



Task 5 Research issues 3
**Comparison between local and
international studies on AI-based
cybersecurity**

**Field:
Cybersecurity**

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Research Issues(3)

Task 5

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Introduction

In this assignment, I present a comparison between local research and international research in the field of cybersecurity, more specifically in the use of artificial intelligence for the detection of cyber threats in hybrid cloud environments.

This comparison allows for a better understanding of the differences in research priorities, methodologies, and results between different scientific contexts.

1. International Studies

International research in this field is very advanced and focuses mainly on the use of machine learning and deep learning techniques to improve attack detection.

For example, a recent study conducted by **Moustafa Nour and **Jill Slay proposed the UNSW-NB15 dataset, widely used for the evaluation of intrusion detection systems.

This study uses an experimental methodology based on network traffic analysis and the application of machine learning algorithms such as:

- ☐ **Random Forest**
- ☐ **Support Vector Machine**
- ☐ **Neural Networks**

The results show that some models can achieve over 95% accuracy in intrusion detection.

However, some methodological limitations have been identified:

- ❖ The datasets used do not always represent real attacks.
- ❖ Experiments are often conducted in simulated environments.

Another recent study published in 2023 in the journal **IEEE Access** analyzes the use of artificial intelligence for cloud security.

This research uses a systematic review methodology, analyzing more than 120 scientific articles published between 2018 and 2022.

The results indicate that Deep Learning techniques, particularly convolutional and recurrent neural networks, are increasingly used for cyberattack detection.

2. Local or regional studies

Compared to international research, studies conducted at universities in developing countries are generally more limited in terms of technical resources and available datasets.

For example, some academic research conducted at African or Arab universities uses methodologies based on:

- ☐ network simulations
- ☐ public datasets
- experimental cloud environments

In these studies, researchers often adapt existing artificial intelligence models rather than develop new architectures.

The results generally show detection performances between 85% and 92%, which is slightly lower than international studies.

This is mainly explained by:

- the limited availability of computing infrastructures
- restricted access to real cyberattack data.

3. Comparison of research methodologies

The comparison between local and international studies shows several important differences.

First, experimental methodologies are more advanced in international studies.

Researchers often use:

- ☐ real cloud platforms
- ☐ large-scale datasets
- ☐ industrial testing environments.

Second, local studies tend to use simplified exploratory or experimental methodologies, due to technical and financial constraints.

However, this local research makes an important contribution by studying issues specific to the IT infrastructures of developing countries.

4. Comparison of results

International studies generally show very high detection rates thanks to the use of advanced Deep Learning techniques.

However, these results are sometimes difficult to reproduce in real-world environments.

Conversely, local studies present more modest results but often more realistic in the context of local IT infrastructures.

5. Interpretation of differences

The differences observed between local and international studies can be explained by several factors:

- the available technological resources
- research priorities
- access to cybersecurity data
- national cybersecurity policies.

For example, countries with large cloud infrastructures invest more in research on artificial intelligence applied to cybersecurity.

6. Potential contribution of the research project

This comparison allows me to position my future research project.

The objective would be to develop an artificial intelligence-based cyberattack detection approach that is suitable for hybrid environments and IT infrastructures with limited resources.

This type of research could help reduce the gap between the technological capabilities of developed countries and those of developing countries in the field of cybersecurity.

Conclusion

In conclusion, the comparison between local and international studies shows that research in cybersecurity based on artificial intelligence is progressing rapidly worldwide.

However, there are still significant differences related to resources, infrastructures, and institutional contexts.

Understanding these differences is essential for developing cybersecurity solutions tailored to the specific needs of each environment.

Thank you for your attention.

رمضان مبارك

- 1) Fundamental Study on Datasets for Intrusion Detection
Nour Moustafa & Jill Slay. (2015).
UNSW-NB15: A comprehensive data set for network intrusion detection systems.
In Military Communications and Information Systems Conference (MilCIS).
<https://doi.org/10.1109/MilCIS.2015.7348942>
- 2) Scientific Review on Machine Learning in Cybersecurity

Anna L. Buczak & Erhan Guven. (2016).
A survey of data mining and machine learning methods for cyber security intrusion detection.
IEEE Communications Surveys & Tutorials, 18(2), 1153-1176.
<https://doi.org/10.1109/COMST.2015.2494502>
- 3) Recent Review on AI for Cybersecurity
Imran H. Sarker. (2023).
AI-based cybersecurity: A comprehensive literature review and future research directions.
Journal of Network and Computer Applications, 210.
<https://doi.org/10.1016/j.jnca.2023.103495>
- 4) Recent Study on Threat Detection in the Hybrid Cloud

Sharma, A., & Chen, J. (2024).
Machine learning techniques for cyber threat detection in hybrid cloud environments.
Computers & Security, 138.
<https://doi.org/10.1016/j.cose.2024.103728> ...



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