

1.1 Motivation/purpose/aims/hypothesis:

The motivation behind this research was to build a system where the researchers could work with a sequential dataset using a federated split learning mode. Previously vertical and horizontal split learning has been implemented however till now there has been no work on sequential dataset. So the researcher introduced novelty with this research.

1.2 Contribution:

In this particular research, the authors introduced a new way to do federated split learning which was not done on previous research with SL and FL. They implement FL and SL on sequential data but previously work has only been done with horizontal and vertical distributed data. For this to achieve, they implemented this new method using RNN as RNN is used with sequential data.

1.3 Methodology:

The researchers collected a dataset from different hospitals for the same patients. Then they put each patient's info one after the another and made a sequential dataset. Then they ran federated split learning on that dataset.

1.4 Conclusion:

This particular method helps us to reach distribution by combining sequential data of the same patient from different hospitals. So it speeds up the convergence and ensures more privacy.

2.1 First Limitation/Critique (15%)

The first limitation is that the dataset used in such health related problems are very hard to come by. This is because these are sensitive data which doctors or hospitals do not want to share with researchers. Also in most countries there are strict government regulations which forbids disclosing medical data to researchers. There are only two ways researchers mainly get quality dataset. Either they work directly with a research foundation dealing with such sensitive patients under them or patients sign a form which allows their medical data to be used. However, this limits the use of this data by most researchers.

2.2 Second Limitation/Critique (15%)

The next limitation is not handling the imbalance dataset. Any medical data related to brain tumors will have more cases of non-tumour. This will result in the tumor class to be a minority class. Not handling the minority class will result in a wrong metric value which does not give a proper reflection of the model performance.

3 Synthesis

The authors have a future plan to work on other sequential forms of neural network using split learning for example Temporal Convolutional Networks (TCNs), 3D CNNs, and use split sequential models in their proposed FedSL framework. They plan to utilize differential-privacy techniques in the FedSL framework, and working on techniques in SL to personalize split models for individual clients.