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A Comprehensive Study on Smart Brain Chip Technologies for Precision Mental Health Monitoring and Treatment

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ABSTRACT

Smart brain-chip technologies have improved both the accuracy and time for diagnostic and treatment of mental health. This article offers an in-depth look at neural interfaces that have been developed, used, and have had practical implications in the treatment of mental disorders via real-time cognitive function simulation. Thanks to multidisciplinary merging of neuroimaging, the most advanced machine learning as well as engineering, these devices will make room for the development of new therapies useful for e.g. depression, anxiety, bipolar disorder, and PTSD. The article points to the fact that intelligent brain chips are able to carry out very precise diagnostics and also allow fast treatment, which, in turn, can lead to positive outcomes in patients. Nevertheless, there are still some issues that need to be answered such as the infringement of data privacy, the risks of ethical nature, and the effects of neural interventions in the future that are not yet well-known. The study deals with these problems by connecting them to issues found in the application of smart brain chips in mental health care.

Keywords: *Smart Brain Chips; Neural Interfaces; AI in Mental Health; Neurotechnology; Precision Medicine; Brain-Computer Interfaces.*

1. INTRODUCTION

Neural implants and artificial intelligence (AI) have become the two major technologies that keep developing in the field of mental healthcare. It turns out that brain-computer interfaces (BCIs), quite often termed as smart brain chips, now have their role as at the present the disposable diagnostics and therapeutic motion devices on patient body parts that have become] paradigmatic in treating neurological and psychiatric disorders with precision. Through these implementations, it is possible to extract the signals from the patient's brain and also give the feedback to stimulate the brain, thus creating adaptive neuromodulation, which represents a new front in the therapy of the individual.

Mental disorders like depression, anxiety, and post-traumatic stress disorder (PTSD) are found to be the most common worldwide [1]. All these diseases generally involve long-term management, and the conventional solutions such as pharmaceuticals and psychotherapy cannot solve the problem in all cases. Under these circumstances, advanced smart brain-chip systems become a feasible way for the patients who are not responding to the old treatment to be helped with their situation.

The latest advancements in wearable neurotechnology are now allowing individuals to monitor their brain activity in a less obtrusive manner, eventually resulting in a continuous recording of the mind's cognitive and emotional states. Furthermore, research on the potential of closed-loop neuromodulation systems has provided evidence that the occurrence of real-time, adaptive events in the brain can alleviate the decline in mental health [2]. The fusion of AI, neuroscience, and bioengineering is the basis for smart, personalized treatment models at efficient levels. In this paper, we are exploring technical, clinical, ethical, and regulatory features of smart brain-chip technologies which were mostly the latest AI-driven analytics and wearable and implantable neural interfaces as well as future mental healthcare were the main focus.

2. LITERATURE REVIEW

A. Evolution of Brain-Computer Interfaces (BCIs)

Brain-computer interface (BCI) technology has grown very fast. The very first BCIS used non-invasive EEG techniques for decoding the neural signals [3]. While, these days, implantable systems like electrocorticography (ECoG) and deep brain stimulation (DBS) have been deployed to offer superlative quality of the neural signals at the same time as they cause more complicated surgery. This development is powered by companies such as Neuralink and NeuroPace which are creating devices that are able to handle data processing from the brain in a faster way now compared to earlier [4].

Closed-loop BCI systems have demonstrated very clear positive outcomes in a clinical context. In a particular study, Ranoel et al. demonstrated that neurostimulation, which adapts to the needs of the patients, was significantly effective in reducing the symptoms in patients with both depression and epilepsy, beyond what the effect of common medications was [5]. At the same time, the other part of the scientific community is looking into individual neural patterns to find a way to provide special therapies in the case of people with multiple psychiatric disorders [6].

B. AI-Driven Analytics in Mental Health Monitoring

Everyday vocabulary is used in every area of life, and artificial neural networks and deep learning are not exceptions to this rule. They have caused a tremendous transformation in the field of mental health diagnostics by deciphering hidden patterns from neural signals [7]. These software products are able to interpret the brain's unbroken stream of data in search of certain biomarkers that indicate such illnesses as depression, anxiety, or PTSD, and at the same time, they can prevent the diseases from developing completely.

