

# SemiFL-Ensmeble-FedSTO: Improving Semi-Supervised Federated Object Detection via Ensemble Methods

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May 2024

## **1 Abstract**

This is a test. I am adding text to see if something changes

## **2 Intro**

## **3 Related Work**

## **4 Method**

## **5 Experiments**

## **6 Discussion**

## **7 Conclusion**

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**Algorithm 1** The proposed method

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1: procedure TRAIN
2:    $W_{s,faster}, W_{s,yolo} \leftarrow \text{WarmUp}()$ 
   /* Phase 1: Selective Training for Pretraining */
3:   for  $i \leftarrow 1$  to  $T_1$  do
4:      $S^t \leftarrow \text{SelectClients}()$ 
5:     for each client  $k \in S^t$  in parallel do
6:        $W_{u,k,yolo}, W_{u,k,faster} \leftarrow \text{UpdateClientBackbone}(x_{u,k}, y_{u,k}, B_{u,k,yolo}, B_{u,k,faster})$ 
7:     end for
8:      $W_{s,yolo} \leftarrow \text{Aggregate}(W_{s,yolo}, \{W_{u,1,yolo}, \dots, W_{u,M,yolo}\})$ 
9:      $W_{s,faster} \leftarrow \text{Aggregate}(W_{s,faster}, \{W_{u,1,faster}, \dots, W_{u,M,faster}\})$ 
10:     $W_{s,yolo}, W_{s,faster} \leftarrow \text{UpdateServer}(W_{s,yolo}, W_{s,faster})$ 
11:  end for
   /* Phase 2: Joint Training for Fine-tuning */
12:  for  $i \leftarrow 1$  to  $T_2$  do
13:     $S^t \leftarrow \text{SelectClients}()$ 
14:    for each client  $k \in S^t$  in parallel do
15:       $W_{u,k,yolo}, W_{u,k,faster} \leftarrow \text{ClientOrthogonalUpdate}(x_{u,k}, y_{u,k}, B_{u,k,yolo}, B_{u,k,faster})$ 
16:    end for
17:     $W_{s,yolo} \leftarrow \text{Aggregate}(W_{s,yolo}, \{W_{u,1,yolo}, \dots, W_{u,M,yolo}\})$ 
18:     $W_{s,faster} \leftarrow \text{Aggregate}(W_{s,faster}, \{W_{u,1,faster}, \dots, W_{u,M,faster}\})$ 
19:     $W_{s,yolo}, W_{s,faster} \leftarrow \text{ServerOrthogonalUpdate}(W_{s,yolo}, W_{s,faster})$ 
20:  end for
21: end procedure
```

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