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SIMULATION RESULTS

SIMULATION 01

Comparing the Gini Indexes of the conventional bitcoin protocol and the proposed PoQuVE protocol.

1. MODEL 1: CONVENTIONAL PROOF-OF-WORK PROTOCOL

2000 entities in the network of which 50 are miners

The miner who mines the block the fastest in the given round receives 1BTC reward.

The other 1500 entities do not receive any rewards from the network. They are the transaction entities in the bitcoin environment.

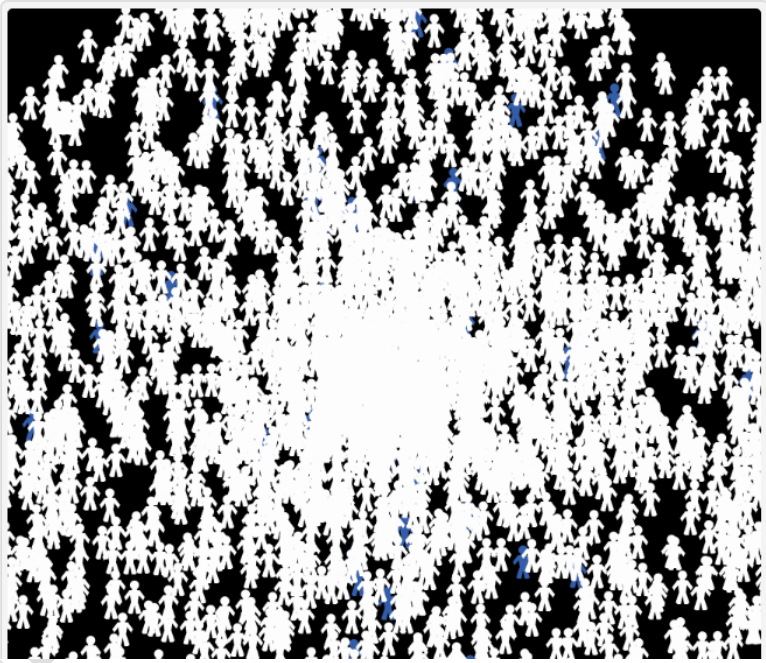
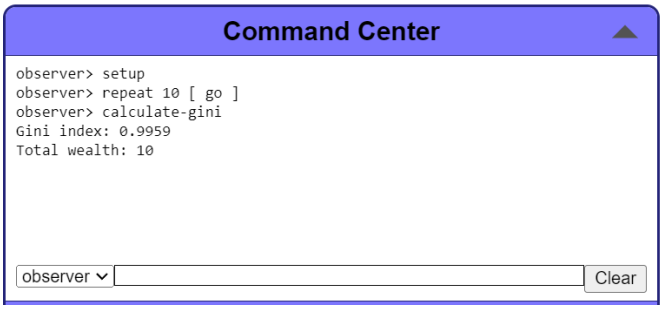


Diagram highlights the simulation view of 50 miners (Blue) + 1500 regular entities (White)

The simulation is run for different number of incremental rounds and the corresponding Gini Index is noted.



The diagram highlights how the simulation is run on the NetLogo console.

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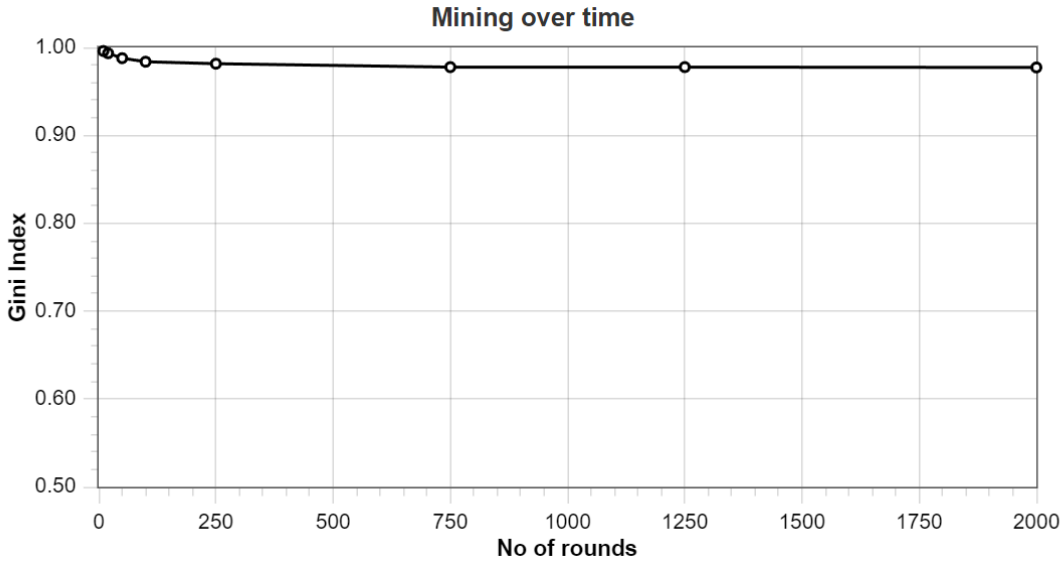
SIMULATION RESULTS

Rounds	10	20	50	100	250	750	1250	2000
Gini Index	0.9959	0.99335	0.98774	0.98370	0.98147	0.97757	0.97758	0.97718

A Gini Index closer to 1 indicates high wealth disparity, whilst a Gini Index closer to 0 indicates equal wealth distribution.