As an example, with the help of AI-enhanced neuroimaging (beyond the boundaries of the usual kind of scans), people are trying to get at the very first symptoms of mental illnesses. Also, among other things, AI-based neurotechnology makes it possible for real-time therapy adaptation by adjusting the therapy to the needs of the patient through the feedback from the brain, thus, improving the patient's condition and the clinical outcome.

C. Comparative Study of Existing Smart Brain Chips

Take the example of the product of Neuralink; it utilizes a specific method for the signal, i.e. high-resolution ECoG electrodes of neural signal acquisition and deep learning models to acquire the data meaning. In contrast, the closed-loop DBS system with pattern-recognition algorithms is done in NeuroPace, whereas Kernel involves a non-invasive EEG interface and artificial intelligence-based cognitive enhancement software. These distinctions demonstrate the invasiveness of the devices, the quality of the signals, and the application focus.

Feature	Neuralink	NeuroPace	Kernel
Signal Acquisition	High-resolution ECoG	Closed-loop DBS	Non-invasive EEG
AI Integration	Deep learning models	Pattern- recognition	AI-driven cognitive enhancement

Feature	Neuralink	NeuroPace	Kernel
Target Application	High-resolution ECoG	Seizure Prevention	Cognitive Enhancement

Table I. Comparison of key features of selected smart brain-chip technologies.

These undoubted innovations point out that technology and mental health interfaces are oriented towards self-regulated control and diagnosis and intervention and that mental health problems are treated by AI and neurotechnology through personalised and adaptive therapies. The most important part of the future search would be therefore to solve such practical issues as prolonging device life, power saving, and being very cautious of the smart-chip use ethical impact.

D. Research Gaps and Future Directions

Despite this, many impediments to further the progress still have to be removed before mind-controlled chips become fully functioning. There are still several areas in the research which remain unsolved:

- **Long-term stability and biocompatibility**: It is very important that the implants will not only be implantable but also that they will have the same properties for a long period; besides, the biological tissue reaction and the decay of the signal can be very hard to overcome.
- **Power consumption:** Those devices that are used in the form of implanted and wearable ones should also be energy-efficient so that they can work day and night without interruption and in a reliable way.
- Signal processing and algorithms: The utilization of AI algorithms is indispensable to not only extract the neural signal from the noisy sources but also obtain a robust signal-to-noise ratio.
- **Data privacy and security:** The data from the brain are characterized by their high privacy nature, so, therefore, against the intrusion for the purpose of obtaining the data safety, it is the most basic requirement that a protection method that is completely unbreakable is used.
- **Materials and design:** The electrodes and device forms used should be new to science and also they should be designed respecting the ergonomics of both medical professionals and the patient to be able to achieve comfort, durability, and signal quality.
- **Clinical translation:** The interface between the sciences of engineering, neuroscience, and clinical is the only point of contact that can gather all the factions and bring the research from the laboratories to the patient caregiver boards.

New smart chips that will work as intended and will last longer in the field of psychology will result from the target-based research which is being done.

3. TECHNICAL FOUNDATIONS & AI INTEGRATION

A. Neural Signal Acquisition and Processing

Efficient and fast data processing rely on precise neural signals, which are in turn, highly dependent on the quality of the implanted brain electrodes. As an example, for the invasive approach (e.g., ECoG, DBS), the electrodes are either directly inserted into the brain tissue or placed on the brain's surface, and as a result, the result is the high spatio-temporal resolution that comes with it [8]. Nevertheless, these methods are highly invasive and, therefore, may raise concerns related to tissue compatibility and the stability of the implanted device that should, anyway, be long-term. On the other hand, non-invasive methods (such as EEG, fMRI) are not only safe, but can also provide better resolution with very little risk, yet they are more vulnerable to the influence of artifacts and noise.

One of the latest technologies is the idea of merging both methods together in a single system. The situation is positively related to the use of a signal through a biocompatible coating on the flexible microelectrode arrays, and not only is the result subject to the constant, but also, the that may cause tissue irritation is removed [9]. Besides, the progress of digital signal processing has reached a level that even such powerful tools as adaptive filtering, wavelet transforms, and Principal Component Analysis can be effectively used for this purpose. The most efficient neural data pre-treatment is AI treatment because it is based on the result of the AI processing of raw neural data and as a result, it is the least ambiguous source of brain activity signals that is reliable [10].

