TQC TALKS @IIIT-DELHI

Meeting Link
April 8, 8PM IST

MAHATHI VEMPATI

Total functions exhibit exponential quantum advantage - albeit in a parallel universe

ABSTRACT

It is well known that the quantum and randomized sequential query complexities are polynomially related for total functions, and it was conjectured to be the case in the parallel setting as well [Jeffery et al. 2017].

We falsify this conjecture, employing the cheat sheet framework to obtain a function with exponential parallel quantum query advantage over its randomized analogue. We then strengthen this result by constructing a total function which exhibits an exponential quantum parallel query advantage despite having no sequential query advantage.

This exponential speedup emerges entirely from quantum algorithms' ability to utilize parallelism more effectively than classical algorithms. We also give an exponential total function separation between randomized and deterministic parallel query complexities.

BIOGRAPHY

Mahathi is a second year Computer Science PhD student at the University of Maryland. Earlier she obtained her masters and undergraduate studies in Computer Science from IIIT-Hyderabad.

Her research interests are quantum algorithms/ information/ query-complexity/ error-correction. Currently, she is working on understanding parallelism in quantum query algorithms. Previously, she worked on characterizing operations that can prepare quantum states which are useful for superdense coding.

meet.google.com/hkk-tias-vbe

Monday, 3rd April, 8:00 PM IST

https://braqiiit.github.io/Talks.html

Abstract