

Analysis of Fast Insertion Sort
(Technical Report)

Overreliance on Algorithms:
Competition over Medical AI in Clinical Care
(STS Research Paper)

An Undergraduate Thesis Portfolio
Presented to the Faculty of the
School of Engineering and Applied Science
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Science

by

Eric Thomas

May 9, 2021

Preface

How can algorithmic bias be reduced? While algorithms can improve expert decision making, undetected biases in algorithms can deepen social divisions and inequities.

Is Fast Insertion Sort competitive with other effective sorting algorithms? Fast Insertion Sort offers improved worst-case time complexity over Insertion Sort, while keeping Insertion Sort's benefits of being simple, stable, and adaptive. Though Fast Insertion Sort has been shown to have a lower runtime than Hoare's Quicksort in many cases, reimplementations are done to verify those results again in C++ and Python, comparing the runtimes of Fast Insertion Sort, Quicksort, and other sorting algorithms on random and partially sorted arrays of different sizes. The pros and cons of Fast Insertion Sort as well as other questions, flaws, insights, and directions for future work is elaborated on.

How do physicians, hospitals, insurers, patient advocacies, and med-tech vendors compete to draw the line between legitimate and excessive reliance on medical AI in clinical care? If unsuccessful, patients' health and privacy is at risk. While physicians are hopeful that clinical care will be improved by AI that is being integrated by hospitals, insurers, and med-tech vendors, physicians, patients, and patient advocacies are pushing for a better balance between human and computer involvement. Since patients desire personalized care by human physicians, AI can be applied to healthcare work to save time for better doctor-patient relationships. By using a more representative data set, bias can be reduced.

List of Contents

1. Technical Report: Analysis of Fast Insertion Sort
2. Sociotechnical Research Paper: Overreliance on Algorithms: Competition over Medical AI in Clinical Care
3. Prospectus