B. AI Algorithms for Brain Activity Interpretation

Artificial Intelligence (AI) is definitely among the most sought-after gadgets in the field of neurology for data processing purposes. The most intelligent way of using these brain chips is in the discovery of better methods of learning and in the identification of patterns and their occurrences through following the processing and functioning of the human brain. Specifically, through the utilization of deep learning models such as Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs), being able to transform brain signals into spatial and temporal features has become a reality [10]. If we can imagine a scenario whereby the above step (machine learning) is repeated over and over again but using much more data and with the availability of labels, we should expect remarkable improvements in the models' abilities to select and separate the disease patterns. For instance, if we want to solve such complex tasks as finding, e.g., depression and anxiety patterns, that machines are much better at by just enlarging the dataset up to a huge size and then providing it with the correct labels, we only have to do this. });">

Reinforcement learning is another example of a well-known learning model. In this case, the feedback that results from the divergence/ convergence of the information obtained from a user's viewed and the targeted neural activity is used by the system as a reference to modulate stimulation in real-time and to continuously adjust the methods to the situation. The importance of ensemble and transfer learning working as a team is that these individuals can have their models and data taken advantage of in such a way as to share the burden and the performance of the individuals across patient groups might be quite good. This approach actually constitutes AI as the part of the brain chip that is "intelligent" and that indeed can not only obtain the finest quality of the neural data but also extract the neural data leading to the therapeutically meaningful insights and, finally, develop a personalized treatment plan.

C. Hardware–Software Synergy and Emerging Trends

The combination of technology and the team has achieved a significant breakthrough by the latest technology - hardware and AI deal perfectly. It has become a reality to perform complex machine learning operations on edge devices with today's new embedded processors and ultra-low-power microcontrollers [11]. This practitioner's IoT learning method has a positive impact on the environment and the issue as it does not rely on remote cheap online servers that create data at the bottom of the nodes.

The present surge in hardware clearly drives the field even further. The latest microprocessors of the "Neuromorphic" community have been verified as extremely economical in power usage due to their use of the structures of cognitive processing of networks in computing and "quantum computing" technology that can process brain interfaces' monstrous data [12]. Besides, among the new developments are energy collection methods that seek to utilize body heat or motion to convert human energy into electricity for implant [13] recharge. It is expected that mental healthcare, with the interrelationship with the advanced AI, will bloom, reversing it to the person's positive transformation. In the future, the intelligent brain implants of the next-gen are perceived to be more obedient, less intrusive, and to be better serving the patients' needs with patients' security and privacy being kept at an extremely high level. One of the essential sources of these innovations, therefore, is ongoing research in neuromorphic computing, quantum-like processing, and integrated energy systems.

D. Integration Challenges and Future Work

Developing brain-computer interfaces (BCIs) using sophisticated AI and hardware systems is a task that gives rise to a number of issues:

- **Energy management:** It is a crucial problem where the power of implants is concerned. The research is mainly about harvesting renewable energy from the human body as well as optimizing the device power consumption [13].
- **Computation trade-offs:** Use of local AI will reduce latency but increase power usage; if the work is shifted to the cloud, the latter will save power but introduce communication delay and security issues. One possible approach is hybrid architectures, which allows a combination of the two along with future designs that can balance the trade-offs [14].
- **Security:** Since the neural interfaces are in charge of very private data, the protection of cybersecurity is a necessity. The systems need to be able to secure and defend themselves from threats such as data breaches and unauthorized manipulation of neural signals while keeping the table in sight [15].
- **Scalability and standards:** The increasing complexity of brain-chip platforms makes it necessary to define corresponding standards, and to create protocols to realize diverse brain-chip platforms to ensure device safety, compatibility, and regulation compliance.

Solving these problems will require a multidisciplinary research team. In line with the development of new materials in materials science, AI, and bioelectronics, the goal of the matching of smart and stable brain chips for deployment in the clinic is within the reach of the researchers' creativity.

