UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II

itee PhD
information technology
electrical engineering

DIETI. UNINA

UNIONE EUROPEA
Fondo sociale europeo

Ministero dell'Università e della Ricerca

PON
RICERCA E INNOVAZIONE
2014 - 2020

Simona De Vivo

Enhancing IoT Security and Efficiency Through Green AI Techniques

Tutor: **Prof. Domenico Cotroneo**

Cycle: XXXVII

Year: Second

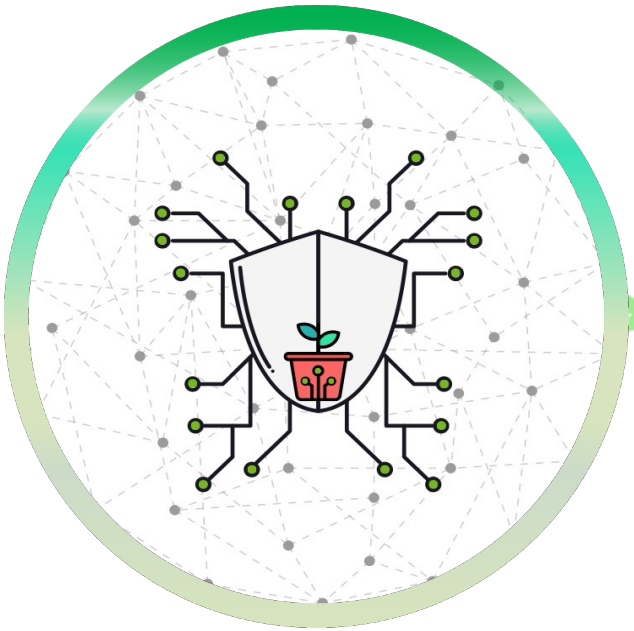
itee PhD
information technology
electrical engineering

My background

- I received my M.Sc. in Computer Engineering (cum laude) from University of Naples Federico II in October 2021
- I work within the DESSERT group at DIETI
- My PhD started on 1st January 2022
- **Type of fellowship:** PhD student grant – Type: MUR PON

Research field of interest

- My research centers on sustainable cybersecurity solutions using advanced AI techniques with low energy consumption. I focus on exploring challenges in green security, particularly in contexts like IoT, marked by significant constraints in energy and processing resources.



Summary of study activities

- **Ad hoc PhD courses / schools:**
  - RTA – REAL TIME ANALYTICS MOD. C
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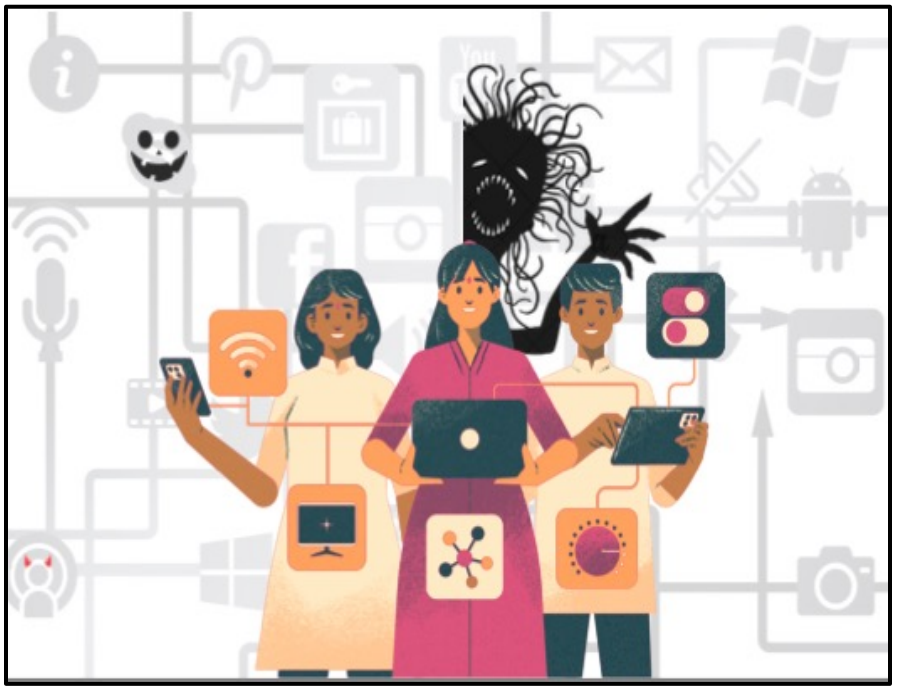
Research activity: Problem

5G Impact on IoT:

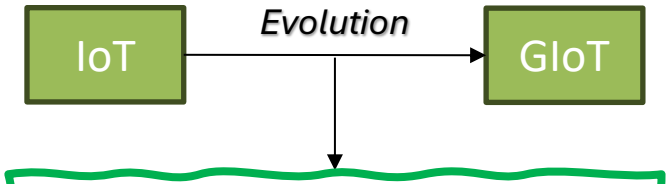
- Revolutionized the IoT landscape.
- Rapidly increasing the number of connected devices.

