BIG DATA & ALGORITHMIC FINANCE

Gabriel GARCIA-ARENAS
PhD student, Oxford-Man Institute and University of Oxford

Gabriel García-Arenas is a PhD student at the Oxford-Man Institute and Mathematical Institute under the supervision of Professor Álvaro Cartea.

SPOOFING ORDER BOOKS WITH LEARNING ALGORITHMS

Alvaro Cartea, Patrick Chang and Gabriel Garcia-Arenas

This paper proposes a dynamic model of the limit order book to test if a trading algorithm will learn to spoof the order book. We derive testable conditions that are simple to implement and to interpret. Our results show that as a market maker becomes more tolerant to bearing inventory risk, the learning algorithm will find optimal strategies that spoof the book more frequently. Spoofing occurs for two reasons: to induce mean reversion in inventory to an optimal level, and to execute round-trip trades with limit orders at a higher probability than was otherwise likely to occur. The conditions are tested with order book data from Nasdaq and we show that market conditions are conducive for an algorithm to learn to spoof the order book. Finally, when two market makers use learning algorithms to trade, their algorithms can learn to coordinate their spoofing.

Download the paper