4. CLINICAL APPLICATIONS AND CASE STUDIES

A. Closed-Loop Neuromodulation

Neuromodulation platforms with an integrated segregation have become capable of adjusting the stimulation according to the data provided by a neural signal. As far as this example is concerned, the fundamentally newer technology is featured in the loop closed neural implant which is quite different from the older open-loop systems. A fixed stimulation level is continually maintained in the open-loop systems and that is why the improvement in this system has been significant only because the design of the closed-loop DBS devices has enabled changing the stimulation power to the neural patterns of the patient and thus attain a better control of the symptoms and eliminate the side effects in diseases like Parkinson's disease or epilepsy. The most used four types of neural stimulation that can be found in smart brain-chip systems include the following:-

Deep Brain Stimulation (DBS):The disease can be alleviated when the neural pathways that are the cause of the disease are disconnected through the very targeted insertion of the electrodes. Consequently, these will become the main medical tools for the rehabilitation of Parkinson's disease, dystonia, and OCD. Real-time power of stimulation is used when the electrophysiological signals are received as feedback [16] and this is the main feature of closed-loop DBS devices.-

Vagus Nerve Stimulation (VNS): The implantation of a stimulator connected to the vagus nerve in the neck is the only solution used in the treatment of epilepsy, depression, and heart failure. There is the aspect of energy consumption that cannot be skipped in closed-loop VNS. The only usage in this method takes place when the stimulation is positive while the pathological signals are at it (e.g., a developing seizure that is found) to lessen the energy consumption which is caused by the otherwise accompanying problems [17].-

Optical Stimulation (Optogenetics): The optogenetic technique also features a part that projects the specific boundaries and depths of the entrained neural circuits as a remarkable aspect of the method. The use of light as the agent for controlling neurons is an apparently new technique, and the accuracy has been increased to an unprecedented level. The attachment of channelrhodopsin to the nucleus can be carried out using virus (vector) delivery. The illumination of the specific sets of neurons can be achieved using the optical fibres brought about during implantation. Such a scenario, where several actions in progression, like firing of the target cells and turn-off are in the signal, embodies the economy of operation, the selectivity in action, and the safety of the whole optogenetics process. In conclusion, the proposed approach utilizes the energy most efficiently, never out of synchronization, and minimizes collateral damage, and presents optogenetics as the safest and most reliable neuromodulation tool for the future. Computer simulation programs accurately predict the performance of these newly devised circuit designs.

B. Clinical Validation Through Trials and Case Studies

Proving smart brain chips's effectiveness and safety necessitates two types of tests, namely clinical trials and real-world case studies.

- Clinical Trials: The validation process of devices planted in the nervous system is a multiple-phase study. The first phase of the trials verifies the safety and dosage in a small group of participants. The second stage focuses on the primary efficacy and side effects. The third step holds large-size trials to demonstrate the efficiency and safety of the devices and generate complete and accurate safety data. Phase IV (post-marketing surveillance) is responsible for the monitoring of the devices in the market including the outcome of the patients. These studies are regulated by Regulatory agencies (e.g., FDA, EMA) to make sure they comply with the protocols strictly used in the experiments. [18].
- Real-World Case Studies: Besides controlled trials, it is the patients that become the real reporters of their experiences with the medical care. Forinstance:
- Personalised treatment: What we learn from each case is not only how the patient undergoes costs of psychotherapy and medication and neuromodulation but also what that person's psychiatric and cerebral diseases are like [19].
- Longitudinal tracking: The instant a patient's change of symptoms is monitored day by day or month by month, his progressive condition can be tracked, with the aid of a symptom scale, and this information is disclosed to those healthcare providers who are administering the treatment [20].
- Research-to-practice feedback: Each of the ideas gathered from the experiences of the patients can also be a part of AI algorithms which are now emerging and can give direction to brain-chips in their next attempts to be designed.

Together, these validation strategies build a comprehensive understanding of how smart brain chips perform in both controlled settings and routine clinical practice.

C. Evaluating Effectiveness: Neurological, Psychological, and Biomarker Assessments

For an efficient evaluation of smart brain-chip therapies, various tools need to be used that measure different parameters of the brain:

• **Neurological assessments:** Mapping of brain function can be carried out by imaging and electrophysiological methods to determine the area of impairment. For example, fMRI is a non-invasive technique for detecting changes in blood-oxygen levels, whereas EEG helps to determine that the treatment brings about some changes in the brainwave patterns. Pet imaging of the brain can uncover the metabolic changes in the relevant circuits when therapy is the reason for the changes

• **Cognitive and psychological assessments:** Mental health questionnaires and cognitive tests are generally considered the most important tools for the evaluation of mental health. For example, the BDI-II test is used to check how much improvement in mental health is made in the case of depression, while PTSD-specific scales indicate the extent of trauma-related symptoms. Neuropsychological evaluations show how the cognitive system is functioning and also provide information about the mental health of a person (memory, attention, executive function after the treatment).