Challenges Posed by IoT Growth:

- Environmental concerns due to increased device proliferation.
- Enlargement of the attack surface, posing cybersecurity risks.



Research activity: Objective



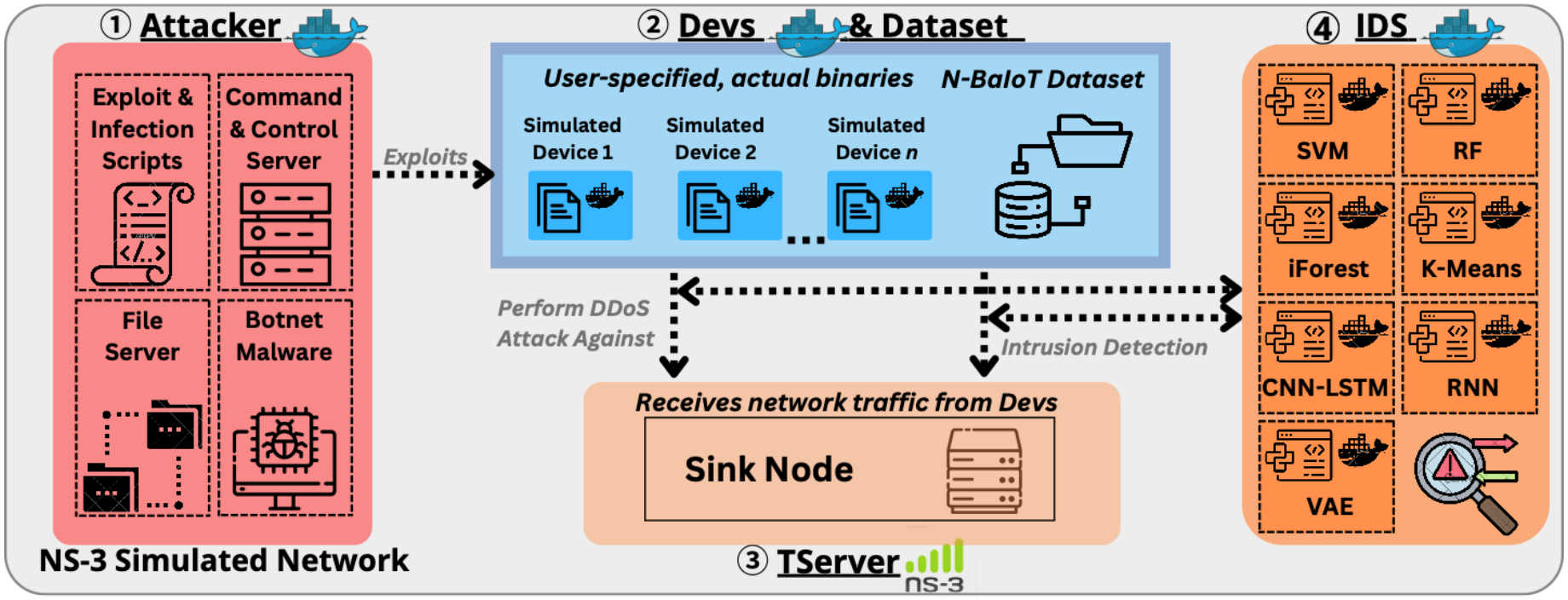
- Eco-friendly product usage
- Lowering facility energy consumption
- Renewable energy sources
- **Decentralized processing at the network edge**
- Energy-efficient routing adoption
- Decreasing wireless data path

Green IoT

AI Integration in IoT

- Crucial for managing security threats and vast data.
- Detects faults, identifies patterns, enables predictive models.
- ML integration in edge computing improves data filtering.
- **Challenge**: IoT devices' computing limitations for AI-based intrusion detection.

