

# Revamping mariner's mental health using quantum computing techniques

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## INTRODUCTION

Mental health in the maritime industry is becoming a thriving issue for mariners and their families. Mariners face a type of lockdown while living in the sea as they don't have any social network. They may be living with crew members who have quite different cultures, languages, and values. While stranded at sea, Mariners face different kinds of challenges in their family life from marriage problems to the problems of children (Sharma, 2021). Apart from negative stressors, positive stressors such as not attending a wedding, the birth of a child and birthdays may be challenging and stressful for mariners. Marines who are away from home for extended periods may have mental health issues like anxiety, stress, depression, and suicide. Moreover, major mental health problems may have contributed to the development of other major health disorders like neurological (migraine, Parkinson's, Alzheimer's,) musculoskeletal, Hand-arm vibration syndrome communicable (malaria, tuberculosis) cardiovascular disorders. Also, mariners are more prone to cancer disorder due to exposure to unhealthy lifestyle factors such as alcohol, poor diet, and smoking. Quantum computers are a way of processing data using qubits and allowing for swift calculations due to their capability of entanglement and superposition. Quantum techniques have the potential to solve mental health issues by identifying different patterns of the brain and predicting different mental health problems as mental illness involves complex social and environmental factors. It seems that the effective use of quantum computing may be beneficial to the mental health of mariners. Also, Quantum computing has the power to enhance understanding of mental health, early diagnosis, ongoing monitoring and identifying novel treatment methods for mental health (Padha & Sahoo, 2024).

This study focuses on mental health problems faced by mariners in the sea and proposes a solution for the

same. The paper briefly presents how quantum computing can be beneficial for mariners' mental health such as ongoing monitoring, and development of targeted and potentially personalized therapeutic strategies for individuals with psychiatric disorders. Also, limitations, challenges and future perspectives of the proposed technique are discussed.

## QUANTUM COMPUTING FOR MENTAL HEALTH

Soft Computing techniques have already had a substantial impact on mental health. Many AI "chatbots" currently used to provide mental health support were initially trained using natural language processing soft computing algorithms (Sharma & Sharma, 2023). However, an improved overall understanding of mental disorders will require extensive and computation-intensive analyses of complex datasets. Thus, quantum computing has the potential to improve our overall understanding of mental health and uncover new and personalized treatment strategies. Also, quantum computing may enhance and refine predictive modelling strategies currently used to determine mental health outcomes. Moreover, quantum computing techniques are capable of simultaneous analysis of genetic, behavioural, historical, clinical, and environmental (Shams et al., 2023). This technique may provide insight into factors that increase the risk of developing mental health disorders, thereby facilitating early intervention. So, quantum computing can be beneficial for the diagnosis of mental health problems by identifying factors that disturbs mental health. Many scientists used a D-Wave quantum computer to analyze the COVID-19 pandemic's effect on the mental health of college students. Moreover, quantum quantum-enabled magnetocardiography property of the quantum technique can help in the early diagnosis of

cardiac problems faced by individuals. Also, medicine and drugs for cancerous tumours can be easily designed by quantum computing techniques.

## **POTENTIAL OF QUANTUM COMPUTING TECHNIQUES IN THE MENTAL HEALTH OF MARINERS**

The mental health of Mariners is very prime concern for the maritime industry as maritime industries are totally dependent on mariners. So, mentally, and physical fitness of mariners is the need of the hour. Quantum computing has enormous potential in identifying the mental health issues of mariners. Since it might be difficult for specialists to maintain constant contact with seafarers, gathering data on mental health issues. The proliferation of smart wristbands and smartphones, coupled with technological advancements, have made gathering data related to mental health issues of mariners quicker and easier. Quantum sensors such as inertial, ambient, and physiological etc. embedded in watches and phones can collect huge amounts of data and capture the information (different-different patterns) about the mariners. Collected data from sensors can be computed and analyzed by specialist with the help of quantum computers (Stefano, 2024).

Researchers or specialists can quickly determine the kind of mental disorder is mariner faces, such as anxiety, depression, stress, etc., that a mariner is experiencing by gathering data on behavioural patterns, environmental factors, and genetic traits using quantum sensors (Tam et al., 2021, Sharma, 2022). Quantum sensors can also detect small variations in the brain that can be helpful in the monitoring and diagnosis of mental disorders as monitoring of mental health of mariners on time is very important. Also, the quantum sensor can identify neural patterns in the brain for identifying Parkinson's and Alzheimer's disorders. As mental health data is very subjective, labelling such data requires a machine learning algorithm. So, quantum computing can also enhance machine learning algorithms for pattern recognition and early prediction of the level of mental issues in mariners. Quantum computing can also enable new methods of treating mental health issues of mariners by using the features and powers of platforms and devices, such as cameras, microphones, sensors, and displays, as well as virtual reality, mobile, and online therapies. Moreover, quantum dots in imaging techniques can also help in the

early diagnosis of mental issues by their distinct fluorescent properties (Padha & Sahoo, 2022). Additionally, the results of computed tomography, positron emission tomography, and magnetic resonance imaging can be processed and analyzed more effectively with the usage of quantum computing techniques. These characteristics will play a critical role in our quest to create new, more potent, and potentially tailored medication treatments for bipolar disorder, schizophrenia, and depression as well as in the diagnosis of other mental health disorders in mariners.

Quantum computing can generate more precise and timely simulations of complex molecular events and interactions; this could speed up the drug discovery process for mental health. Also, this proposed technique can revamp the existing drugs for new medical applications. Quantum computing may be utilised to improve healthcare resource allocation and logistics, such as hospital operations, patient scheduling, and supply chain management for improving healthcare's affordability and accessibility. Overall, the study focuses on the benefits of quantum computing in the mental health of mariners. Apart from mental health, other neurological disorders, and cardio problems are also discussed as physical health issues directly impact the mental health of the mariners. So, physical health problems also need to be identified and resolved. Additionally, research can focus on the availability and accessibility of internet connection and modern devices such as watches, phones etc. to the mariners in remote locations for collecting health-related data (Stefano, 2024).

## **CHALLENGES AND LIMITATION**

Despite the enormous potential of quantum computing in healthcare, several issues and restrictions must be resolved. Firstly, the stability of qubits—the essential components of quantum computing—remains a major issue. The development of more resilient and error-correcting technology is essential since even the smallest disruption in qubits can result in inaccurate results and delay in diagnosis as early diagnosis of mental illness in mariners is more important. Secondly, psychiatrists or specialists can face a challenge while collecting data from quantum sensors as specialists should have experience working with quantum sensors. Thirdly, the maintenance cost of quantum computers is very high. Lastly, the security of mental healthcare data is a very big challenge as data related to mental health is very sensitive data.

## FUTURE OF QUANTUM COMPUTING IN MENTAL HEALTH

Quantum computing has the power to revolutionize mental health research by providing powerful computational features for analyzing the most influential factors that contribute to a mariner's mental health. Also, drug development for mental health can be revolutionised by quantum computing. After analyzing exactly mental health issues among mariners, quantum computing techniques will be able to advise drugs to the mariners. With ground-breaking discoveries like brain stimulation technology, AI-powered medical apps, and quantum

computing, the Deeptech technology consisting of brain simulation technologies can completely change the mental health industry. The integration of quantum computing with the Deeptech technique can revolutionize mental healthcare and can lead to early and accurate diagnosis of mental disorders in mariners.

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