• **Physiological and biomarker analysis**: Measuring the functions of the internal organs and their constituent parts will help to know where the treatments are effective and where they are not. Heart rate variability (HRV) is an example of the indicator of the heart rate, which usually indicates the improvement of patients with low frequency mainly from the treatment. The level of cortisol suggests information about the mental condition of the patient, whereas the measures like galvanic skin response depict the state of the arousal or relaxation of the person. A combined approach that takes into account neurological, physiological, and psychological data helps the researcher not only to evaluate the effect of smart brain-chip therapies on the behavior and human brains but also to gauge the relationship between different systems.

D. Implications for Future Mental Health Treatment

One of the most important changes in the mental health industry is the use of closed-loop neuromodulation and artificial intelligence to collect and analyze data. It is expected the developments in this area will lead to, among other things: -

Precision care optimization: Artificial intelligence can adapt the therapies dynamically for patients using the patient's neural feedback so that interventions are individualized time after time [22]. - The decrease of medication usage: Smart brain chips may give specific neural stimulation to symptom relief, hence leading to the possibility of drug treatment and consequent side effects being reduced.

- **Accessibility:** Device miniaturization and cost reduction in the neurotechnology sector might be the reasons for diminution of volume, less invasiveness, and more usability, hence availability, and cost reduction enabling neurotechnology to be used outside specialized clinics and in a wider population [23].Still, continuing with the technological progress, **the main question stays the same:** How can we be sure that data security and regulatory compliance are guaranteed? The issues of data security, neuroprivacy, safety, and ethical aspects need to be proactively addressed in order to allow a responsible and massive application of smart brain-chip therapies.

5. ETHICAL, SECURITY, AND POLICY CONSIDERATIONS

A. Ethical Considerations in Neural Data Usage

Brain-chip information includes the most private and personal thoughts and feelings of a person, giving rise to new ethical doubts about who the data actually belongs to, the right to give consent to data collection with that data, and the ability of individuals to regulate their lives. The crucial points to be kept in mind are as follows:

• **Ownership and consent:** Patients should have the right to solely decide what happens with their neural data. This means having:

• **User control:** Persons decide when and how information from their minds is captured.

• **Informed consent:** People need to be aware of what their neural data will be exploited, retained, and given away for.

• **Right to withdraw:** People can pull their data out of the research or commercial field at any time. (Today's general data protection laws (e.g., GDPR, HIPAA) only partially cover these concerns, and specific legal frameworks for neural data are still being developed.

• **Cognitive autonomy:** Innovative brain chips of the smart type have the ability to interfere with a person's thoughts or feelings. However, the ethical aspects of the use of such chips are also there:

• **Algorithmic bias:** Artificial Intelligence (AI) models can contain unintentional bias that may lead to unequal treatment of different groups of patients.

• **External manipulation:** At times, brain interfaces may end up being used by unauthorized entities (governments, companies, hackers) to change people's cognitive abilities or behavior without their consent.

Consequently, it is necessary that the protections are in place so the autonomy of individuals is the hallmark of neural devices and these are secure from such iniquitous behavior.

B. Security Challenges in Neural Interfaces

Smart brain chips face significant cybersecurity risks. Table III summarises key threats and recommended safeguards:

Security Risk	Proposed Solution
Data Breaches	Use end-to-end encryption and secure data storage protocols.
Unauthorised Access / Cyberattacks	Implement multi-factor authentication and biometric security; employ robust anomaly detection and real-time monitoring systems.
Manipulation of Neural Signals	Ensure encryption of communication channels and implement robust authentication to prevent unauthorised signal alterations.
Neuro-surveillance & Privacy Invasion	Apply blockchain-based data integrity checks and enforce strict data governance.
Software Vulnerabilities	Conduct regular security audits, patch management, and enforce secure coding practices.

Table III. Key security risks in brain-chip systems and recommended safeguards.

