NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Computer Science and Engineering
College of Engineering

A Blockchain-Based Deep Learning Optimal Auction Platform

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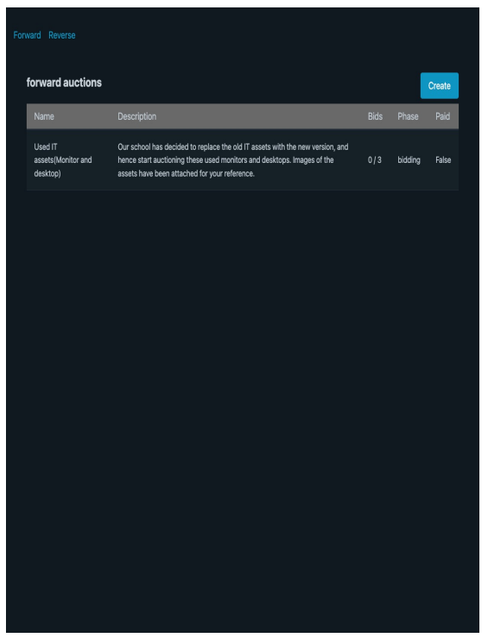
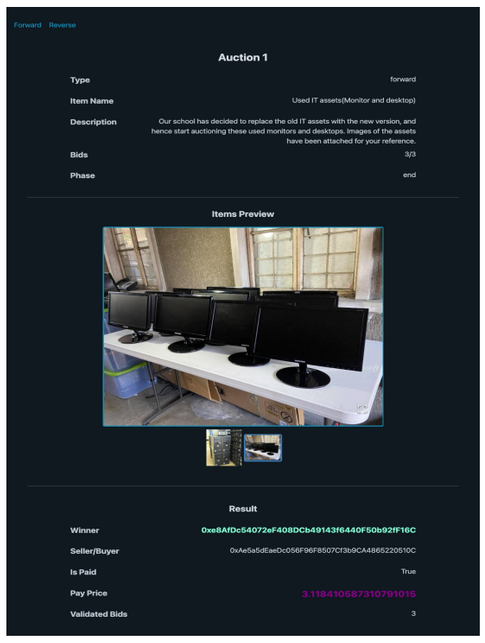
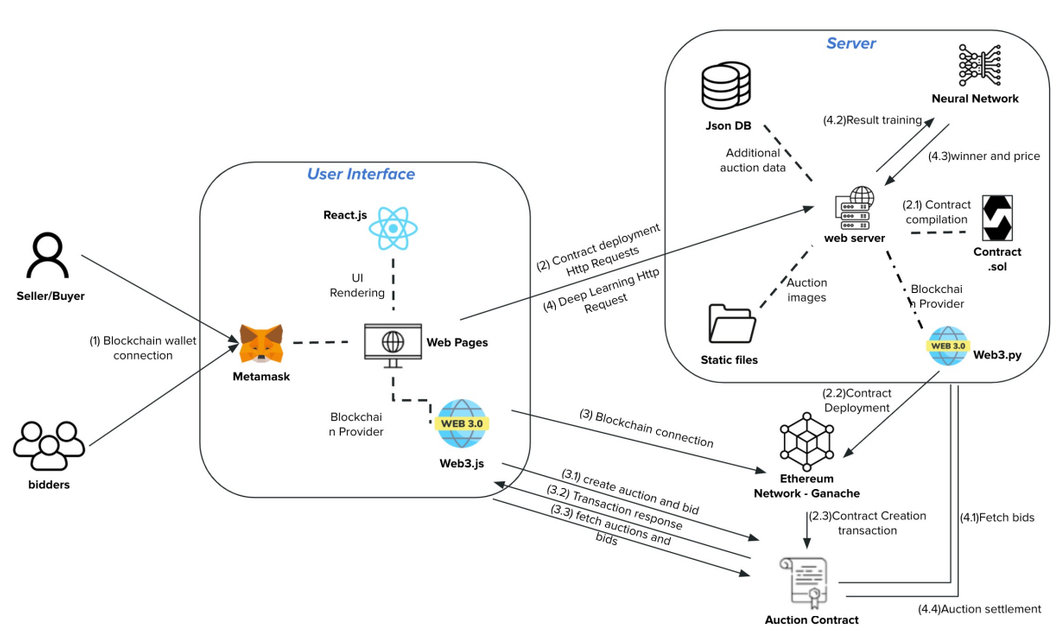


A list of auctions fetched directly from blockchain is displayed with certain detail, contract owner can go to auction create page from here.



Auction detail page to allow bidders to bid for the item, and allow contract owner to initiate the deep learning training for auction result.



The overall architecture of the system is in the figure above, which contains user-facing web3 application, a web server that can handle HTTP requests and perform TensorFlow training, and an Ethereum with smart contract deployed.

Project Objectives:

This project starts with the proposal of optimizing the common second price seal-bid auction process in mainly three parts,

- Reducing auction operation cost
- Storing auction data in transparent and non-manipulatable manner
- Optimizing cost/revenue of auction initiator

The system has undergone thorough testing and evaluation on its scalability and accuracy. Gas fee is a price to be paid for any transaction taking place on blockchain, hence the system will not be scalable if the gas cost grow exponentially with the number of bids in auctions. The system has been tested to have gas costs increasing linearly with the number of bids in both forward and reverse auctions thus proving its scalability. Deep learning results on the adopted model has also been proven to be accurate by having training on 1000 data profiles with 10 bids in each profile(bids sampled from uniform distribution U[0.1, 1.0]). For forward auction, auction item price appears to increase and lean to highest bid. For reverse auction, item price appears to decrease and lean to lowest bid.