CS4930/5930 Privacy and Censorship

Spring 2019, Credit Hrs: 3, CS Dept/College of EAS

Instructor: Dr. Yanyan Zhuang Office: ENGR 184 E-mail: yzhuang@uccs.edu Office Phone: (719) 255-3062 Time: M/W 4:45pm-6:00pm Classroom: ENGR 109 Office Hrs: M/W 6:00pm-6:45pm (or by appt.)

Course Description

This class will cover two topics: privacy from the perspectives of organizations and individuals, and censorship techniques that censors use to monitor citizen's Internet use and block unwanted network traffic. You will build your knowledge about privacy and censorship by learning about technology-related privacy concerns and mitigation, for example: the different techniques that third parties use to track website visits, privacy risks on smartphones; and the (in)famous ways how censors block Facebook, YouTube, Twitter, or other unwanted Internet access, using techniques such as DNS injection, content filtering, as well as some popular tools that can provide anonymity and censorship circumvention, like Tor.

This course is intended primarily for graduate students and advanced undergraduate students (juniors and seniors) with some technical background. Topics of this class include:

Privacy:

- Internet monitoring and web tracking: cookies, third-party ads, social networks, etc.
- Location tracking: WiFi and Bluetooth fingerprinting
- Differential privacy for avoiding database de-identification
- Smartphone privacy concerns: e.g., accelerometer can be used to steal passwords

Censorship:

- Methods used for implementing Internet censorship around the globe: DNS injection, content filtering, deep packet inspection, etc.
- Censorship of social media: the use of social networks for political agendas
- Circumvention/anonymization tools and technologies: an arms-race between censors and Tor, VPN, etc.

Prerequisites

- CS2080 (Programming with Unix)
- Knowledge about UNIX/Linux systems, Operating System, TCP/IP stack, programming language C/Python/Java.
- If you want to take the class without the prerequisite, you have the get the permission from the instructor. If approved, it is your responsibilities to make up for the required background.

Text and Reference Books

There is no textbook for this class. However, there will be weekly readings about relevant topics from prestigious conferences and journals.

Assignments

There will be (weekly) reading assignments and 2-3 homework assignments. Reading assignments (45%):

- Each week, except the last week, there will be associated readings (1-2 papers). The discussion for the papers will be led by two students, an advocate and a skeptic;
- Advocate and skeptic are in charge of leading the discussion for a paper. You may or may not choose to use slides. Give a concise summary of the reading and pose questions to dig deeper into why the paper was written, what can we take away from it, its strengths and weaknesses, etc.
- Everyone writes a review of each of the assigned papers.

Homework assignments (30%):

- There will be 2-3 homework assignments based on the class materials;
- Homework assignments are to be completed individually.

Project

There will be a final project (25%). The project must address a non-trivial problem relevant to the class. The project can be done in a team of 2 or 3 students. Here are some projects ideas (do not limit yourself to these!):

- Take 100 million image dataset from Flickr (publicly available) and try to "attack" it from privacy point of view;
- Scrap privacy related new articles from last two decades and then apply techniques like machine learning to group them into incidences and classify incidences into types of violations;
- Statistical attacks against simulated Tor traffic in shadow (a simulator for Tor https://shadow.github.io/);
- Learn about how anti-tracking browser plugins like Privacy Badger or Umatrix, and come up with improvements.

The project deliverables include a project description and source code (with dataset if any).

Exams

No exams.

Grading

Grading Scale

- A: [90, 100], A-: [87, 89]
- B+: [84, 86], B: [80, 83]
- C+: [75, 79], C: [70, 74]
- D+: [65, 69], D: [60, 64]
- F: below 60

Course Policy

• Academic Dishonesty:

Students must follow the collaboration guidelines for the projects. All assignments and tests are individual. Students must behave ethically at all times. Academic dishonesty will be severely punished, and will extend beyond failing the class. For more details, see the Code of Conduct:

https://www.uccs.edu/dos/student-conduct.html

- Last day to add full semester length courses WITHOUT instructor approval 1/30/2019.
- If you have a disability for which you are requesting an accommodation, you are encouraged to contact the Disability Services Office within the first week of classes. The Disability Services Office is located in Main Hall #105 (Phone number: 255-3354).
- Students are expected to attend all lectures. However, each student is allowed one absence. For each extra absence, the attendance percentage is reduced proportionally.
- Late submission of homework and project assignments will have the following penalty (days late / points off). There will also be a final cut off date where all submissions will receive 0 points after the date.
 - 1-3 days / -5
 - 4-7days / -15
 - 8-14 days / -25
 - 14-21 days / -40
 - 21+ days / -100
- Under extreme non-academic circumstances, such as illness, exceptions can be made in above attendance, submission, and exam policies. You have to provide sufficient and convincing proof, e.g., documents from the doctors.