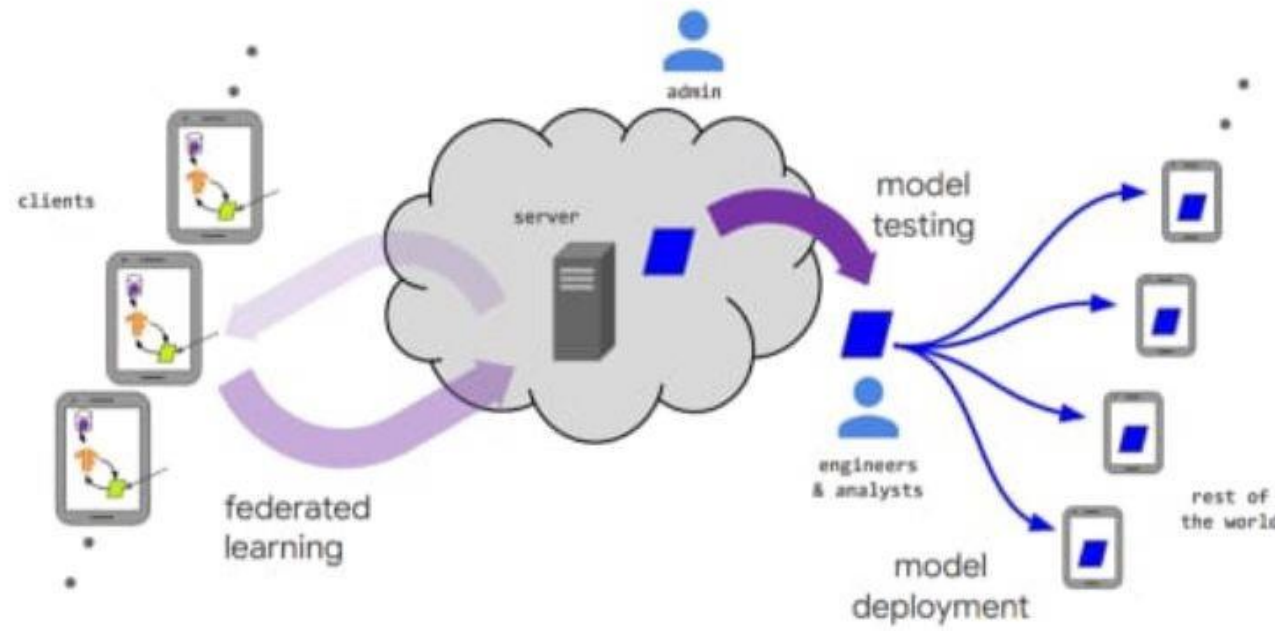


Introduction

What is Cross-Silo Federated Learning?



