Alesia Chernikova

chernikova.a@northeastern.edu https://achernikova.github.io/ (781) 350-0139

Research Interests

Adversarial machine learning, deep learning, network science, mathematical modeling, network and cloud security.

Education

Doctor of Philosophy in Computer Science Fall 2017 - Present
Northeastern University, Boston, MA
GPA: 3.9, Advisor: Dr. Alina Oprea
Khoury College of Computer Science Fellowship (2017-2018)

Bachelor of Science in Applied Mathematics Fall 2009 - Spring 2014
Belarusian State University, Minsk, Belarus
GPA: 3.8, Advisor: Dr. Vladimir Malugin
Thesis: "Development of risk management algorithms based on derivatives contracts"
National Bank of the Republic of Belarus Merit Scholarship (2014-2015)
BSU Excellence Merit Scholarship (2009-2014)

Research Experience

Research Assistant Fall 2017 - Present
NDS2 Lab, Northeastern University, Boston, MA
Conducting research on:

- Robustness of deep neural networks in constrained environments and self-driving cars domain.
- Detecting malicious behavior through network data analysis.
- Modeling the behavior of self-propagating malware in the networks with the help of compartmental models of epidemiology.
- Improving network robustness in the face of self-propagating malware by leveraging spectral graph theory.

Applied Scientist Intern May 2021 - September 2021, May 2020 - August 2020
Amazon Web Services, AWS-ESS Detective, Boston, MA

- Performing research in cloud security for lateral movement detection using Bayesian statistics and network science perspectives.
- Creating scalable algorithms for tracing the activity in the cloud environment.

Research Assistant January 2012 - December 2013
Belarusian State University, Minsk, Belarus

- Participated in the research project for the estimation and evaluation of credit rankings of national enterprises using mathematical, statistical, and econometric methods and models based on the data from the National Bank of the Republic of Belarus enterprise monitoring systems.

Professional Experience

Senior Software Engineer November 2013 - July 2017
IBA IT Park, Minsk, Belarus

- Participated in the development and improvement of the IBM GSAR web portal.

Leadership Experience

CS4100: Artificial Intelligence Teaching Assistant Fall 2022, Fall 2023
Northeastern University, Boston, MA

- Grading exams and homework, holding office hours, assisting Professor in homework and exam preparation, advising students regarding final projects.

Publications

Alesia Chernikova, Nicolò Gozzi, Simona Boboila, Nicola Perra, Tina Eliassi-Rad, and Alina Oprea. **Modeling Self-Propagating Malware with Epidemiological Models.** [Applied Network Science 2023]

Alesia Chernikova, Nicolò Gozzi, Simona Boboila, Priyanka Angadi, John Loughner, Matthew Wilden, Nicola Perra, Tina Eliassi-Rad, and Alina Oprea. **Cyber Network Resilience against Self-Propagating Malware Attacks.** [European Symposium on Research in Computer Security (ESORICS) 2022]

Alesia Chernikova and Alina Oprea. **Fence: Feasible evasion attacks on neural networks in constrained environments.** [ACM Transactions on Security and Privacy 2022]

Alesia Chernikova, Alina Oprea, Cristina Nita-Rotaru and Baekgyu Kim. **Are Self-Driving Cars Secure? Evasion Attacks against Deep Neural Networks for Steering Angle Prediction.** [IEEE Workshop on the Internet of Safe Things collocated with IEEE S&P 2019]

Alesia Chernikova and Vladimir Malugin. **Algorithms for interest-rate swaps hedging**. In the 70th undergraduate, graduate, and postgraduate students scientific conference of Belarusian State University (vol. 1, pp. 242 – 245).

Relevant Skills

Programming Languages: Python, Java, Scala, Javascript, C/C++
Frameworks and Libraries: PyTorch, Tensorflow, Keras, Spark