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Student/Bachelor/Master Project: Towards privacy-preserving with split learning for communications in smart ships

Description:

Due to the evolution of cellular networks, the internet of things (IoT) and internet of ships (IoS) bring about more flexible and efficient communications. Different from vehicular social networks [1], etc., maritime communications have their own characteristics because ships are normally far away from the land and base stations. Communications in ships on the ocean supported by satellites or unmanned aerial vehicle (UAV)-relay networks would cause privacy issues such as real-time locating, information sharing, etc. Therefore, how to achieve trustworthy communications in distributed network environments is challenging. This project aims to explore effective solutions in smart ship communications by using split learning so as to achieve trustworthy communications [2-4].

Prerequisites:

- Good at mathematical modeling
- Programming skills such as Python, C++, MATLAB, etc.
- Experience in machine learning techniques such as neural networks, deep learning, etc.
- Know on split learning/federated learning is a plus
- Interested in wireless communications, ambitious to learn new techniques, new algorithms, etc.

Contact: Chair for High Performance Computing
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References:

[1] X. Wang et al. Privacy-preserving content dissemination for vehicular social networks: Challenges and solutions. IEEE Communications Surveys & Tutorials 21(2):1314-1345, 2018.

[2] Q. Jia et al. Efficient privacy-preserving machine learning in hierarchical distributed system. IEEE transactions on network science and engineering 6(4):599-612, 2018

[3] V. Turina et al. Federated or split? a performance and privacy analysis of hybrid split and federated learning architectures. 2021 IEEE 14th International Conference on Cloud Computing (CLOUD). IEEE, 2021.

[4] C. Thapa et al. Splitfed: When federated learning meets split learning. Proceedings of the AAAI Conference on Artificial Intelligence 36(8), 2022.