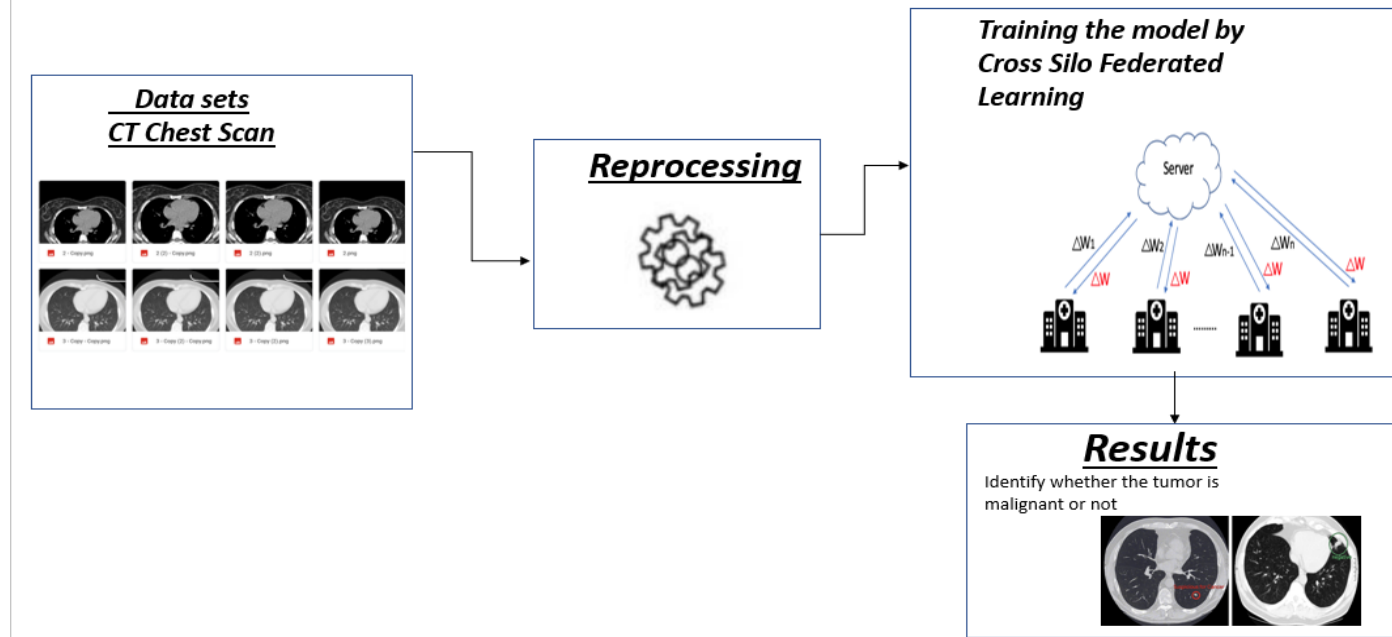
Federated Learning is a type of machine learning technique. The difference is that it is so secure and trains the datasets individually and privately. It trains an algorithm across multiple decentralized edge devices or servers that are having local data and no one can have access to except for the owner.

In cross-silo federated learning, data is partitioned into silos, each with an associated trainer.

