COSC6378: Computer and Network Security

Final Project

1. **Introduction**

The purpose of this project is to give you experience in researching the current computer and network security technology. This is a team project, and each team can at most have 2-3 members. You will select your own interest from one of the security topics below, and write an in-depth survey paper.

What is survey?

The goal of a survey is to give a broad, structured overview of a specific area. Here are two scenarios in which you may have to prepare a survey after you graduate:

- You are working for a company that is exploring a new security technology or market, and employees and management are very not very familiar with this new area. You could be asked to prepare a 30-minute presentation to introduce to area, highlighting different approaches, challenges, opportunities, and risks.
- You decided to write your first paper on a research project you just touched. You need to have an overview on the topic, which could be done by writing a survey of existing work in the areas relevant to your research.

A survey is different from a set of paper summaries. The survey should focus on presenting the "big picture" using the papers as examples. For each topic, we generally expect that you will have to consult additional materials. Examples may be papers cited in the original papers, material found on the web, or results from online libraries, like IEEE Explorer, or the google scholar. In addition, we have provided an initial set of papers for you to start for reading.

Besides giving you experience in preparing a survey, this project should also help you sharpen your critical thinking skills. You should not blindly accept all statements you read (including in the papers cited below) simply because they appear in print in a refereed publication. While the material will generally be technically correct, parts of the papers may be biased or may ignore relevant related work (typically by accident), or the claims may overstate the results that are presented. These problems most often show up in the evaluation section of the papers. The evaluation is sometimes flawed (e.g. uses inaccurate simulators, ignores certain sources of overhead, or presents graphs in misleading ways) or may be very limited in scope (e.g. collects results on one testbed that may not be typical, but then makes very broad claims). Your assessment of the accuracy of the results should be reflected in the survey, i.e. the survey must present your perspective on the state of the art in the area.

You can consult any material as long as you cite the source. However, you cannot copy text from other papers or the web, **since that is plagiarism**. The only exception is that you can quote short excerpts or figures from other material, assuming you make it clear that it is a quote and you cite the source. A good example of survey paper is given in this project as reference to write your own survey.

In order to write that survey paper, you need to:
- Decide the area/topic you are interested in

- Find a set of recent major research papers in that specific area (most of the papers should be within 6 years)
- Read these papers so that you get a good understanding of the problem addressed, related work, proposed solution and contribution significance.
- Most importantly, you must be able to describe in your own words how the surveyed works compare (trade-offs, benefits, complexity, performance).

2. **Specifications**
   - Topics you can choose
     - o Applying Blockchain in Security or Privacy
     - o Android Security
       - ▪ CopperDroid: Automatic Reconstruction of Android Malware Behaviors
       - ▪ Crowdroid: behavior-based malware detection system for Android
     - o Wireless Network Security & Privacy
       - ▪ Enhancing Source-Location Privacy in Sensor Network Routing
     - o Key Distribution & Management
       - ▪ A secure and privacy-preserving key management scheme for cloud-assisted wireless body area network in m-healthcare social networks
     - o Cloud Security & Privacy
       - ▪ Maneuvering Around Clouds: Bypassing Cloud-based Security Providers
       - ▪ Fuzzy Keyword Search over Encrypted Data in Cloud Computing
     - o Internet of Things
       - ▪ Security, privacy and trust in Internet of Things: The road ahead
     - o Any other security topics you are interested in
   - Resources for getting papers
     - o Google scholar (cite times)
     - o IEEE Xplore (Access on campus)
     - o Google/Bing/so on. search engine
   - When you read a paper, remember to make comments for the following questions
     - o What is the problem addressed or motivation?
     - o Related works?
     - o What are the main contributions?
     - o Comparison with alternative solutions: your opinion on weaknesses, strengths and ways to improve?

3. **Survey paper format and layout**
   - You will write the survey using the attached template in this project, the survey itself must have **6 pages**.
   - **Abstract**. 150-250 words
   - **Introduction**. Describe briefly the problem addressed and its significance. State your paper's objectives and scope. Summarize the main contributions surveyed.
   - **A section for background**. Describe the related fields or technologies.
   - **A section for each solution**. Divide all your researched solutions into different categories. For each solution, describe author assumptions, models, the approach used to solve the

problem, methods used and approach for validation. Summarize performance results. Provide your own assessment of the contributions each paper makes and give your own thoughts on how this work can be extended or improved. Do not forget to list references.

- **A section where you compare all papers**. Contrast assumptions, methods used for reaching a solution, benefits/drawbacks, and validation methods. Compare solutions significance (is it a new approach or just an improvement?) and show how these solutions relate.
- **Conclusions**. Draw your conclusions on the problem relevance, contribution significance, and potential for improvement/extension.
- **References**.

4. **Deliveries**

This final project consists of several presentations, reports, and a research survey paper

1) The research survey paper has to be turned in through Canvas before **12/9/2020, 11:59:59pm.**
2) The presentations are scheduled as follows:

Date, and Day	Presentation
Week 6	Project plan, Presentation (10 mins + 5 mins questions) The project plan should include: a. Project title b. Student name(s) c. State the topic of interest and describe briefly d. List selected papers e. Identify clearly the contributions for each participating student
Week 11	Presentation (10 mins + 5 mins questions) It should include: a. Background of your survey. b. Categories that you have after your research and the basic logic behind it.
Week 13	Presentation (10 mins + 5 mins questions) It should include: a. Solutions of each category. b. Comparison and basic analysis of categories/solutions
Week 15	Final presentation a. Prepare with slides that summarize the content of your survey paper. b. 20'-25' talk time, 5' for Q & A

Attached Materials:

1) Example survey:
   a. A STUDY OF INDEX POISONING IN PEER-TO-PEER FILE SHARING SYSTEMS (**example-P2P_poisoning.doc**)
2) Survey writing template (**survey_format.doc**)