RISE IN MENTAL HEALTH DISORDERS AND AI IN DIGITAL THERAPEUTICS TO SUPPORT IT

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ADVANCING TECHNOLOGY FOR HUMANITY

ABOUT IEEE

Inspiring a global community of innovation
Where forward-thinking professional collaborate
Discover what’s next in tech innovation
Build technical communities
Shape and share research
Create global standards
Engage in Humanitarian activities
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Industry Connections
Exploring & incubating new tech & its use

Standardization
Creating markets & protecting public safety through standards development

Membership
Connecting to experts & resources with advanced participation options

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Providing confidence & assurance & accelerating market adoption

Open Source
Providing a community-powered platform to support open source projects

Alliance Management
Providing support to alliances & trade associations

Registries
Providing unique identifiers to support global compatibility & interoperability
To improve the global standard quality of life at every step through affordable healthcare and access to medicines; support innovation to improve overall wellness and improve societal outcomes; and to enable innovation through open and standardized means.

Three Major Branches of Focus
1. Pharma/Biotech
2. Clinical Health
3. Global Wellness

https://ieeesa.io/hls
APPLICATIIONS OF AI IN HEALTHCARE

MEDICAL ROBOTS

PERSONALISED MEDICINE

ELECTRONIC HEALTH RECORDS

CLINICAL TRIALS

MEDICAL IMAGE DIAGNOSIS

MEDICAL IMAGE DIAGNOSIS

OUTBREAK PREDICTION

DIAGNOSIS OF DISEASES

GLOBAL RISE IN MENTAL HEALTH STATISTICS

• The COVID-19 pandemic have contributed to an estimated 25% global rise in depression and anxiety with people aged 20-24 years being more affected than older people (Source: World Health Organization [WHO])

• Globally, 280 million people are living with depressive disorders. Approximately 85% of people in low-income countries receive no treatment. (WHO Africa)

• Prior to the pandemic, it had already been predicted that by 2030, mental health illnesses — depression in particular — will be ranked No. 1 in the global burden of disease and that it will cost $16 trillion. (The Lancet)

• People with severe mental health conditions are likely to die up to 20 years earlier than the general population and were five (5) times more likely to die early during the COVID-19 pandemic. (The Lancet)
REAL WORLD SCENARIO

RWANDA: MENTAL HEALTH CONCERNS ON THE RISE

• Approximately 25% of Rwandan citizens struggle with post-traumatic stress disorder (PTSD)

• One in six (1 in 6) people suffer from depression.

• According to the Rwanda Mental Health Survey (RMHS) in 2023, reveal that a significant proportion of Rwandans aged 14 to 25 are struggling with psychological disorders like depression, anxiety, and trauma, among others

• There’s also a lack of psychiatrists in the country, with 0.06 per 100,000 people. There are approximately 13 psychiatrists in Rwanda.
Q. SO WHERE TO GO FOR HELP?

A. AI

- Mobile Health APPs
  - There are estimated to be between 10,000 to 20,000 mental wellbeing apps available (includes medical and general wellness)
- Immersive Experience: Headsets/Wearables/AI (Example to follow)
- Psychological AI Chatbots for Mental Healthcare (consequence case to follow)
  - Can provide personalized support and guidance.
  - Use ML algorithms, these technologies can learn about an individual's unique needs and preferences, and tailor their responses accordingly.
  - Conveniently accessible and less expensive
  - Can keep patients anonymous
  - They can encourage people to seek mental healthcare when they need it
Xaia, or eXtended-Reality Artificially Intelligent Ally developed by a team of Cedars-Sinai clinicians and AI experts.

The VR application, available via the Apple Vision Pro headset, leverages generative AI and spatial computing to provide conversational therapy through a robot avatar. In the VR environment, users can see and converse with the robot like a human.

- The app has 200 experiences (currently)
- All conversations are processed through a HIPAA-compliant server
- It is a direct-to-consumer wellness product.
- The app has also been trained to manage high-risk scenarios. If a user mentions suicidal ideations, for example, the technology will provide the national suicide hotline number.

“Now, anyone working in AI should always be careful to never promise that there can never be a problem. There can always be a Black Swan event, so to speak.”

See the full article MHealthIntelligence.com, 20 Feb 2024
VITAL CONSEQUENCE:

“A Belgian man reportedly decided to end his life after having conversations about the future of the planet with an AI chatbot named Eliza.”

“He placed all his hopes in technology and artificial intelligence to get out of ‘it’”.

Euronews.next published on 31/03/2023
USES OF AI IN DIGITAL MENTAL HEALTH

“60% of Americans Would Be Uncomfortable with the Provider Relying on AI in Their Own Health Care.”

Pew Research, 22 Feb 2023
The program provides platform for the global community of multidisciplinary stakeholders seeking to openly collaborate, identify and develop solutions in an open standardized means. The volunteers explore the development of best practices and/or potential standards for assurance that an automated decision-making tool meets agreed upon ethical standards of explainability or autonomy.

