Findings on websocket communications

1. Typical model size is 65539\*5+3216 each;
2. For all tuples in the dataset, randomly select 10000 samples as test dataset. For each training iteration a model needs to be passed forward and then backward
3. From 1 and 2, it results in a huge communication rate (2GB) in both directions. This is verified by the ACK number of TCP packets
4. Only model parameters (as tensors are transmitted), and they are encoded with utf-8. Some of the packets, including those data packets, has a mask key. This mask key does not protect the transmitted information by the client, but only designed to protect network infrastructure. The server can parse model parameters using the mask key from the received packet.
5. Typical length of instructions is between 100 Bytes and 300 Bytes, which does not contribute much to the total communication rate
6. There is waste of communication link usage when the server is waiting for the remote worker to train the model. Websocket needs to maintaining the link after certain time intervals by constantly exchanging information. However, the resulted communication rate is trivial compared to model uploading
7. The major reason for delay results from the high communication frequency between the worker and server. Each step of training corresponds to one instruction, and each instruction need a handshake to start and terminate the connection. Two independent messages are required to terminate the connection: one for websocket, the other for TCP