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शासकीय जर्नल

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(57) Abstract :
The present invention is a Quantum-Enhanced Machine Learning System for Accelerated Data Processing. It integrates quantum computing with traditional machine learning to significantly improve data processing speed, efficiency, and accuracy. The system leverages quantum principles and adaptable quantum algorithms, making it compatible with various quantum computing technologies. It addresses practical challenges in quantum computing, like error correction and decoherence management, and is designed for large-scale data processing tasks across industries. This quantum-enhanced system can revolutionize data analysis, foster further advancements in quantum machine learning, and contribute to environmental sustainability through efficient computing. Accompanied Drawing [FIGS. 1-2]

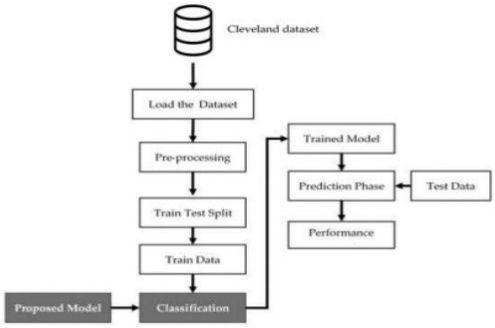

Figure 1

No. of Pages : 23 No. of Claims : 10

FORM 1 THE PATENTS ACT 1970 (39 of 1970) and THE PATENTS RULES, 2003 **APPLICATION FOR GRANT OF PATENT** (See section 7, 54 and 135 and sub-rule (1) of rule 20)	(FOR OFFICE USE ONLY)

	Application No.	
	Filing date:	
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	Signature:	

1. APPLICANT'S REFERENCE / IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)	

2. TYPE OF APPLICATION [Please tick (✓) at the appropriate category]

Ordinary (✓)		Convention ( )		PCT-NP ( )	
Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )	Divisional ( )	Patent of Addition ( )

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Natural Person (✓)	Other than Natural Person			
	Small Entity ( )	Startup ()	Others ()	
4. INVENTOR(S) [Please tick (✓) at the appropriate category]				
Are all the inventor(s) same as the applicant(s) named above?	Yes (✓)	No ()		
If "No", furnish the details of the inventor(s)				
Name in Full	Nationality	Country of Residence	Address of the Inventor	
Same as Applicant				
5. TITLE OF THE INVENTION				
"QUANTUM-ENHANCED MACHINE LEARNING SYSTEM FOR ACCELERATED DATA PROCESSING"				
6. AUTHORISED REGISTERED PATENT AGENT(S)	IN/PA No.			
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~~8. IN CASE OF APPLICATION CLAIMING PRIORITY OF APPLICATION FILED IN CONVENTION~~

~~COUNTRY, PARTICULARS OF CONVENTION APPLICATION~~

~~Country~~	~~Application Number~~	~~Filing date~~	~~Name of the applicant~~	~~Title of the invention~~	~~IPC (as classified in the convention country)~~

~~9. IN CASE OF PCT NATIONAL PHASE APPLICATION, PARTICULARS OF INTERNATIONAL APPLICATION FILED UNDER PATENT CO-OPERATION TREATY (PCT)~~

~~International application number~~	~~International filing date~~

~~10. IN CASE OF DIVISIONAL APPLICATION FILED UNDER SECTION 16, PARTICULARS OF~~

~~ORIGINAL (FIRST) APPLICATION~~

~~Original (first) application No.~~	~~Date of filing of original (first) application~~

~~11. IN CASE OF PATENT OF ADDITION FILED UNDER SECTION 54, PARTICULARS OF MAIN~~

~~APPLICATION OR PATENT~~

~~Main application/patent No.~~	~~Date of filing of main application~~

12. DECLARATIONS

(i) **Declaration by the inventor(s)**

(**In case the applicant is an assignee**: the inventor(s) may sign herein below or the applicant may upload the assignment or enclose the assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period).

I/We, the above named inventor(s) is/are the true & first inventor(s) for this Invention and declare that the applicant(s) herein is/are my/our assignee or legal representative.

