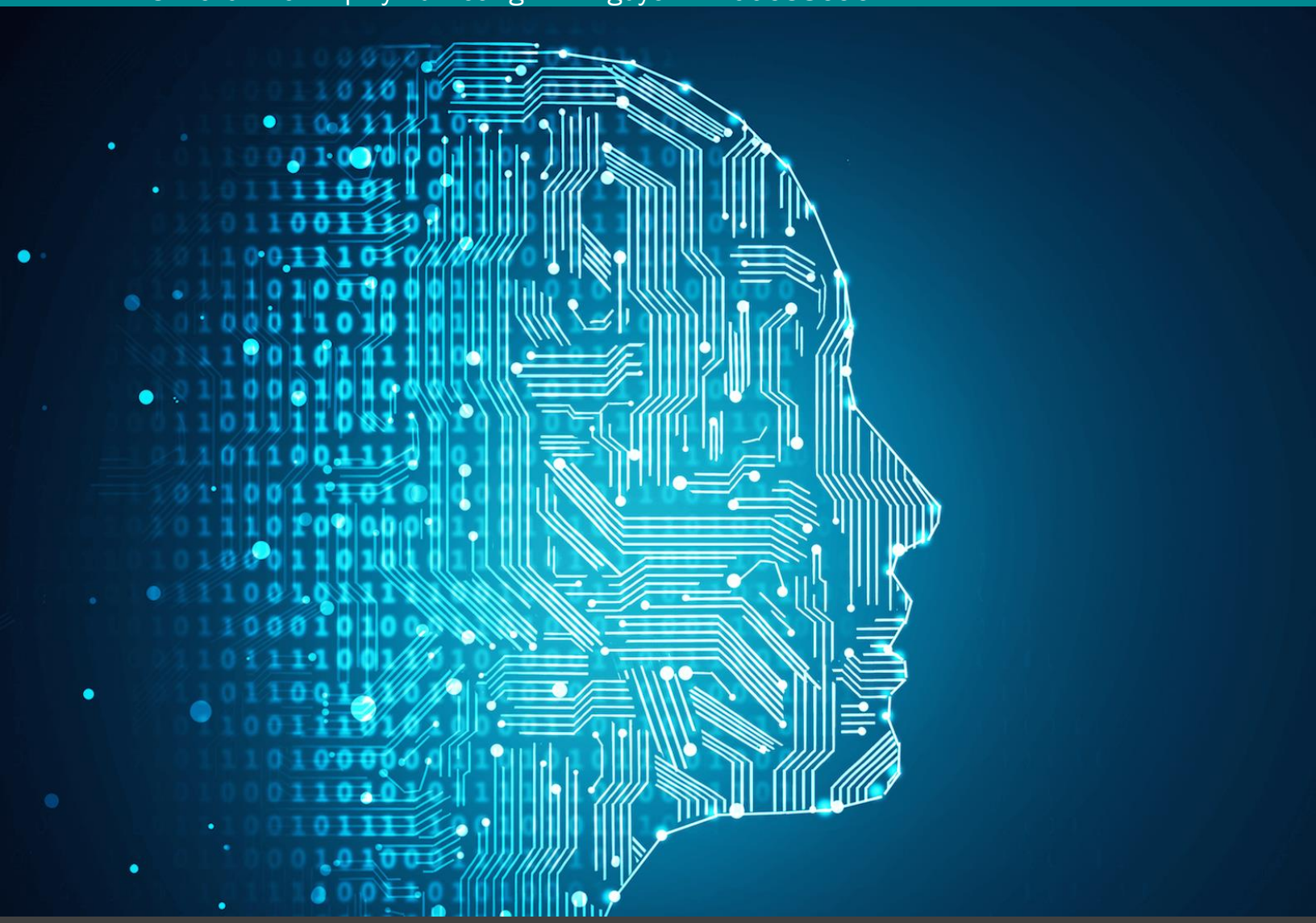
13 March 2021 | By Vu Hoang Anh Nguyen – T00638696



The Future of Work

Adopting AI in mental healthcare treatments

INTRODUCTION

In the midst of the current COVID-19 pandemic, there are legitimate concerns that an epidemic of mental illness is actually occurring and affecting all populations. However, there are key obstacles to address global mental health. They are stigma, low funding, and an acute shortage of mental health professionals. Regarding these obstacles, **Artificial Intelligence** (AI) technology holds great promises to transform mental healthcare.

