ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

SUPERVISOR'S OPINION OF FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	**Online Advertising Fraud Detection Via Network Traffic Monitoring**
Author's name:	**Bc. Lada Ondráčková**
Type of thesis :	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Computer Science
Thesis supervisor:	Ing. Martin Grill, Ph.D.
Supervisor's department:	External – Cisco Systems

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **challenging**

Evaluation of thesis difficulty of assignment.

The research assignment is challenging as well as relevant. The detection of malware infections in computer networks by analyzing network traffic is a very popular topic in the field of network security. Even though the presented research focuses solely on one specific malicious behavior related to ad frauds it will undeniably resonate within the security community. The main prerequisite of the ad fraud detection is the identification of ad related network traffic that by itself represents a complex problem.

Satisfaction of assignment **fulfilled**

Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.

Thesis fulfills all the objectives defined in the assignment. Beyond the assignment, the student implemented a detection method for the ad related traffic to overcome limitations of existing pattern matching techniques that were not identified during the creation of the assignment. This task itself is of a great complexity as the online advertisement infrastructures are complex and the ad providers are typically using techniques to avoid signature-based detection that is implemented in many ad-blocking tools.

Activity and independence when creating final thesis **B - very good.**

Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.

The student was periodically consulting her progress that was in the beginning of the work slower than expected, probably caused by the learning of new programming language. She was diligent, coming for the consultations well prepared with a specific questions or results. The consultations were more frequent when she was solving harder problems.

Technical level **A - excellent.**

Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.

Student demonstrated a solid understanding of the large-scale data mining techniques needed to analyze network traces collected over longer period of time from a large number of networks. She analyzed the process of web advertisement loading and proposed an algorithm to extend the set of known ad-related network servers to get better coverage of the ad-related network traffic. The student familiarized herself with the main principles of network anomaly detection, proposed a way how to assess the anomaly of the observations and thoroughly evaluated the proposed approach. Additionally, she showed an ability to effectively analyze network traffic traces and decide its maliciousness in the final evaluation.

Formal and language level, scope of thesis **A - excellent.**

Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.

The thesis is written in English containing only few typos that do not affect its overall intelligibility. The thesis is well structured and correctly presented. The figures, schemes, and tables are shown properly and placed in thesis critical parts to allow for easy understanding of the presented concepts. Individual chapters and sections are in logical order well-capturing the problem to be solved and the proposed approach.

Selection of sources, citation correctness	**A - excellent.**
Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.	
All resources are well cited throughout the thesis. Student reviews some of the relevant existing network ad fraud detection methods in the related work chapter.	

Additional commentary and evaluation
Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.
Please insert your commentary (voluntary evaluation).

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation.

The student demonstrated the ability to analyze the problem, review the state-of-art methods with respect to the problem and propose novel method. She successfully identified weaknesses of the proposed algorithms and modified them to provide optimal results. Additionally, she shown to be able to quickly learn new programming language and techniques for big data analysis.

I evaluate handed thesis with classification grade **A - excellent.**

Date: **7.6.2018** Signature: