(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :16/10/2025
(21) Application No.202511100448 A
(43) Publication Date : 05/12/2025

(54) Title of the invention : A COMPUTER-BASED FRAMEWORK FOR OPTIMIZED QUANTUM CIRCUIT SIMULATION

(51) International classification	:G06N0010000000, G06F0030367000, G06F0030230000, G06F0008410000, G06N0010400000
(31) Priority Document No	:NA
(32) Priority Date	:NA
(33) Name of priority country	:NA
(86) International Application No Filing Date	: :01/01/1900
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
(62) Divisional to Application Number Filing Date	:NA :NA

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(57) Abstract :
The invention discloses a computer-based framework for optimized quantum circuit simulation comprising a circuit input unit (101), preprocessing engine (102), adaptive simulation core (103), hardware optimization layer (104), diagnostic analyzer (105), and visualization module (106). The framework integrates preprocessing, adaptive algorithms, and hardware-aware optimizations to reduce memory and runtime requirements. Diagnostic and visualization modules enhance debugging and interpretability. Experimental validation demonstrates efficiency improvements, scalability, and reduced memory consumption, making the invention a comprehensive solution for advancing quantum computing research and applications.

No. of Pages : 16 No. of Claims : 6