  - log of your weekly progress at the bottom

http://jicorrea.com/sensory-helmet/
Opportunity

Using the navigation tools from smartphones and digital technology located in the bicycle helmet, it is possible to create ways to direct cyclists through those last hundred meters.

sensory helmet: http://jicorrea.com/sensory-helmet/
we will make time in class to
• find a team mate
• brainstorm ideas
• collect feedback
• do initial prototyping
• ...

but it’s helpful to start collecting ideas now.
project budget
• project budget of $50 per student
• + micro-controller with wifi module
• breadboard and some other basic components

reimbursement
• give Jared your receipts
• put your name on them
• you will get a check in return

free resources
• 3D printing at IDC is free
• EDS has many basic electronics on stock
laboratory assignment / problem set
pset: laser cut + electronics + computer vision code
we will do an exercise for each skill you need in class
we give you all materials on Friday including the micro-controller
grading
no written exams
50% group project
40% laboratory assignments / problem set
10% nano-quizzes

warm up for your group project
not every week, I will announce it
home works

- pass / no pass
- **small exercises**, will be helpful for group project
- **install software / setup controller**, need this for class
location
International Design Center (IDC) Engineering Design Studio (EDS)

N52-387 38-501 (this friday!)

both have a workshop!
class resources
class website with slides:
http://hcie.csail.mit.edu/
engineering-interactive-technologies.html

piazza:
post questions on piazza
do not email us!

office hours:
my office hour is Mondays, 4-5pm.
TA office hours tbd.
this is a new course!
this is the **first time we give this course**, not everything will be perfect but **we will try our best!**

(if you like to have everything perfect this is not the course for you—please come back next year.)
questions?
let’s take a 5 minute break!
let’s take a **5 minute break!**
end.