COM S 413/513: Homework 10 [Reading]
Dataflow Analysis-Inspired Deep Learning for Efficient Vulnerability Detection

November 16, 2023

Learning Objectives:

In this homework, students will

1. learn and understand terminologies related to vulnerability detection, dataflow analysis and deep learning
2. learn the research ideas at the intersection of program analysis, software engineering and deep learning
3. learn the state-of-the-art research on the topic of AI for program analysis tasks
4. exercise technical reading and writing

Instructions:

1. Total points: 18 pt
2. Early Deadline: Nov 29 (Wed) 11:59PM
3. Deadline: Dec 1 (Fri) 11:59PM
4. How to submit: Create a single PDF with answers and upload it to Canvas.

Question:

Read the paper and answer the following questions based on the paper.

1. (4 pt) When applying a deep learning tool to vulnerability detection, what is the input and output of the tool? (Word limit $\leq$ 50 words)
2. (4 pt) Why is deep learning for vulnerability detection hard? (Word limit $\leq$ 100 words)
3. (3 pt) Name three deep learning models that can detect vulnerabilities.
4. (4 pt) Why do we need to develop *abstract dataflow embedding* and not directly use the dataflow information taught in class? (Word limit $\leq$ 250 words)
5. (3 pt) How this work can be further improved? Document your thoughts.