Current Situation

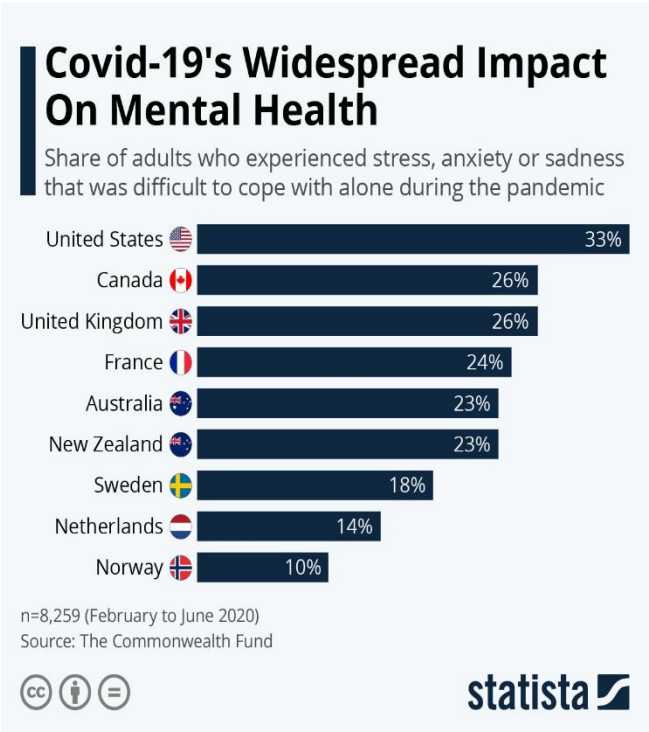
Nowadays, countries all around the world are struggling with the high prevalence of mental health disorders. These disorders have enormous influences on people's lives, the community, and society in terms of health care costs.

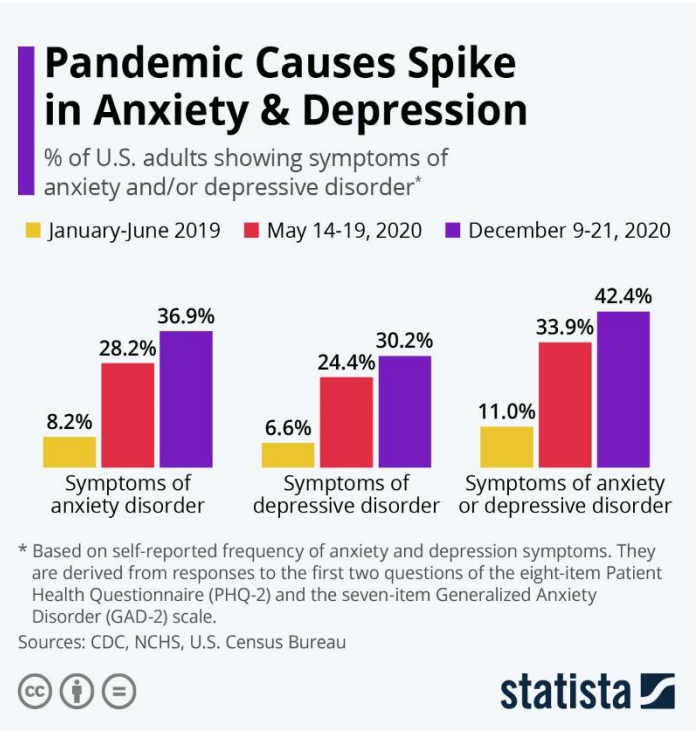
Psychiatric disorders are one of the leading causes of disability worldwide, and they might affect individuals from an early age.