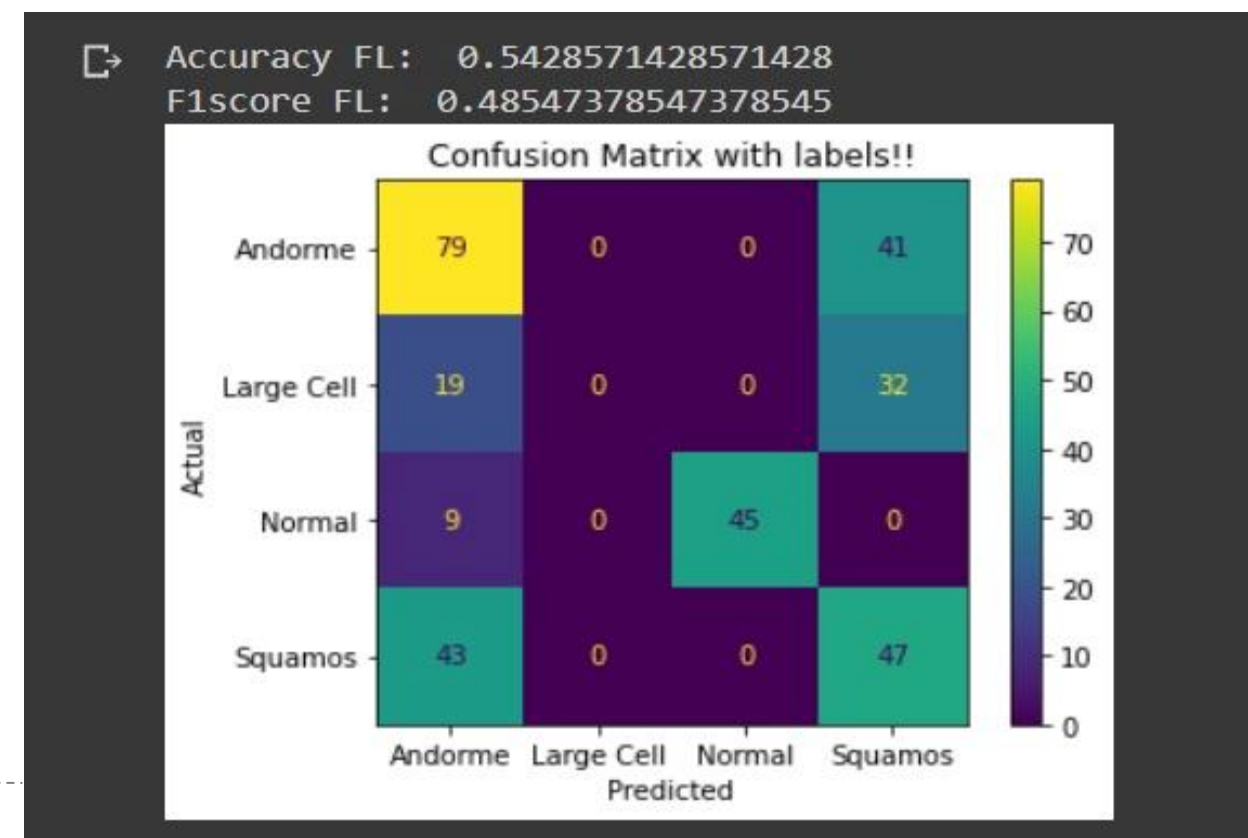
Literature Review

In a summary of the research papers, all the research papers are talking about either the importance and the evolution of machine learning doing lung cancer detection, proposing new techniques for classifying lung tumours, or the importance and differences of using Federated Learning over traditional machine learning in health care. Author A. Asuntha proposed the use of FPSOCNN [2]. While Onur Ozdemir proposed the use of CADx and CADe [3]. Moreover, Vaishnavi. D proposed the PNN [4], these are all the research papers that tackle enhancing the classification metrics. FPSOCNN [2] results in higher accuracy and better sensitivity, and CADx and CADe [3] have a great improvement in performance. Lastly, the PNN gives less computation time [4]. The authors Kadir T [1], Konstantina Kourou [6], and Parthasarathy G [7] are all discussing How Convolutional Neural Network and deep learning affected the results of classifying lung cancer tumours giving us faster and more accurate results. Finally, Lan X [11], Prayitno [8], and Rieke [9] are discussing the emergence of the federated learning concept in medical use and how it is crucial to be used especially in the medical field to make all the patients' data private and increase the security. The author Adnan Qayyum proposed the use of clustered federated learning (CFL) which is a modified federated learning technique that has higher security and less bandwidth compared to the normal federated learning methods [10].

Methodology



My dataset is chest scans consisting of around 700 images. I was working on Retina code and its model was Unet with an Iou of 0.02 then after my modifications, Iou was 0.1 which is better but not the best then I started searching for another code and after a lot of searching, I found covid-19 code having 0.8 accuracy and Efficient Net Pre-trained model but does not have the federated part so for the past period I was trying to add the federated part and finally I did and the accuracy of the federated is 0.6. A couple of days ago, I added a new client. They were two clients, the most popular ones Bob and Alice then I added a new client called Hana. Therefore, the accuracy has decreased to 0.56 which is 0.04, not a big deal for the sake of privacy.



Results

These numbers indicate the accuracy for each model

Code	Original Code	Code after Update
<u>Client Bob</u>	0.49	0.43
<u>Client Alice</u>	0.45	0.32
<u>Client Hana</u>	Not found	0.40
<u>All After Aggregation</u>	0.6	0.56

Conclusion

To conclude, Federated Learning becomes one of the most emerging techniques nowadays in training models and predicting results. Federated Learning provides poorer performance when compared to traditional models, however, it has a ubiquitous amount of applications. Moreover, federated learning tackles privacy by separating data sources leading to the non-collection of data. It is also mainly used in the medical field.

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