JOIN TO MAKE A GLOBAL IMPACT
Open · Collaborative

ieeesa.io/DigitalMentalHealth
WHAT ARE SOME CONCERNS WITH AI IN DIGITAL MENTAL HEALTH

Argument: Algorithmic Bias
AI tools used in health care have discriminated against people based on their race and disability status. How much "comprehensive data" can be accessible to train the algorithms effectively?

Argument: Validation/Monitoring
Rogue chatbots have spread misinformation. After testing phase and introduction of more real-world data the algorithm can degrade. What happens if an algorithm degrades and because it runs autonomously what could be the consequences?

Argument: Governance/Ethics
What protections could help ensure privacy, transparency, and equity as these tools are increasingly used across society?
IEEE SA AI & DIGITAL MENTAL HEALTH TOOLS INITIATIVE

Establishing guardrails to drive trust in adoption through standards, training and education

Technical Considerations
- Privacy
- Security
- Portability
- Interoperability

Ethical considerations
- Data governance
- AI algorithm bias
- Privacy
- Consent
- Verification of Developer locations

Therapeutic validation (non-medical)

Regulatory Compliance
- Multi-national
- Regional
- Closed Loopholes
IEEE GLOBAL REGISTRY: STANDARDIZED IDENTIFIER FOR MEDICAL MOBILE MENTAL HEALTH APPS

ESTABLISH TRUSTED GLOBAL IDENTITY FOR YOUR MEDICAL MOBILE HEALTH APP

The trusted source for clinicians, patients, researchers, regulators and all vested stakeholders.
IEEE GLOBAL REGISTRY FOR STANDARDIZED IDENTIFIER FOR MEDICAL MOBILE MENTAL HEALTH APPS

The global standardized registry will serve as a directory of “approved” medical mobile health apps that have applied and shown proof of meeting the established set of criteria required to attain an IEEE standardized identifier. The multi-point criteria will be developed and built with consensus by a diverse group of expert committee members. Each app will need to complete an application, display satisfaction of set criteria, and those that are approved will receive a global standardized unique identifier that resides in the official IEEE SA global registry.

*For the purpose of this project, medical mobile health apps are defined as intended use for clinical and medical purposes and can be legally regulated as mobile medical devices.
THE REGISTRY TO HARMONIZE EFFORTS AND ADDRESS COMMON CHALLENGES AMONGST STAKEHOLDERS

CREDIBILITY
IEEE GLOBAL STANDARDIZED IDENTIFIER FOR MEDICAL MOBILE MENTAL HEALTH APPS REGISTRY

addressing global challenges

- Provide regulators with a resource that will contribute to streamlining the review and approval of medical health apps when submissions include the official IEEE registered standard identifier thereby showing evidence that consensus-built criteria had been met to obtain the identifier.
- Provide payors (health insurers) evidence of credibility to support covering the cost of medical health apps prescribed by physicians and clinical staff.
- Lower the barrier to access for all patients as cost may be prohibitive to use when not covered by state or private insurers.
- Trust in use from patients, clinical professionals, regulators and other key stakeholders
- Mitigating liability/risk of clinical teams in prescribing these tools for patients to have confidence in the use of these tools
- Enable an effective “product recall” process for regulators or app stores when issues have been identified that can negatively impact patient care
- Better safeguard the most vulnerable patients – children, elderly and those are unfamiliar with smart technologies especially in the use of mental health apps.
- Enabling technology developers to have a “means” to show credibility in their medical mobile health app on a global scale
### IEEE STANDARDS – AI/ML

**An example of published and project standards**

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<th>Standard/Practice</th>
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<td>IEEE 2801-2022 - IEEE</td>
<td>Recommended Practice for the Quality Management of Datasets for Medical Artificial Intelligence</td>
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<td>IEEE P2802 - Standard for the Performance and Safety Evaluation of Artificial</td>
<td>Intelligent Based Medical Device: Terminology</td>
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<td>IEEE P2975 - Standard for Industrial Artificial Intelligence (AI) Data Attributes</td>
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<td>IEEE P2975.3 Recommended Practice for Software Framework for Industrial</td>
<td>Artificial Intelligence (AI) At-the-edge</td>
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<td>IEEE P3129 - Standard for Robustness Testing and Evaluation of Artificial</td>
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<td>IEEE P3128 - Recommended Practice for The Evaluation of Artificial Intelligence (AI) Dialogue System</td>
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<td>IEEE P3430 - Recommended Practice for A Holistic Framework for AI Foundation Models</td>
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<td>IEEE P3396 Recommended Practice for Defining and Evaluating Artificial</td>
<td>Intelligence (AI) Risk, Safety, Trustworthiness, and Responsibility</td>
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<td>IEEE 2941-2021 - IEEE</td>
<td>Standard for Artificial Intelligence (AI) Model Representation, Compression, Distribution, and Management</td>
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<td>IEEE P3395 - Standard for the Implementation of Safeguards, Controls, and</td>
<td>Preventive Techniques for Artificial Intelligence (AI) Models</td>
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<td>IEEE P3123 Standard for Artificial Intelligence and Machine Learning (AI/ML)</td>
<td>Termination and Data Formats</td>
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<td>IEEE P3350 - Recommended Practice for Improving Generalizability of Artificial</td>
<td>Intelligence for Medical Imaging</td>
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**IEEE SA Standards Association**