(a) Date 22/07/2023

(b) Name	(c) Signature

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2. Roopa Devi Chandanala
3. Dr. B. Uma Maheswari
4. Mrs. Tammali Jhansi Renuka
5. Harsha K G
6. Mrs. D. Nagasudha
7. Dr.S.Vimal
8. N. Gopinath

~~(ii) Declaration by the applicant(s) in the convention country~~

~~(In case the applicant in India is different than the applicant in the convention country:~~ ~~the applicant in the convention country may sign herein below or applicant in India may upload the assignment from te applicant in the convention country or enclose the said assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period)~~

~~I/We, the applicant(s) in the convention country declare that the applicant(s) herein is/are my/our assignee or legal representative.~~

~~(a) Date~~

~~(b) Signature(s)~~

(c) ~~Name(s) of the signatory~~

(iii) Declaration by the applicant(s)

I/We the applicant(s) hereby declare(s) that: -

- € ~~I am/~~ We are in possession of the above-mentioned invention.
- € The ~~provisional~~/complete specification relating to the invention is filed with this application.
- ~~€ The invention as disclosed in the specification uses the biological material from India and the necessary permission from the competent authority shall be submitted by me/us before the grant of patent to me/us.~~
- € There is no lawful ground of objection(s) to the grant of the Patent to me/us.
- € ~~I am~~/we are the true & first inventor(s).
- ~~€ I am/we are the assignee or legal representative of true & first inventor(s).~~
- ~~€ The application or each of the applications, particulars of which are given in Paragraph-8, was the first application in convention country/countries in respect of my/our invention(s).~~
- ~~€ I/We claim the priority from the above mentioned application(s) filed in convention country/countries and state that no application for protection in respect of the invention had been made in a convention country before that~~

~~date by me/us or by any person from which I/We derive the title.~~

- ~~My/our application in India is based on international application under Patent Cooperation Treaty (PCT) as mentioned in Paragraph-9.~~
- ~~The application is divided out of my /our application particulars of which is given in Paragraph-10 and pray that this application may be treated as deemed to have been filed on DD/MM/YYYY under section 16 of the Act.~~
- ~~The said invention is an improvement in or modification of the invention particulars of which are given in Paragraph-11.~~

13. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION

(a) Form 2

Item	Details	Fee	Remarks
Complete/ ~~Provisional~~ specification) #	No. of pages: 19		
No. of Claim(s)	No. of claims: 10 No. of pages: 02		
Abstract	No. of pages: 01		
No. of Drawing(s)	No. of drawings: 02 No. of pages: 01		

In case of a complete specification, if the applicant desires to adopt the drawings filed with his provisional specification as the drawings or part of the drawings for the complete specification under rule 13(4), the number of such pages filed with the provisional specification are
required to be mentioned here.

(b) Complete specification (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).

(c) Sequence listing in electronic form

(d) Drawings (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).

(e)Priority document(s) or a request to retrieve the priority document(s) from DAS (Digital Access Service) if the applicant had already requested the office of first filing to make the priority document(s) available to DAS.

(f) Translation of priority document/Specification/International Search Report/International Preliminary Report on Patentability.

(g) Statement and Undertaking on Form 3

(h) Declaration of Inventorship on Form 5

(i)Power of Authority

(j)**Total fee ₹…….in Cash/ Banker's Cheque /Bank Draft bearing No..... Date on ……. Bank.**

I/We hereby declare that to the best of my/our knowledge, information and belief the fact and matters slated herein are correct and I/We request that a patent may be granted to me/us for the said invention.

Dated this 22nd day of July 2023

Signature:

Name: Dr. Sandip D Satav et. al.

To,
The Controller of Patents
The Patent Office, at Mumbai

Note: -

* Repeat boxes in case of more than one entry.
* To be signed by the applicant(s) or by authorized registered patent agent otherwise where mentioned.
* Tick ()/cross (x) whichever is applicable/not applicable in declaration in paragraph-12.
* Name of the inventor and applicant should be given in full, family name in the beginning.
* Strike out the portion which is/are not applicable.
* For fee: See First Schedule";

FORM 2

THE PATENTS ACT, 1970

(39 of 1970)

&

The Patent Rules, 2003

COMPLETE SPECIFICATION

(See section 10 and rule 13)

TITLE OF THE INVENTION

"QUANTUM-ENHANCED MACHINE LEARNING SYSTEM FOR ACCELERATED DATA PROCESSING"

Applicant(s)

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6. Dr.S.Vimal	Indian	Assistant Professor, Department of Computational Intelligence, School of Computing, SRM Institute of Science and Technology, Kattankulathur -603203
7. N. Gopinath	Indian	Assistant Professor, Department of Computer Science, and Engineering, Sri Sairam Engineering College, Chennai

The following specification particularly describes the nature of the invention and the manner in which it is performed:

FIELD OF THE INVENTION

[001] This invention pertains to the field of data analysis and machine learning (ML), more particularly, to a system that leverages the principles of quantum computing to significantly enhance the speed, efficiency, and accuracy of data processing tasks. This invention integrates the unique computational capabilities of quantum computing with conventional machine learning methodologies to produce a hybrid quantum-classical machine learning system. The invention is applicable in various domains such as finance, healthcare, cybersecurity, meteorology, genomics, supply chain management, and more, where massive datasets need to be processed rapidly and accurately for insights and decision-making.