Yes, despite taking all these precautions, neural cyberattacks are a very serious worry. An attacker can change the stimulation pattern, and an individual can be impacted without any warning. A reference to the latest innovation in this area of protecting the neural data through the application of techniques such as encryption periodically, biometric identification such as brainwave authentication and decentralization of data logging (e.g. blockchain) to maintain the security and privacy of the data has been given [25].

C. Policy Innovations in Neural Data Protection

To make sure brain interfaces are used in an ethical way, the paper will describe the rules and conditions to develop new legal and regulatory frameworks.

• **Neural data rights:** Proposed legislation would treat neural data as extremely sensitive. Suggested rights include:

• **Right to mental privacy:** Persons can legally inhibit others from tracking their brain data without authorization. [26]

• **Cognitive liberty:** Individuals have the right of self-governance over their thoughts and neural activity.

• **Limits on commercial use:** It is forbidden to use the neural data for any recommendation or neuromarketing without the user's unequivocal consent.

• **AI regulation in neurotechnology:** The guidelines for neurotechnologies with AI capacities are currently being discussed. The main suggestions are as follows:

• **Bias audits:** AI training data that contain biases must be regularly audited to be identified and the biases eliminated [27].

• **Transparency requirements:** Clinicians and patients need to be provided with clear, understandable AI models so that they can see how diagnostic or therapeutic decisions are made.

• **Mandatory trials:** The intensive clinical testing imposed on doctors and researchers is a prior condition for the use of AI-driven neurotechnology.

The major purpose of drafting such regulations is to give a dual role to the emerging technology with the intent of protecting the fundamental rights of users and at the same time stimulating technological innovation.

D. Socioeconomic Barriers and Global Accessibility

There are several economic and infrastructural problems that prevent smart brain chips from being available to everyone:

• **High manufacturing costs:** advanced brain chips are costly to produce because they require specific materials and fabrication processes.

• **Insurance gaps:** Even in developed countries, the healthcare system often does not provide coverage for neurotechnologies, which results in high out-of-pocket costs and thus limited access only to high-income people [28].

• **Regulatory delays:** The introduction of more affordable device models could be a delayed process due to the necessary procedures for the approval of those devices.

• **Infrastructure limitations:** A lack of reliable electricity and internet connectivity, as well as the unavailability of trained clinical support, do not meet the required criteria for deploying advanced devices in many regions.

The suggestions that were made in order to fill these gaps included the following: programs funded by governments which could provide brain-chip devices for underserved populations, collaboration of private and public sectors to expand the production, and digital literacy campaigns in healthcare to raise awareness of the benefits of neurotechnology among both healthcare providers and patients were some that were proposed [29].

E. Implications for Future Policy and Research

Addressing the increasing complexity of brain-chip systems necessitates a cohesive policy approach. Among the strategies to be considered are:

• **Security regulations enhancement:** For neurological device manufacturers, strict cybersecurity and privacy standards with which to adhere.

• **Access programs at low cost:** Subsidize devices for patients and be conducive to the development of cheap alternates as well.

• **Data protocols internationally:** That can protect the privacy and ownership rights of neural data by way of agreeing across the borders.

Political and professional coordinated action with the contribution of the industry will assure that the artificial brain chips are produced and used in an ethical, just, and safe way. From that perspective, the only way to successfully integrate AI-empowered neurotech with mental healthcare is through single, multi-disciplinary collaboration and responsibility.

6. CONCLUSION

Smart brain chips- with on-board AI analytics and real-time neuromodulation- mark a significant step forward in mental healthcare. They have the potential to increase cognitive function, cure neurological disorders, and offer very personalized therapies. However, the acceptance of these devices is dependent on the resolution of various huge challenges: data security and privacy concerns, complex regulatory requirements, and problems related to the consumption of energy and the trade-offs between hardware and software. The further development will concentrate on establishing the technology that is neuro-based, adaptive, non-invasive, and patient-driven by taking into account security, safety, and accessibility as well. The main research goals embrace the protocols that can ensure high security, the undermining of algorithmic biases in AI models, and the setting of clinical standards for brain-computer interfaces. Only through collaboration between biomedical engineers, neuroscientists, AI specialists, and policymakers will it be possible to realise the full benefits of smart brain chips. When these technologies get to maturity, the application of the standards of interoperability and shared commitments can be used to foster the development of the AI-based diagnostic tools and neurotechnologies to be included in the regular mental health care.

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