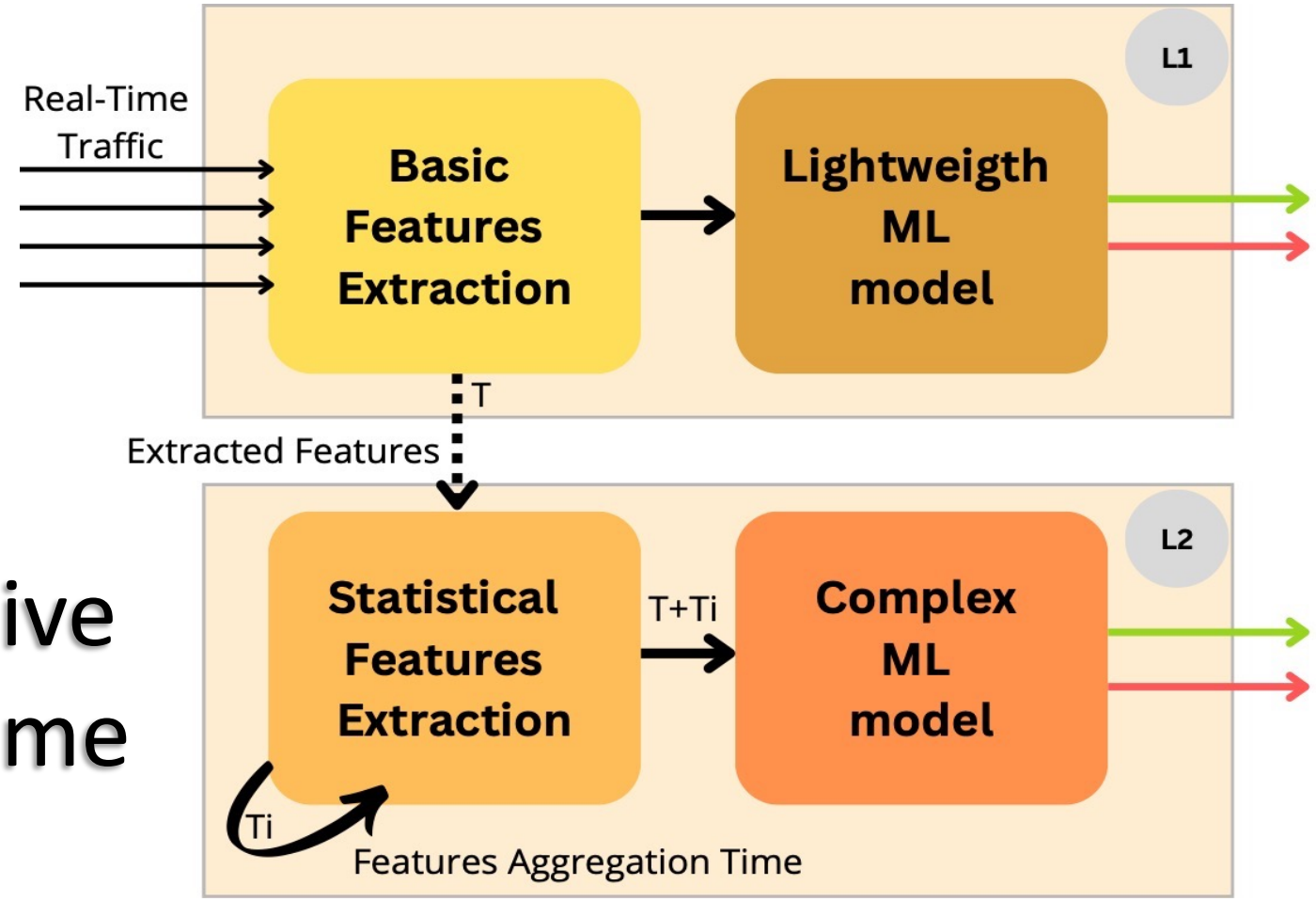
Research activity: My Contribution



DDoShield-IoT

Research activity: My Contribution

Proactive Real-Time IDS



Products

[P1]	**Simona De Vivo**, Pietro Liguori, 2023 IEEE 34th International Symposium on Software Reliability Engineering Workshops (ISSREW), published, 2023.
[P2]	**Simona De Vivo**, Islam Obaidat, Dong Dai, Pietro Liguori, 2024 54th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), under revision.

Research activity: Next Year

- Use of Federated Learning for lightweight IDS
- IPv6 threats and solutions

Thank you for your attention!

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