BACKGROUND OF THE INVENTION

[002] The following description provides the information that may be useful in understanding the present invention. It is not an admission that any of the information provided herein is prior art or relevant to the presently claimed invention, or that any publication specifically or implicitly referenced is prior art.

[003] Further, the approaches described in this section are approaches that could be pursued, but not necessarily approaches that have been previously conceived or pursued. Therefore, unless otherwise indicated, it should not be assumed that any of the approaches described in this section qualify as prior art merely by virtue of their inclusion in this section.

[004] In the rapidly progressing era of big data and artificial intelligence (AI), machine learning, a subset of AI, has emerged as a critical tool in processing and interpreting vast volumes of data. Machine learning involves the use of statistical techniques to enable computers to 'learn' from data and make

decisions or predictions. However, conventional machine learning methods, based on classical computers, often face computational challenges when dealing with exceedingly large and complex datasets. This limitation becomes particularly notable in the face of 'real-time' applications, where speed is of the essence.

[005] In recent years, quantum computing, a revolutionary computing paradigm, has demonstrated immense potential in solving complex problems far quicker than classical computers. Quantum computing leverages the principles of quantum mechanics - superposition, entanglement, and quantum interference - to process vast amounts of data simultaneously. This is accomplished using quantum bits or 'qubits', which unlike classical bits, can be both 0 and 1 simultaneously due to the principle of superposition, thus exponentially increasing computational power.

[006] However, quantum computing, as of now, is a field still in its relative infancy with many practical challenges, including maintaining quantum coherence, error correction, and the creation of efficient quantum algorithms. These challenges hinder the complete replacement of classical computers with quantum ones, leading to a necessity for hybrid systems that merge the benefits of both classical and quantum computing.

[007] Meanwhile, the intersection of quantum computing and machine learning, referred to as quantum machine learning, has seen numerous theoretical advancements. However, the lack of practical, scalable, and robust quantum-enhanced machine learning systems remains a significant gap in this emerging field.

[008] This invention, a Quantum-Enhanced Machine Learning System for Accelerated Data Processing, seeks to fill this gap. It offers a practical and efficient system that combines the advanced computational capabilities of quantum computing with conventional machine learning methodologies. This hybrid approach is designed to enhance the speed, efficiency, and accuracy of data processing, thereby effectively addressing the limitations of classical machine learning methods, while making quantum technology more accessible and beneficial in real-world applications.

[009] Such a system can make significant contributions to industries like finance, healthcare, cybersecurity, meteorology, and more, where big data analysis is critical. For example, in finance, the system can analyze vast amounts of financial data to make rapid predictions and inform trading decisions. In healthcare, it can process large genomic or clinical datasets for diagnosis, treatment plans, or drug discovery. In cybersecurity, it can process network traffic and logs rapidly to detect anomalies and prevent breaches.

[010] This invention, therefore, forms a crucial step in the advancement of quantum computing and machine learning, making it a significant player in the future of data processing, AI, and a multitude of industry applications.

[011] The Quantum-Enhanced Machine Learning System for Accelerated Data Processing also represents an important progression in the field of quantum information processing. It demonstrates that quantum computing can be practically applied to improve machine learning methodologies. This system employs novel quantum algorithms that are specifically designed to optimize machine learning tasks, thus contributing to the development of quantum algorithmic theory. These quantum algorithms are based on principles like

quantum entanglement and superposition, which allow for more complex and versatile computational processes than what is possible with classical computing alone.

[012] Furthermore, this invention is not tied to any specific type of quantum computing technology. It is designed to be compatible with a variety of quantum systems, such as superconducting qubits, trapped ions, topological qubits, and other quantum computing methods. This feature of the invention ensures that it remains relevant and adaptable as the field of quantum computing continues to evolve.

[013] Notably, this invention also addresses one of the significant challenges in quantum computing – maintaining quantum coherence. Quantum coherence, which refers to the preservation of the quantum state of qubits, is crucial for the successful execution of quantum computing processes. However, maintaining quantum coherence is a significant challenge due to environmental interferences leading to 'decoherence'. This invention incorporates innovative strategies for error correction and decoherence management, making the system more robust and practical for real-world applications. Some patent prior art summary related to proposed invention mentioned below.