Mental health illnesses are estimated to affect approximately 15% of the global population. They are also one of the leading factors leading to morbidity and mortality worldwide. In the next 10 years, these health disorders are forecasted to cause a loss of $16 trillion of the global economy (Doraiswammy, 2019).

It is claimed that the coronavirus disease 2019 (COVID-19) pandemic has had a negative impact on mental health.

Rapid public health responses to the pandemic such as physical distancing, infection prevention, and control measures are effective in reducing the risk of exposure or infection. However, in locations where lockdown is enforced, they might trigger the mental health burden. For example, in China, the prevalence of anxiety among the general population is estimated to be around 31.9%, and depression to be around 33.7% (Wang, 2020). The economic downturn and reduced earnings because of the lockdown might further exacerbate psychological distress and increase the vulnerability of low-income populations and individuals with pre-existing mental illnesses. Furthermore, the virus might also hurt the central nervous system, which results in a psychiatric and neuro-psychiatric burden on infected individuals that are in the acute or post-illness stage (Rogers, 2020). Unfortunately, the victims of mental disorders might face the difficulty of meeting a professional during the pandemic.





This current situation leads health care decision-makers, professionals, health systems leaders, and policymakers to ask: What is a solution to remedy this problem?

In this paper, I share an overview of AI and potential applications in mental healthcare, the challenges of adopting AI in mental treatments, and a discussion of how AI and can supplement clinical practice regarding the mental health crisis in the world. It is rooted in a growing body of research and insight from early adopters and experimenters. By putting the ideas into print, I hope to inspire people to improve the quality of mental health care services, expand the access to mental healthcare, and revolutionize the mental health workforce.

THINGS TO KNOW ABOUT AI

The definition of AI

AI can be defined as “the study of ideas to bring into being machines that respond to stimulation consistent with traditional responses from humans, given the human capacity for contemplation, judgment, and intention” (Grewal, 2014). AI, in varying forms and degrees, has begun to appear in a wide spectrum of technologies, from the phones we use to communicate to the supply chains that bring goods to market. It is transforming the way we interact, consume information, and obtain goods and services. Health care is no exception. In health care, the impact of AI, through natural language processing (NLP) and machine learning (ML), is transforming care delivery.

While AI is starting to be leveraged in clinical practices such as medical imaging and genetic testing, the routine adoption of AI in healthcare is still not popular because of the greater potential risks (Z.Pang, 2019).

AI in Mental Healthcare

While AI technology is becoming more popular in medicine for physical health applications, the discipline of mental health has been slower to adopt AI. Mental health practitioners are more hands-on and patient-centered. However, mental health practice still has much to benefit from AI. AI has great potential to re-define our diagnosis and understanding of mental illness, as well as the nature of psychology and psychiatry work (Z.Pang, 2019).

Leveraging AI techniques offers the ability to develop better pre-diagnosis screening tools and formulate risk models to determine an individual's predisposition for, or risk of developing, mental illness.

With the rapid spread of smartphones, wearable sensors, cloud-based computing, and intelligent technologies, using AI for better diagnosis and creating virtual therapists might be an effective solution. AI-based therapies have the potential to be fast, cheap and effective.

POTENTIAL APPLICATIONS OF AI IN MENTAL HEALTHCARE

Artificial Mental Health Therapy Software

Artificial intelligence solutions such as facial recognition, natural language processing, and computer vision might be integrated to develop personal profiles for patients and give pre-diagnostic screen.

This type of AI tool helps find indicators of certain conditions in the patients.

Human therapists can use these cues for a more accurate diagnosis. The tools might be available for personal use for those that suspect they have a mental problem and want to seek professional help as soon as possible. AI-based psychologists can also help monitor patients' symptoms and provide additional supports besides counselling sessions.

Mental Health Chatbots

Many patients struggle to communicate their thoughts and show their feelings directly, and AI-based chatbots offer a space for those who are too shy to seek direct professional help.

Especially in the age of coronavirus, the chatbots can fulfill the patients' urgent needs of being listened immediately and share the burden with human practitioners.