**Healthcare & Life Sciences**

**IEEE**
Specific requirements for AI Systems, as a specific case of socio-technical systems:

• Prioritize human-centric design and establish control mechanisms throughout the entire lifecycle of any product, service or system

• Use appropriate indicators to define success with Autonomous Intelligent Systems (AIS), also taking into the improvement of societal and environmental factors, in addition to productivity increase and avoidance of risk

• We must envision, define, and build socio-technical systems towards a positive, equitable future for humanity, through science and technology, through leadership standards, and through proper governance.
### IEEE SA IMPACT STANDARDS

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<th>Red font indicates approved standard.</th>
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<tr>
<td><strong>IEEE 7000-2021™</strong> - Standard for Model Process for Addressing Ethical Concerns During System Design</td>
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<td><strong>IEEE 7002-2022™</strong> - Standard for Data Privacy Process</td>
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<td><strong>IEEE P7003™</strong> - Standard for Algorithmic Bias Considerations</td>
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<td><strong>IEEE P7004™</strong> - Standard for Child and Student Data Governance</td>
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<td><strong>IEEE 7005-2021™</strong> - Standard for Transparent Employer Data Governance</td>
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<td><strong>IEEE P7006™</strong> - Standard for Personal Data Artificial Intelligence (AI) Agent</td>
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<td><strong>IEEE 7007-2021™</strong> - Ontological Standard for Ethically Driven Robotics and Automation Systems</td>
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<td><strong>IEEE 7010-2020™</strong> - IEEE Recommended Practice for Assessing the Impact of Autonomous and Intelligent Systems on Human Well-being</td>
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<td><strong>IEEE 7010.1™</strong> - IEEE Recommended Practice for Environmental Social Governance (ESG) and Social Development Goal (SDG) Action Implementation and Advancing Corporate Social Responsibility</td>
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<td><strong>IEEE P7011™</strong> - Standard for the Process of Identifying and Rating the Trustworthiness of News Sources</td>
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<td><strong>IEEE P7012™</strong> - Standard for Machine Readable Personal Privacy Terms</td>
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<tr>
<td><strong>IEEE P7014™</strong> - Standard for Ethical considerations in Emulated Empathy in Autonomous and Intelligent Systems</td>
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THE IEEE GLOBAL INITIATIVE ON ETHICS OF AUTONOMOUS AND INTELLIGENT SYSTEMS

Programs and Services

**AIS Certification**
IEEE CertifAIEd™ is a certification program for assessing ethics of AIS to help protect, differentiate, and grow product adoption. The resulting certificate and mark demonstrates the organization's effort to deliver a solution with a more trustworthy AIS experience to their users.

Learn More About IEEE CertifAIEd™

**Artificial Intelligence and Ethics in Design Course Program**
This educational program offers 10 courses focused on ethics in design of artificial intelligence systems.

Learn More About The Artificial Intelligence and Ethics in Design Course Program

**New Program for Free Access to AI Ethics and Governance Standards**
Program brings sociotechnical standards providing guidance and considerations to aid the development of trustworthy AI to the global community at no cost.

View Free Standards

https://standards.ieee.org/initiatives/autonomous-intelligence-systems/
WHITEPAPER TO BE PUBLISHED IN Q3 2024 IN IEEE XPLORE

Co-Authors:
• Dr. Lily Frank
• Dr. Matthew Dennis

Professors, Eindhoven University of Technology

Co-Chairs, IEEE Ethical Assurance of Data-driven Technologies for Mental Healthcare

Comments and feedback contributed by 35 multidisciplinary experts across EU and North America
IEEE Regulating AI in Digital Mental Health Forum
Southeast Asia
September 2024 - Singapore
IEEE PRE-STANDARDS INCUBATOR PROGRAMS: AI + HEALTH

TRANSFORMING THE TELEHEALTH PARADIGM: SUSTAINABLE CONNECTIVITY, ACCESSIBILITY, PRIVACY, AND SECURITY FOR ALL
This program provides a platform for the global community to openly develop technical solutions to challenges impeding trust and validation, security, interoperability, accessibility, feasibility and integration telehealth systems. [https://ieeesa.io/telehealthic](https://ieeesa.io/telehealthic)

CLINICAL TRIALS MODERNIZATION NETWORK
Prioritize the areas DCT using DHT standards can accelerate adoption, mitigate risks, and optimize efficiencies with sponsors, regulators, sites, technologists, service providers, patient advocacy organizations, and other relevant stakeholders. [https://ieeesa.io/rct](https://ieeesa.io/rct)

ETHICAL ASSURANCE OF DATA-DRIVEN TECHNOLOGIES FOR MENTAL HEALTHCARE
Explore the development of best practices and/or potential standards for assurance that an automated decision-making tool meets agreed upon ethical standards of explainability or autonomy. [https://standards.ieee.org/industry-connections/data-driven-tech-healthcare/](https://standards.ieee.org/industry-connections/data-driven-tech-healthcare/)
THANK YOU

GET INVOLVED:
Write about it, talk about it, develop solutions...make an impact.

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