**APPENDIX B**

$Nomenclatures used in Proposed Algorithms$**:** $EnQPBEA \& EnQBCEA$

**Table B1 Used symbols in our quantum algorithms with precise descriptions**

|  |  |  |
| --- | --- | --- |
| $|ψ\_{qubits}〉$ | **:** | *Quantum state of superposition, with the qubits to exploring qubits-dimensional Hilbert Space as* $2^{qubits} $*amplitudes with all column vectors* |
| $|T\_{2^{n} × w}〉\_{QMEM}$  | **:** | *Superposition based quantum memory* $QMEM$ *with* $N=2^{n}$ *addresses, each of word size* $w$*, access by n-qubits address* $|T\_{n}〉\_{QA}$*, w-qubits data register* $|T\_{[w]}〉\_{QD}$ |
| $|T\_{i}〉\_{QA}$  | **:** | $i^{th}$ *index remain in superposition of text indices of size* $n=log\_{2}N$ *qubits or* $tq=log\_{2}t$ *(filtered)* |
| $|T\_{[i]}〉\_{QD}$  | **:** | $i^{th}$ *index data corresponds to entangled address of pattern size* $w=M\*log\_{2}\left|Σ\right|$ *qubits* |
| $|P〉\_{DR}$  | **:** | *Pattern data register to store* $M$ *length pattern of size* $M$$\*$$log\_{2}\left|Σ\right|$ *qubits in separate manner* |
| $|wait〉$***,*** $|left〉$***,*** $|right〉$ | **:** | *Qutrit switches which remains in superposition* $|wait〉$*, and transform to states as* $|left〉$ *or* $|right〉$ |
| $|q〉$  | **:** | *Ancillary qubit initialize to* $|-〉$ *used in phase inversion to mark amplitude by picking phase factor* $-1$ |
| $|q\_{Comp}〉$  | **:** | *Single qubit whose value is returned to function as the outcome of Boolean oracle of exact search* |
| $|same\_{[qubits]}〉$  | **:** | *This keeps the state of quantum register as with same instance by using the explored qubits* |
| $|zeroes\_{qubits}〉$  | **:** | *It initializes the quantum register with zero values as per specified qubits within the register* |
| $|T\_{n+1}〉\_{AX}$  | **:** | *An auxiliary register of text size with additional ancillary qubit used for approximate text filtering* |
| $LA\left[…\right]$  | **:** | *Location array to classically store the* $t$ *filtered text indices as per the measured outcome of filtering*  |
| $|T\_{tq}〉\_{QL}$  | **:** | *A location register of size* $tq=log\_{2}t$ *qubits to access filtered text indices stored in array* $LA\left[t\right]$ |
| $U\_{QMEM}$  | **:** | *A unitary transformation to load data of size* $|T\_{[w]}〉\_{QD}$ *as* $|T\_{[i]}〉\_{QD}$ *for all entangled address* $|T\_{i}〉\_{QA}$ |
| $U\_{Swap}$  | **:** | *A unitary operator to transform qutrit from* $|wait〉$ *to* $|left〉$ *or* $|right〉$ *state,* $U^{†}\_{Swap}$ *is reverse of it.*  |
| $U\_{Load}$  | **:** | *A unitary to explore and trace the path as followed by qutrit switches, and copies the data at* $|T\_{[i]}〉\_{QD}$ *by performing round trip of bus qubits, corresponding to each address* $|T\_{i}〉\_{QA}$ *in superposition* |
| $U\_{Comp}$  | **:** | *A unitary operation used for exact match between pattern and text substring at each index* $|T\_{i}〉\_{QA}$ |
| $U\_{mark}$  | **:** | *A unitary operator that yields to the phase inversion of the marked solution index by using ancilla qubit*  |
| $U\_{Diff}$  | **:** | *A unitary operator for amplitude purification, that inverts probability amplitude around mean value* |
| $U\_{GetL}$ | **:** | *A unitary transformation that gets n-qubits actual index by* $|T\_{i}〉\_{QL}$ *i.e. the memory content of* $LA\left[t\right]$ *then store that address for its further access through* $|T\_{i}〉\_{QA}$ *i.e. address register* |