

Remote diagnosis, monitoring and intervention for maritime industry workers: need and challenges

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The mariner industry plays a significant role in overall world trading. It seems to be almost impossible to do inter-continental trade, massive global transportation, import/export of goods and food items without having assistance from the shipping industry [1]. However, due to the tough and challenging working environment, it is very difficult to work in this industry. The person working in the maritime industry has to normally spend a couple of months and more on the ship. The hectic work pressure and isolation from the family may induce different human psychiatric conditions among the mariners. Therefore, for the healthy mental state of mariners, there is a dire need to monitor the psychological state of the mariners at a regular interval of time, so that, they can be given remote psychological intervention if required.

There is a tremendous need to design and implement a mental healthcare policy that focuses on providing psychological intervention, mobile and online mental health services for the shipping industry workers. However, one of the major challenges in designing such a monitoring system is the bandwidth and the availability of the internet connection.

The delay in this health policy can drastically exacerbate stress, anxiety, depression, and other psychological disorders [2]. Initially, to cope with this health problem, the distinct online resources (Zoom, WebEx, Skype, Join.me) need to be used to develop a virtual environment (School, College, Gym, Temple) for assisting the sharing among the congregation of people. Moreover, a comprehensive therapeutic technique (psychotherapy) should be used to understand and rectify the behaviours, thoughts, and emotions of mentally sick employees. The use of in-place cognitive and behavioural therapies may assist to transform the mental state and behaviour of the mariners. The psychological interventions strengthen their morale and could be

effective in mitigating the psychological impacts induced due to momentous work and the isolation from family. The psychiatric therapies (cognitive and behavioural) will also improve the functioning of their immune systems. However, the implementation of an in-place comprehensive therapeutic technique seems to be very tough and challenging as far as the shipping industry is concerned. Therefore, there is a need for remote monitoring of the psychological health of mariners.

In the light of the above situation, the real necessity is a well-planned framework that works on following strategic policies:

- as people normally share their feelings and opinion over social networks; therefore, despite the official record, the use of sentiment analysis of Facebook, Twitter, and other social networking sites can also be useful to trace the individuals that are in serious psychiatric needs;
- additionally, the design of a stress symptom mapper app (Android and iOS) can be an added advantage;
- the early and timely mobile (remote) psychiatric intervention can even mitigate the risk and mortality rate of suicides;
- the use of m-health (mobile health) services such as calls (audio, video), apps (WhatsApp, Zoom, WeChat), messages (text, audio, picture, video) would be an important way to mental stepped care;
- different m-health services can be used to provide cognitive and behavioural therapies to stressed workers;
- additionally, there is a dire need to design and implement free web-based mental health services (like www.betterhelp.com, www.moodgym.com.au, www.beyondblue.org, .au etc.) for effective management of different psychiatric conditions such as stress, anxiety, depression, suicide, anger, and sleep disorders (Fig. 1).

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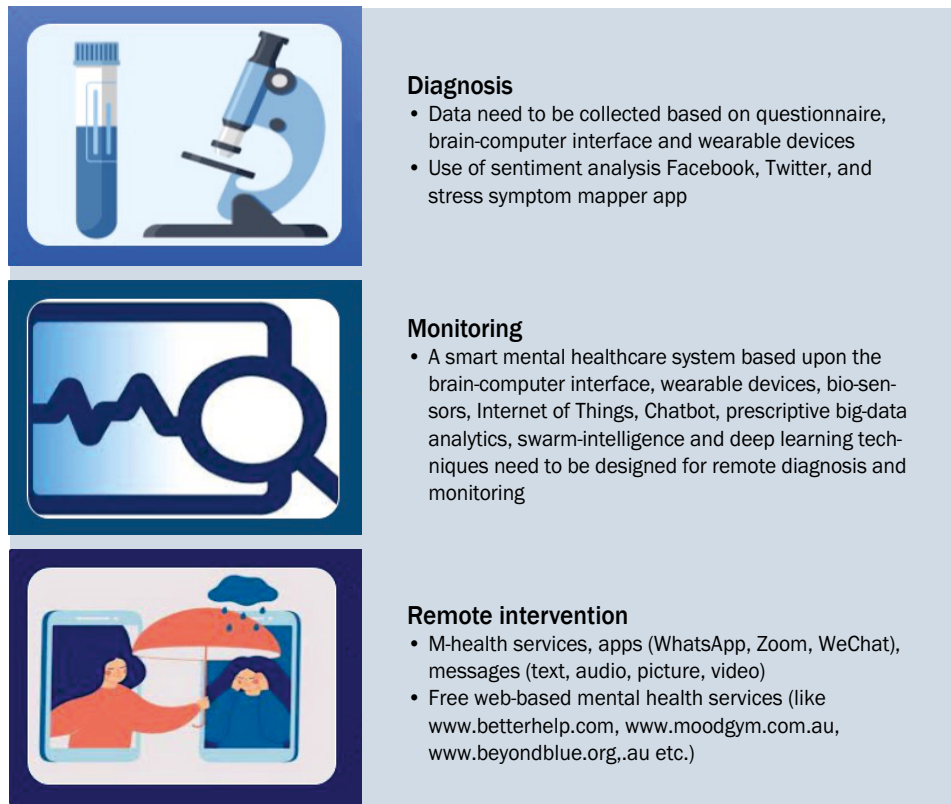


Figure 1. Proposed system

Above all, a smart mental healthcare system based upon the brain-computer interface, wearable devices, bio-sensors, Internet of Things, Chatbot, prescriptive big-data analytics, swarm-intelligence and deep learning techniques need to be designed for remote monitoring of the psychological condition of the mariners [3]. The system may be used to monitor the real-time psychological state of the victims so that remote (online or mobile) psychiatric assistance can be provided to them if needed. Moreover, an online hub of leading psychiatric and research institutes need to be deployed to provide regular and timely support to all afflicted individuals [4]. The challenges that need to be faced during the design and implementation of this system are:

- first of all, the reliability and the precision of the proposed system significantly depend upon the internet connection. However, the internet availability, bandwidth and the cost associated with it is the real challenge in the successful implementation of this model;
- furthermore, as the system attempts to locate a satellite, the unstable connections, lack of coverage, lapses in operation and slowdown are some of the common connectivity issues on the ship;

- additionally, for effective performance, the exploration and exploitation phases for swarm-intelligent computing techniques need to be carefully balanced;
- finally, to maintain the privacy and confidentiality of the mariner's data, advanced security mechanism need to be employed.

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