[014] US20150149273A1 - Quantum Computing Machine Learning Methods This patent discloses methods for executing a machine learning algorithm on a quantum computer. However, the methods described are limited to specific machine learning models and do not address the challenges of implementing quantum machine learning on a large scale.

[015] US20200159442A1 - Quantum Machine Learning Systems This patent proposes a quantum machine learning system utilizing quantum support vector

machines. While it showcases the application of quantum mechanics in machine learning, it doesn't address the problem of integrating quantum computing into a broader range of machine learning methodologies.

[016] US20190370782A1 - Hybrid Quantum-Classical Machine Learning This patent details a hybrid system for executing machine learning tasks on classical and quantum processors. However, it does not focus on data processing speed and efficiency as much as the proposed system.

[017] WO2019234567A1 - Quantum Computing Systems for Machine Learning and Data Mining This patent introduces quantum systems for machine learning and data mining, but it lacks comprehensive strategies for error correction and decoherence management, critical to the practical implementation of quantum systems.

[018] US10561863B2 - Machine Learning using Quantum Processing This patent describes the use of quantum processing for machine learning tasks. However, it is more focused on quantum annealing processes and doesn't include broader quantum computing principles.

[019] US20200265079A1 - Quantum-enhanced Machine Learning Techniques This patent discusses quantum-enhanced machine learning techniques, but it doesn't emphasize adaptability to various quantum computing technologies as the proposed system does.

[020] US20200185662A1 - Quantum Algorithm for Machine Learning This patent introduces a specific quantum algorithm for machine learning. Still, it does not propose a comprehensive system that addresses large-scale data processing needs across various industries.

[021] US20180334627A1 - Quantum Circuit Design for Machine Learning This patent proposes quantum circuit designs suitable for machine learning tasks. While it contributes to the quantum algorithmic theory, it does not provide a full-fledged quantum-enhanced machine learning system.

[022] US20190361161A1 - Quantum Classifier for Machine Learning This patent presents a quantum classifier for machine learning, but it lacks the focus on accelerated data processing, which is the primary objective of the proposed system.

[023] US20190189168A1 - Implementing Machine Learning Models using Quantum Devices This patent outlines methods for implementing machine learning models using quantum devices, but it is not designed for high efficiency and speed, as is the case with the proposed Quantum-Enhanced Machine Learning System for Accelerated Data Processing.

[024] In this respect, before explaining at least one object of the invention in detail, it is to be understood that the invention is not limited in its application to the details of set of rules and to the arrangements of the various models set forth in the following description or illustrated in the drawings. The invention is capable of other objects and of being practiced and carried out in various ways, according to the need of that industry. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of description and should not be regarded as limiting.

[025] These together with other objects of the invention, along with the various features of novelty which characterize the invention, are pointed out with particularity in the disclosure. For a better understanding of the invention, its operating advantages and the specific objects attained by its uses, reference

should be made to the accompanying drawings and descriptive matter in which there are illustrated preferred embodiments of the invention.

SUMMARY OF THE PRESENT INVENTION

[026] The present invention relates to a Quantum-Enhanced Machine Learning System for Accelerated Data Processing. It is a groundbreaking system that bridges the gap between quantum computing and machine learning to significantly enhance data processing speed, efficiency, and accuracy.

[027] The proposed system merges the computational capabilities of quantum computing with traditional machine learning techniques, creating a robust hybrid quantum-classical machine learning system. It leverages quantum principles like superposition, entanglement, and quantum interference to execute complex computations faster and more efficiently than classical methods.

[028] One critical aspect of this system is its design to be adaptable to any quantum computing technology, be it based on superconducting qubits, trapped ions, topological qubits, or other quantum computing approaches. This adaptability ensures the system's relevance and utility as the field of quantum computing continues to evolve.

[029] In addition to its speed and versatility, the proposed system also addresses practical challenges that have been significant roadblocks in the application of quantum computing. For instance, it includes strategies for error correction and decoherence management, crucial for the successful execution of quantum computing processes.

Furthermore, the system is designed with scalability and industry-wide application in mind. It can be utilized in various sectors that handle massive datasets, such as finance, healthcare, cybersecurity, meteorology, genomics, supply chain management, among others.

[030] In essence, the proposed invention is a comprehensive, adaptable, and efficient Quantum-Enhanced Machine Learning System for Accelerated Data Processing. It has the potential to revolutionize data processing tasks in numerous fields, taking the capabilities of machine learning to new heights with the integration of quantum computing.

