INN - Involuntary Learning Neural Network

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Abstract

For many scientific problems, the sharing of information between different groups in collaborative networks is essential for the combined analysis of the data. However, in many cases there are many ethical and legal problems in sharing the original data, in particular for medical research. This problem is even more restrictive across international borders as privacy and security legislations vary strongly from country to country. This article presents a new methodology to transfer and share information on sensitive data used to train neural networks. Using only the parameters of separately trained Neural Networks of the same architecture, this approach produces a "combined" network that has a performance similar to that of a Neural Network trained with the combined training sets of the original Networks. By transferring only the parameters of the trained networks, the approach maintains the secrecy of the original data. We compared the results of the approach using 5-fold cross validation obtaining, in the majority of cases, a correlation index higher than 0.9 between the Network obtained by our approach and that trained with the combined training sets. These initial experiments show the potential of our new approach, which can help the development of future systems for collaborative research even in fields with complex rules governing secrecy and privacy issues. In this poster we will present the basic algorithm being proposed, the current results applied to a simpler problems and discuss future developments.

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