

## **Sujet 3 : A Deep Learning Approach to IoT Authentication**

### **Description :**

At its peak, the Internet-of-Things will largely be composed of low-power devices with wireless radios attached [1]. Yet, secure authentication of these devices amidst adversaries with much higher power and computational capability remains a challenge, even for advanced cryptographic and wireless security protocols. For instance, a high-power software radio could simply replay chunks of signals from a low-power device to emulate it. To address the security issue of IoT, several studies are being carried out that involve the use of, but are not limited to, blockchain, artificial intelligence, and edge/fog computing. Authentication and authorization are crucial aspects of the CIA triad to protect the network from malicious parties. However, existing authorization and authentication [2] are not sufficient for handling security, due to the scale of the IoT networks and the resource-constrained nature of devices. In order to overcome challenges due to various constraints of IoT networks, there is a significant interest in using machine learning [3] techniques to assist in the authentication and authorization process for IoT.

### **Travail demandé :**

- Take a relevant case studies of authentication in IoT by focusing on deep learning.
- Present a taxonomy of authentication and authorization schemes in IoT focusing on machine learning-based schemes.
- Implement and evaluate some schemes to enhance authentication in IoT based DL models.

### **Références :**

- [1] Istiaque Ahmed, K.; Tahir, M.; Hadi Habaebi, M.; Lun Lau, S.; Ahad, A. Machine Learning for Authentication and Authorization in IoT: Taxonomy, Challenges and Future Research Direction. *Sensors*, 2021.
- [2] R. Das, A. Gadre, S. Zhang, S. Kumar and J. M. F. Moura, "A Deep Learning Approach to IoT Authentication," *2018 IEEE International Conference on Communications (ICC)*, Kansas City, MO, USA, 2018,
- [3] D. Huang, A. Al-Hourani, K. Sithamparanathan and W. S. T. Rowe, "Deep Learning Methods for IoT Device Authentication Using Symbols Density Trace Plot," in *IEEE Internet of Things Journal*, vol. 11, no. 10, pp. 18167-18179, 2024.

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