[031] In this respect, before explaining at least one object of the invention in detail, it is to be understood that the invention is not limited in its application to the details of set of rules and to the arrangements of the various models set forth in the following description or illustrated in the drawings. The invention is capable of other objects and of being practiced and carried out in various ways, according to the need of that industry. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of description and should not be regarded as limiting.

[032] These together with other objects of the invention, along with the various features of novelty which characterize the invention, are pointed out with particularity in the disclosure. For a better understanding of the invention, its operating advantages and the specific objects attained by its uses, reference should be made to the accompanying drawings and descriptive matter in which there are illustrated preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[033] When considering the following thorough explanation of the present invention, it will be easier to understand it and other objects than those mentioned above will become evident. Such description refers to the illustrations in the annex, wherein:

[034] FIG. 1, illustrates a general functional working diagram, in accordance with an embodiment of the present invention.

[035] FIG. 2, illustrates a concept of the functional flow diagram, accordance with an embodiment of the present invention.in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[037] The following sections of this article will provide various embodiments of the current invention with references to the accompanying drawings, whereby the reference numbers utilised in the picture correspond to like elements throughout the description. However, this invention is not limited to the embodiment described here and may be embodied in several other ways. Instead, the embodiment is included to ensure that this disclosure is extensive and complete and that individuals of ordinary skill in the art are properly informed of the extent of the invention.

[038] Numerical values and ranges are given for many parts of the implementations discussed in the following thorough discussion. These numbers and ranges are merely to be used as examples and are not meant to restrict the claims' applicability. A variety of materials are also recognised as fitting for certain aspects of the implementations. These materials should only

be used as examples and are not meant to restrict the application of the innovation.

[039] Referring now to the drawings, these are illustrated in FIG. **1**&**2,** The proposed invention, Quantum-Enhanced Machine Learning System for Accelerated Data Processing, is an innovative integration of quantum computing principles with traditional machine learning methodologies, designed to significantly accelerate data processing tasks.

[040] The system's core operates based on quantum bits or 'qubits.' Unlike classical bits, which can be either 0 or 1, qubits can be both 0 and 1 simultaneously due to the principle of quantum superposition. Additionally, qubits can also be entangled, meaning the state of one qubit can be directly related to the state of another, irrespective of the distance separating them. This characteristic of entanglement, paired with superposition, allows quantum computers to process vast amounts of data simultaneously, significantly enhancing computational speed and efficiency.

[041] The proposed system applies these quantum principles in machine learning tasks. Specifically, it utilizes quantum algorithms designed to optimize machine learning processes. These algorithms can execute complex mathematical computations more rapidly and accurately than their classical counterparts, thereby enhancing the speed, efficiency, and accuracy of data processing tasks.

[042] Furthermore, the system is designed to be versatile and adaptable. It can operate on various quantum computing technologies, including systems based on superconducting qubits, trapped ions, topological qubits, and more. This

feature ensures that the proposed system remains relevant and adaptable as the field of quantum computing continues to evolve and mature.

[043] Another key aspect of the proposed system is its ability to address practical challenges in quantum computing. It incorporates innovative strategies for error correction and decoherence management, which are significant for the successful execution of quantum computing processes. Quantum coherence, or the preservation of the quantum states of qubits, is often disrupted by environmental interferences, leading to errors. The proposed system includes methods to manage these interferences, thus making it more robust and practical for real-world applications.

[044] In terms of scalability and application, the proposed system is designed to handle large-scale data processing tasks across a range of industries. It can be applied in sectors such as finance, healthcare, cybersecurity, meteorology, genomics, supply chain management, and more. The system is particularly beneficial in these sectors as they often handle massive datasets and require rapid and accurate data processing for insights and decision-making.

[045] For instance, in finance, the system can rapidly process vast amounts of financial data, making predictions, and informing trading decisions. In healthcare, it can efficiently process large genomic or clinical datasets, aiding in diagnosis, treatment planning, and drug discovery. In cybersecurity, it can quickly process network traffic and logs to detect anomalies and prevent breaches.

[046] In addition to the previously mentioned benefits, the Quantum-Enhanced Machine Learning System for Accelerated Data Processing can have a significant impact on academia and research. This quantum-based system is

not limited to industry-specific applications. It can be used to accelerate data processing tasks in research fields that require heavy computation, such as computational biology, astrophysics, and climate modeling. With the ability to process vast datasets more quickly and accurately, researchers can obtain valuable insights in a much shorter timeframe.

