

Final exams on June 6th (Monday) - at 14:30

Candidates: *Mohamad Almgerbi, Giulio Rigoni, Hafiza Maria Maqsood, Mirko Staderini.*

Where: Dip. di Matematica e Informatica U. Dini - Firenze - *Aula Tricerrini*

Link for joining remotely: <https://meet.google.com/dbg-nupc-aby>

Program:

14:30-14:40 Welcome

14:40-15:15 *Mohamad Almgerbi*

15:15-15:50 *Giulio Rigoni*

15:50-16:00 Short break

16:00-16:35 *Hafiza Maria Maqsood*

16:35-17:10 *Mirko Staderini*

17:10-17:20 Closing

Talk Abstract:

*** Mohamad Almgerbi. Stop N-gram Removal and Topic-Similarity to Improve Topic Modeling.**

In recent years, topic modeling has been increasingly adopted to find conceptual patterns in large corpora of digital documents to organize them accordingly. The success of any topic modeling algorithm depends on two fundamental steps: data preprocessing and determining the optimal number of topics. This presentation will cover two different approaches: Stop N-gram Removal, a novel preprocessing procedure based on the elimination of a dynamic number of repeated words in text documents and Topic-Similarity, a new way to determine the optimal number of topics which automatically measures the similarity between the meanings of the words in each topic. I will further discuss the success of these approaches and limitations of this study.

*** Giulio Rigoni. Drones Applications, Safety and Security Issues.**

The introduction of drones has simplified life in different daily tasks, but at the same time, they are subjected to attacks carried on by malicious users that can turn them into weapons, thus harming people and causing damage.

Consequently, one of the most current uses of drones, the delivery of packages, is studied in the initial part of the thesis from different perspectives and scenarios, especially considering the wind. From the drones' deployment, security and privacy issues are then considered starting from an overview of the possible attacks, followed by an affordable drones detection framework for compromised drones.

***Hafiza Maria Maqsood. Development of Safety-critical systems with agile software development process models.**

Agile methodologies are widely adapted for software development processes. However, for safety-critical systems there is still need of research and experimentation before they can be applied to the development phases in a more efficient way.

This thesis highlights the major areas of concern or in other words, the points of conflict between agile and safety-critical systems. Along with that it addresses some of major problems for adaption of agile in development of safety-critical systems. Further it proposes solutions for possible applications of agile process models for development of safety-critical systems by combining traditional approaches and agile approaches for system development.

** Mirko Staderini. **Towards the Assessment and the Improvement of Smart Contract Security.***

The development of smart contracts has increased the application areas of the Blockchain. Security is one of the most important issues considering that smart contracts cannot be patched once they are deployed into the Blockchain. Focusing on one of the main platforms for contract development (Ethereum) and its primary language Solidity, this presentation proposes an approach to evaluate and improve the security of smart contracts. We initially propose a language-independent systematisation of vulnerabilities, the basis of our research. Then, through the use of static analysis, we perform an assessment of smart contract security.

Finally, we investigate three possible approaches to improve security: combining several tools, identifying top-priority vulnerabilities that escape detection, and determining where vulnerabilities are most likely located.