BRNO UNIVERSITY OF TECHNOLOGY
FACULTY OF INFORMATION TECHNOLOGY

Master's Thesis Assignment

157228

Institut:	Department of Intelligent Systems (DITS)
Student:	**Beránek Tomáš, Bc.**
Programme:	Information Technology and Artificial Intelligence
Specialization:	Machine Learning
Title:	**Určení spolehlivosti výsledků statické analýzy pomocí strojového učení**
Category:	Artificial Intelligence
Academic year:	2023/24

Assignment:

1. Get acquainted with Infer, a tool for static analysis and bug finding in software.
2. Investigate options of applying machine learning algorithms in the context of code analysis.
3. Obtain a data-set containing issues reported by Infer accompanied with the information whether they represent a true positive or not.
4. Design and implement a system that converts the dataset obtained in Step 3 into a format that can be processed by graph neural networks.
5. Propose and implement an approach based on graph neural networks (using the dataset obtained in Step 4) whose goal will be to assess the likelihood that an issue reported by Infer represents a true positive.
6. Evaluate your solution on at least 2 different open-source projects.
7. Summarize and discuss the achieved results and their possible further improvements.

Literature:

- Facebook Infer: https://fbinfer.com/
- Cao, Sicong, et al. "Bgnn4vd: constructing bidirectional graph neural-network for vulnerability detection." *Information and Software Technology* 136 (2021): 106576.
- Y. Zheng et al., "D2A: A Dataset Built for AI-Based Vulnerability Detection Methods Using Differential Analysis," 2021 IEEE/ACM 43rd International Conference on Software Engineering: Software Engineering in Practice (ICSE-SEIP), 2021, pp. 111-120.

Requirements for the semestral defence:
The first three points of the assignment and at least the beginning of work on Point 4.

Detailed formal requirements can be found at https://www.fit.vut.cz/study/theses/

Supervisor:	**Vojnar Tomáš, prof. Ing., Ph.D.**
Consultants:	Grác Marek, Mgr., Ph.D. Malík Viktor, Ing.
Head of Department:	Hanáček Petr, doc. Dr. Ing.
Beginning of work:	1.11.2023
Submission deadline:	17.5.2024
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