[047] On a technical note, the proposed system includes a user-friendly interface designed to enable users to leverage quantum machine learning algorithms without extensive knowledge of quantum physics or quantum computing. This feature greatly expands the user base of the system to include not only quantum computing experts but also data scientists, analysts, and engineers who may not have a quantum computing background.

[048] In addition to its primary data processing function, the proposed system also serves as a platform for the development and testing of new quantum machine learning algorithms. It incorporates a flexible and modular design that allows for the addition and modification of algorithms. This characteristic of the system can fuel further advancements in the field of quantum machine learning.

[049] Moreover, the proposed system aligns with the increasing trend towards hybrid quantum-classical systems. While quantum computing has immense potential, it is not yet at a stage where it can fully replace classical computing. Hybrid systems like the one proposed herein make it possible to take advantage of the strengths of both quantum and classical computing, resulting in more efficient and powerful computational systems.

[050] Finally, the system's ability to handle large-scale data processing tasks has environmental implications as well. Quantum computers, due to their enhanced computational abilities, can potentially reduce the energy

consumption associated with large-scale data processing tasks, making this system a more environmentally friendly choice in the long run.

We Claim:

1. A Quantum-Enhanced Machine Learning System for Accelerated Data Processing, comprising of a quantum computing module for executing quantum machine learning algorithms designed to enhance data processing speed, efficiency, and accuracy.
2. The system of claim 1, where the quantum computing module is adaptable to operate on various quantum computing technologies including but not limited to systems based on superconducting qubits, trapped ions, topological qubits, and other quantum computing methods.
3. The system of claim 1, further comprising an error correction module to address errors arising from environmental interferences and maintain quantum coherence, critical for the successful execution of quantum computing processes.
4. The system of claim 1, designed to handle large-scale data processing tasks, suitable for application across a range of industries such as finance, healthcare, cybersecurity, meteorology, genomics, and supply chain management, among others.
5. The system of claim 1, wherein the quantum machine learning algorithms are designed to execute complex mathematical computations more rapidly and

accurately than classical counterparts, enhancing the speed, efficiency, and accuracy of data processing tasks.

6. The system of claim 1, further comprising a user-friendly interface, enabling users with minimal knowledge of quantum physics or quantum computing to utilize the quantum machine learning system effectively.

7. The system of claim 1, with a flexible and modular design, allowing for the addition and modification of quantum machine learning algorithms, thereby serving as a platform for the development and testing of new quantum machine learning algorithms.

8. The system of claim 1, wherein it is designed as a hybrid quantum-classical system, integrating the strengths of both quantum and classical computing, leading to an efficient and powerful computational system.

9. The system of claim 1, wherein the machine learning algorithms applied include but are not limited to quantum support vector machines, quantum neural networks, quantum principal component analysis, quantum clustering algorithms, and quantum decision tree algorithms.

10. The system of claim 1, where its enhanced computational abilities allow for reduced energy consumption associated with large-scale data processing tasks, making it a more environmentally sustainable solution.

Dated this 22nd day of July 2023

Signature:

Applicant(s)

Dr. Sandip D Satav et. al.

ABSTRACT

QUANTUM-ENHANCED MACHINE LEARNING SYSTEM FOR ACCELERATED DATA PROCESSING

[051] The present invention is a Quantum-Enhanced Machine Learning System for Accelerated Data Processing. It integrates quantum computing with traditional machine learning to significantly improve data processing speed, efficiency, and accuracy. The system leverages quantum principles and adaptable quantum algorithms, making it compatible with various quantum computing technologies. It addresses practical challenges in quantum computing, like error correction and decoherence management, and is designed for large-scale data processing tasks across industries. This quantum-enhanced system can revolutionize data analysis, foster further advancements in quantum machine learning, and contribute to environmental sustainability through efficient computing.

Accompanied Drawing **[FIGS. 1-2]**

Dated this 22nd day of July 2023

Signature:

Applicant(s)

Dr. Sandip D Satav et. al.