AI in Coordinated Healthcare

AI can be used to coordinate mental health care with physical health care.

During stressful times, artificial intelligence mental health care applications can be developed to help users keep actively engaged in their treatments. Computer-based therapists can suggest exercises that are specifically targeted to handle stress and anxiety. The physicians of mental disorders may also be alerted the physical health impacts of treatments by AI applications ("Artificial intelligence in behavioral and mental health care").

THE ADVANTAGES OF USING AI IN MENTAL HEALTHCARE

1. Better predictive value

At this moment, observation of mental state and self-report questionnaires are main methods of psychiatric assessment for mental patients. However, these methods are subjective, challenging to repeat, and time-consuming. Fortunately, additional methods, such as audio and video analysis, are offered by AI. Audio and video analysis might have greater objectivity and have better predictive value. A machine learning speech classifier developed by IBM has an accuracy of 79% in predicting psychosis onset. Moreover, the computer vision, based on video analysis, could detect mental symptoms with 96% accuracy (Lovejoy, 2019).

2. Additional monitoring

AI could be combined with sensors and smartphone applications to improve monitoring for patients. Furthermore, medication adherence is another aspect of monitoring. AI, combining with mobile applications, improves the medication adherence by giving reminders and helping patients keep track of their medications. To maximize the effect on mediation adherence, machine learning might be used as well to facilitate continual improvement of these application.

3. Accessibility, de-stigmatization and personalization

A single AI system can be used by a large population. By reducing the length and the high cost of travel to mental health clinics, which is usually located in the centres, AI increase the accessibility. AI can help over-burdened mental health professionals to increase the reach of their services. Additionally, it could help people whose conditions restrict their ability to travel.

AI might also provide patients with greater personalization of care. As an illustration, the sophisticated analysis that AI collects from patients' data leads to a better prediction of therapeutic response. Therefore, the need to perform multiple trials of different medications would be reduced.

Furthermore, AI might also enhance the accessibility to mental health treatments by circumventing the stigma surrounding mental illness. For example, chatbots may avoid the stigma because the chatbots are not affected by any cultural norm and expectation. They are non-judgmental, non-opinionated and overall neutral.

4. Re-balancing clinician workload

AI can re-balance a clinician's workload, giving them more time to interact with patients. Therefore, the quality of care is improved. Reading notes to build an accurate picture of a patient's history is time-consuming for psychiatrists. Natural Language Processing (NLP), a solution to this time-consuming practice, is an area of AI which involves analyzing human language. NLP could be used to summarize data from a patient's electronic health records, then provide a succinct summary for the preparation of a consultation. NLP could also provide a short summary of a patient's mental state, which could be a useful supplement to the psychiatrist's mental state examination (Lovejoy, 2020). And of course, the algorithm of NLP is objective.

THE LIMITATIONS OF USING AI IN MENTAL HEALTHCARE

Data security, privacy and consent

Healthcare data is sensitive. The healthcare profession must earn the public's trust in order to gain the embrace of the adopting of AI technology. There are cases that involve the misuse of personal data. For example, Facebook-Cambridge Analytica scandal is a well-known case. The similar events within the healthcare disciplines might lead to serious consequences.

Moreover, mental illness might patients' ability to provide consent. For example, A patient may initially give the consent for passive monitoring, but due to his worsening mental health, it is unclear whether the patient's initial consent remains valid. AI would also require patients to consent to much greater amounts of data, and the consent to video, audio and other forms of data are not easily collected.

Unregulated use and potential harm

The majority of mental health applications in the market had not been validated. Dangerously, these applications are primarily conducted by small-scale and short-term pilot studies. Because of poor-quality information and potentially harmful recommendations, the use of these unvalidated apps might pose risk to patients.

“The Future of Work” is a series of papers created by the students of CMNS 3240 course. The series is designed to communicate particular perspectives that affects the future of work - Business perspective, Labour perspective, and Education perspective. The contributors to this paper – Adopting AI in Mental Health Treatments – is Vu Hoang Anh Nguyen.

Resources

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