

Q: Can agent negotiation (and fair-minded agents) be used to create a more equitable outcome? (e.g. "Use all equipment equally")

# Agent Negotiation, Fairness and The Miner World Simulation

Mark Kilfoil (mark.kilfoil@unb.ca)

A: Yes! And without changing overall effectiveness significantly.

Motivation: To create a global effect from local agent negotiation policies.

Goal: To explore the effect of agent negotiation; to determine how an agent with a non-selfish world-view effects overall production, fairness and individual agent wealth.

Results:

- Same overall productivity (within 6-12%)
- Much greater number of agents (~245% increase)
- Fair, but max and min of each agent is lower

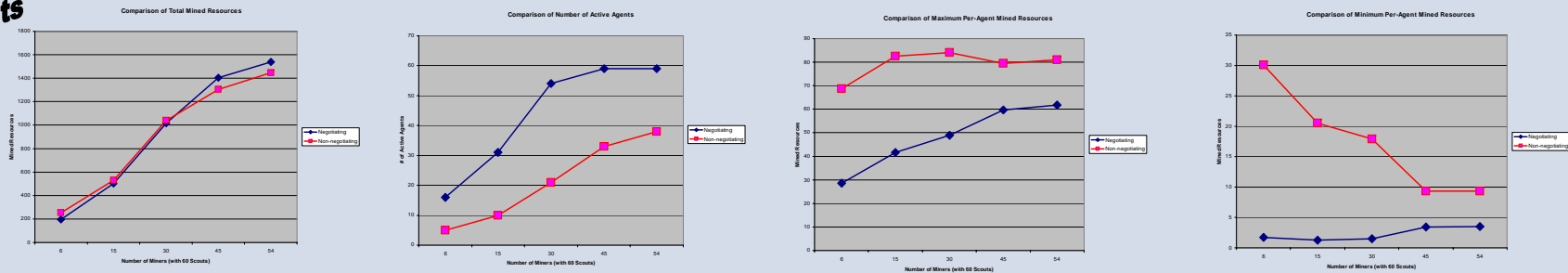
Conclusions: That equitable/fairness can be placed into an agent's negotiation strategy to create a global equity, and this need not significantly impact overall work.



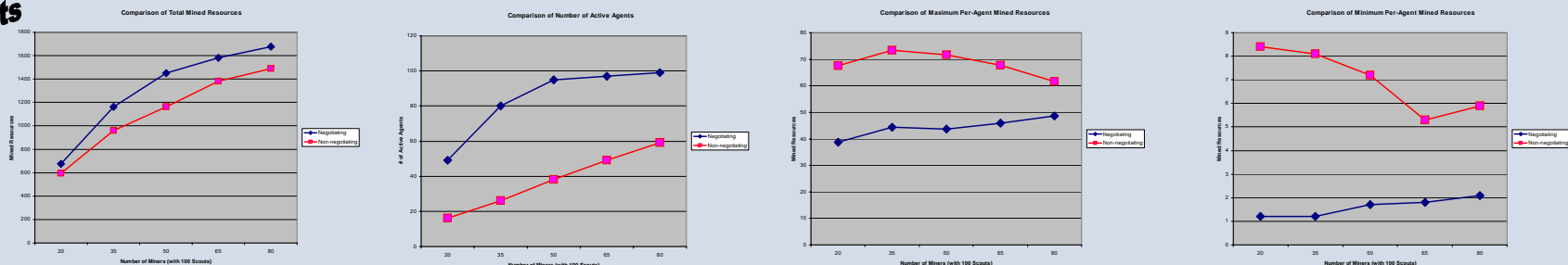
Miner World:

- A rectangular world of plots of land containing valuable minerals.
- A population of competing Scouts (two trials, 60 and 100 agents).
- A population of Miner agents (10%, 25%, 50%, 75%, 90% of Scout population) responsible for taking valuable minerals out of a plot of land for its owner.
- Scouts compete to own plots of land and to hire Miner agents to extract valuables.
- 100 times steps, repeated 10 times for each combination of (# of Scouts, # of Miners).
- Auction system negotiation; bids are visible, and Scouts can opt out.

## 60 Agents



## 100 Agents



## Results

Comparable Overall Production (within 6-12%)

System is more "fair" – Negotiation toward equity. (number of involved agents grew 245% on average)

Individual profits are lower, because total spread out more.