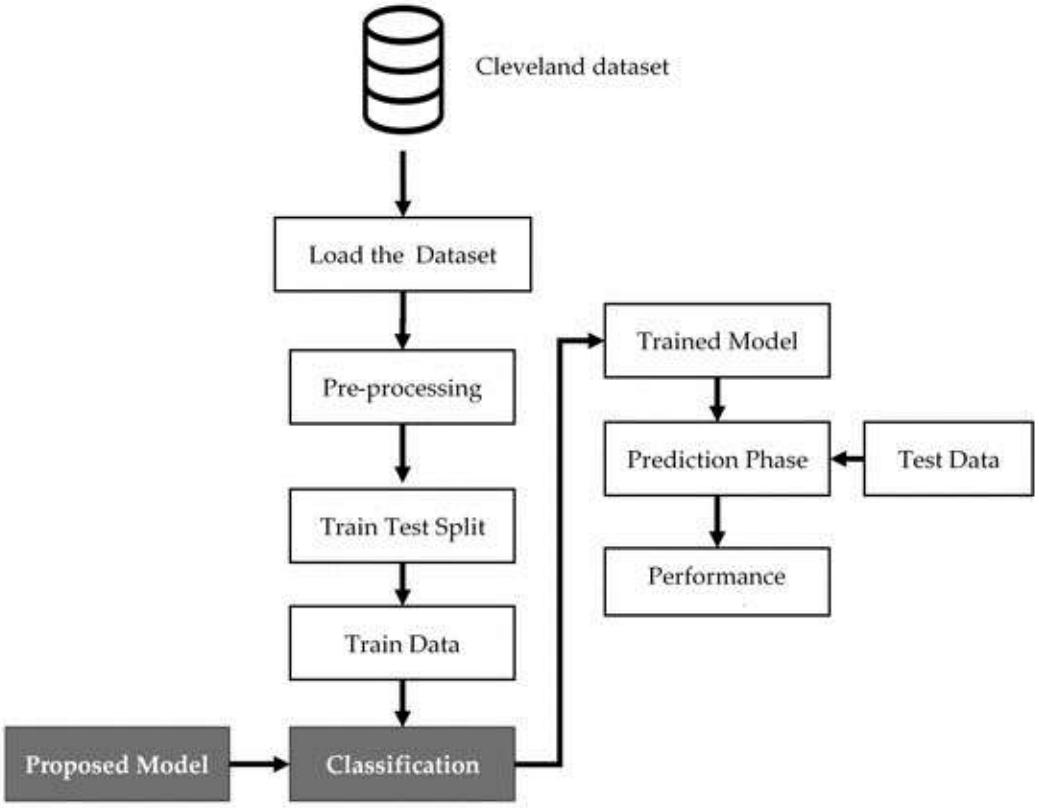

Figure 1

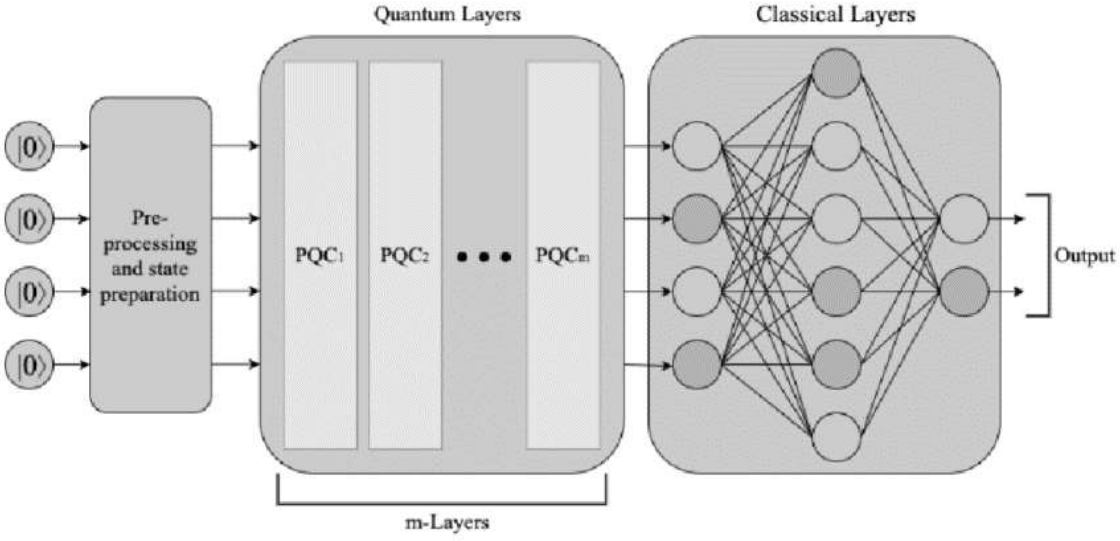

Figure 2

Dated this 22nd day of July 2023

Signature:

Applicant(s) Name: Dr. Sandip D Satav et. al.