GINI INDEX V/S ROUNDS GRAPH



2. MODEL 2: PROOF-OF-QUANTUM-VERIFICATION(POQUVE) PROTOCOL

2000 entities in the network of which 50 are miners. There are 1550 verifiers in the network. There are five verifier indexes (20% reward, 30% reward, 50% reward,60% reward and 80% reward). Each verifier index consists of 310 verifiers.

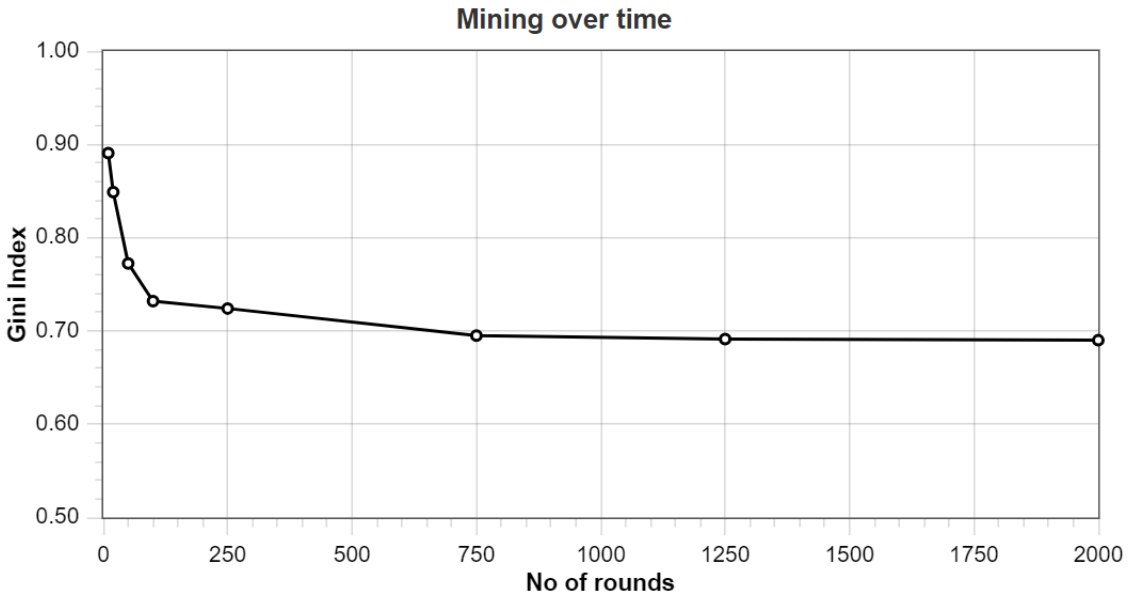
The rewards are distributed between the miner and verifier based on the verifier index quorum that is selected at random.

The other 300 entities in the network do not receive like in the previous model. They are the transaction entities in the bitcoin environment.

SIMULATION RESULTS

Rounds	10	20	50	100	250	750	1250	2000
Gini Index	0.89073	0.84880	0.77247	0.73200	0.72408	0.69500	0.69139	0.69001

GINI INDEX V/S ROUNDS GRAPH



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SIMULATION 02

Comparing the best case, worst case and average case Gini Indexes of the proposed protocol PoQuVe

1. **Worst Case Scenarios**
   A) When the miner receives all the reward for successful mining and the verifiers receives none (100% Miner) → **ANALOGOUS TO MODEL 01 IN SIMULATION 01**

   B) When the miner receives no reward for successful mining and verifiers receive all of the reward (100% Verifier).

2. **Best Case Scenario**
   A) When the miner and verifiers receive equal reward proportions on successful mining (50% miner + 50% verifier).

3. **Average Case Scenario**
   A) When the reward proportions are randomized between the miner and verifier on successful mining. → **ANALOGOUS TO MODEL 02 IN SIMULATION 02**

SIMULATION RESULTS

Rounds → **Gini Index**	**10**	**20**	**50**	**100**	**250**
Worst Case 01 100% Miner	0.99590	0.99335	0.98774	0.98370	0.98147
Worst Case 02 100% Verifier	0.73173	0.59632	0.47911	0.40562	0.33693
Best Case 50-50% Miner Verifier	0.85407	0.78811	0.73412	0.69302	0.64449
Average Case Randomized Distribution	0.86876	0.83170	0.75594	0.73621	0.70378

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RESULTS GRAPH