



gMG Crisis Prediction and Disease Assessment through voice AI on a wearable device

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Introduction

- Overview of Myasthenia Gravis (MG) as a chronic autoimmune disorder
- Importance of personalized monitoring for myasthenic crises
- Challenges in current symptom assessment



Challenges in Diagnosing Myasthenic Crises



Limitations of existing MG assessment scales (MG-ADL, QMG)



Difficulties in predicting imminent crises

Potential of Voice AI

Role of voice
synthesis in detecting
muscular and
respiratory function



Comparison of
traditional vs. AI-
enhanced diagnostic
methods



Technological Approach



Description of Google's Health Acoustics Representations (HeAR)



Integration of AI models with wearable devices

Objective



Goal to develop non-invasive AI tools for early crisis detection



Integration of edge AI models into wearable technology

Methodology



Data collection and collaborations



Machine learning algorithms and model development



Device specifications



Technological Innovation



AI-based precision
diagnostics in neurology



Comparisons to AI
applications in other
medical fields



Expected Impact



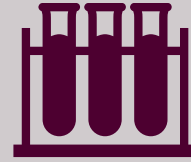
Improved diagnostic accuracy and patient outcomes



Cost reduction and increased accessibility



Implementation plan



Phases of development:
Research, testing,
commercialization



Target markets and initial
rollout strategy



Monetization strategy



Licensing



subscription models



consulting services



Conclusion



Summary of the proposed solution's impact on healthcare



Vision for broader applications in other medical areas



Common symptoms in ALX indications

Disorder	Muscle	Voice	Respiratory
gMG	Muscle weakness	Hoarseness, etc ...	Dyspnoea, respiratory failure
NF1	Muscle weakness	*	Breathing problems *
HPP	Muscle stiffness, weakness and pain	Secondary to neurological symptoms **	Breathing difficulties and respiratory failure
Amyloidosis	Muscle weakness	Hoarseness	Dyspnoea, secondary difficulties (cardiac) ***
Others ?			



Companies / Startups

Company	Web	Description
Canary Speech	https://canaryspeech.com	Canary Speech's vocal biomarker technology unlocks voice as a vital sign, leading a new era of machine learning in healthcare.
VoiceMed	https://www.voicemed.io/	Acoustic analysis of voice and breath to measure multiple innovative biomarkers—for lung health, fitness, and more. Powered by advanced AI and deep-tech innovation .
ModalityAI	https://modality.ai/	Modality.AI, Inc. has developed the first automated, clinically validated, multimodal system to assess neurological and psychiatric states, in clinic and remotely.
Vocadian	https://www.vocadian.ai/	Empowering safer, smarter workplaces, we deliver a cutting-edge voice-based tool that assesses and predicts fatigue in real-time
UHURA BIONICS	https://www.uhura.pl/en	Uhura Bionics has set itself the goal of finding solution for atypical speech in voice and speech disorders for more than 136 million people worldwide.
Noah Labs	https://www.noah-labs.com/	At Noah Labs, we empower patients with cardiovascular conditions to live healthier, longer lives by developing voice-based biomarkers for early detection and enabling the most accessible remote monitoring.
Kintsugi	https://www.kintsugihealth.com/	We train and validate our voice biomarker AI models by conducting clinical trials with prestigious academic institutions and collaborating with top experts and research partners in healthcare.



Companies / Startups

Company	Web	Description
Amplifier	https://www.amplifierhealth.com	Like heart rate or blood pressure, your voice holds crucial health data. Amplifier unlocks this data, turning voice into a vital sign.
Audeering	https://www.audeering.com/	Our cutting-edge Voice AI technology enables machines to understand and respond to human vocal expression, ushering in a new age of empathetic AI-interactions. audEERING® bridges the gap between humans and machines, creating a future where technology is in tune with our tone of voice.
Klaatch	https://www.klaatch.com/	Klaatch has developed the Social Quotient, the first holistic measure of individual and community social connection that finally provides the information you need to increase social connection, reduce loneliness, and improve performance.
Phonely	https://www.phonely.ai/product	Everything you need to answer any call with AI Phonely gives you all the tools you need to harness voice AI, empowering you to reduce costs and scale your contact center effortlessly.
Virtuosis	https://www.virtuosis.ai/	Track mood and engagement, prevent burnout, and early-detect team conflicts. Identify individual needs and automatically recommend the best support.



Consortiums

Name	Web	Description
Bridge2AI Voice	https://b2ai-voice.org/	The Bridge2AI Voice Consortium aims to integrate the use of voice as biomarker of health in clinical care to assist in screening, diagnosis, and treatment of a broad range of diseases. Read on to learn more about this project.
Colive Voice	https://www.colivevoice.org/en/	Colive Voice is a groundbreaking digital health study aiming to identify vocal biomarkers to improve diagnosis and monitoring of symptoms and diseases.



Advantages of voice biomarkers

- Voice and speech, by their very nature, **encapsulate a lot of health-related information**, such as, but not restricted to our emotional state, cognitive function, respiratory health, or neuromuscular changes.
- Voice and speech data remain a **largely underutilized** resource in clinical research, mostly due to the ***lack of standards and processes*** to integrate voice biomarkers into clinical trials.
- Voice data can be collected **non-invasively** and **regularly**, providing a dynamic picture of an individual's health over time.
- This aspect is especially critical in the **context of chronic diseases**, where patients might find **frequent clinical visits** to be a substantial **burden**.
- The **low-cost implications** of integrating voice data into clinical trials are noteworthy.



Challenges of voice biomarkers

- **Lack of standardized protocols** for voice data collection and analysis.
- Many voice features are **not specific to a single disease or symptom**. This non-specificity, while challenging, also underscores the potential of voice as a **holistic biomarker** for health.
- Voice biomarkers can also become very precisely measurable digital endpoints in the **context** of clinical trials.
- **Collecting the data now in a standardized fashion** can provide an important advantage that can later be explored.
- **Ensuring the privacy and security by design** of voice data is of paramount importance to ensure the buy-in from end users (patients, healthcare professionals) and stakeholders. (i.e., HIPAA, GDPR, AI Act)



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