FORM 3

THE PATENTS ACT,
1970 (39 of 1970)
and
THE PATENTS RULES, 2003

STATEMENT AND UNDERTAKING UNDER SECTION 8

(See section 8; Rule 12)

1. Name of the applicant(s).	I/We Dr. Sandip D Satav et. al., all are citizen of India, Address of one of the Applicant: Associate Professor, Department of Information Technology, JSPM's Jayawantrao Sawant College of Engineering, Hadapsar, Pune - 411028.
2. Name, address and nationality of the joint applicant.	(i) that I/We have not made any application for the same/substantially the same invention outside India Or (ii) ~~that I/We who have made this application No… dated alone/jointly with ..... , made for the same/ substantially same invention, application(s) for patent in the other countries, the particulars of which are given below:~~

Name of the Country	Date of Application	Application No.	Status of the Application	Date of Publication	Date of grant
-	-	-	-	-	-

3. Name and address of the assignee	(iii) that the rights in the application(s) has/have been assigned to …… none …… …… …… that I/We undertake that upto the date of grant of the patent by the Controller, I/We would keep him informed in writing the details regarding corresponding applications for patents filed outside India within six months from the date of filing of such application. **Dated this 22nd day of July 2023**

4. To be signed by the applicant or his authorized registered patent agent.	**Signature:** 
5. Name of the natural person who has signed.	Dr. Sandip D Satav et. al. **Name of the Applicant(s)**
	To The Controller of Patents, The Patent Office, at Mumbai
Note.- Strike out whichever is not applicable;	

FORM- 5

THE PATENTS ACT, 1970

(39 of 1970)

&

The Patents Rules, 2003

DECLARATION AS TO INVENTORSHIP

[See Section 10(6) and Rule 13(6)]

1. NAME OF THE APPLICANT

I/We Dr. Sandip D Satav et. al., all are citizen of India, Address of one of the Applicant: Associate Professor, Department of Information Technology, JSPM's Jayawantrao Sawant College of Engineering, Hadapsar, Pune - 411028.

hereby declare that the true and first inventor(s) of the invention disclosed in the complete specification filed in pursuance of ~~my~~ / our application numbered _____ dated 22-07-2023 ~~is/~~are

2. INVENTOR(S)

(a) NAME	**(b) NATIONALITY**	**(c) ADDRESS**
1. Dr. Sandip D Satav	Indian	Associate Professor, Department of Information Technology, JSPM's Jayawantrao Sawant College of Engineering, Hadapsar, Pune - 411028
2. Dr. M. Sumithra	Indian	Associate Professor, Department of Information Technology, Panimalar Engineering College, Chennai 600123
3. Mr. Malka Ashish	Indian	Student, Department of Mechanical Engineering, TKR College of Engineering & Technology, Medbowli, Meerpet, Hyderabad, 500097
4. Mr. Naresh Kumar A	Indian	Assistant Professor, Department of Computer Science & Engineering, JNTUH University College of Engineering, Science & Technology Hyderabad, Kukatpally, Hyderabad-500085
5. Mrs. Sambari Chaitanya	Indian	Assistant Professor, Department of CSE (AIML), Malla Reddy Engineering College (Autonomous), Main campus, Secunderabad-500100
6. Dr.S.Vimal	Indian	Assistant Professor, Department of Computational Intelligence,

		School of Computing, SRM Institute of Science and Technology, Kattankulathur - 603203
7. N. Gopinath	Indian	Assistant Professor, Department of Computer Science, and Engineering, Sri Sairam Engineering College, Chennai

~~3. DECLARATION TO BE GIVEN WHEN THE APPLICATION IN INDIA IS FILED BY THE APPLICANT(S) IN THE CONVENTION COUNTRY: -~~

N.A.

~~We the applicant(s) in the convention country hereby declare that our right to apply for a patent in India is by way of assignment from the true and first inventor(s).~~

Dated this 22nd day of July 2023

Dr. Sandip D Satav et. al.
Applicant(s)

To,
The Controller of Patents
The Patent Office, Mumbai

FORM 9

THE PATENT ACT, 1970
(39 of 1970)
&
THE PATENTS RULES, 2003

REQUEST FOR PUBLICATION

[See section 11A (2) rule 24A]

I/We **Dr. Sandip D Satav,Dr. M. Sumithra,Mr. Malka Ashish,Mr. Naresh Kumar A,Mrs. Sambari Chaitanya,Dr.S.Vimal,N. Gopinath** hereby request for early publication of my/our [Patent Application No.] TEMP/E-1/57102/2023-MUM

Dated **22/07/2023 00:00:00** under section 11A(2) of the Act.

Dated this(Final Payment Date):----------
Signature
Name of the signatory

To,
The Controller of Patents,
The Patent Office,
At Mumbai

This form is electronically generated.