AstraZeneca

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

Javier Díez Pérez

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

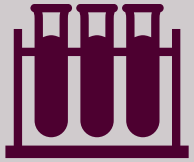
Comparisons to AI applications in other medical fields

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	Hoarness, 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	Hoarness	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.
Sonde	https://www.sondehealth.com/	Sonde's API/SDK platform makes it easy to integrate vocal biomarker analysis into your organization's health initiatives to gain new insights into users' mental, cognitive and/or respiratory fitness.
Sonaphi	https://sonaphi.com/	Sonaphi is a machine learning analysis solution that generates health assessments from a 30-second smartphone voice recording. Results are fast, affordable, & easy. From general wellness insights to specific health conditions including.

Consortiums

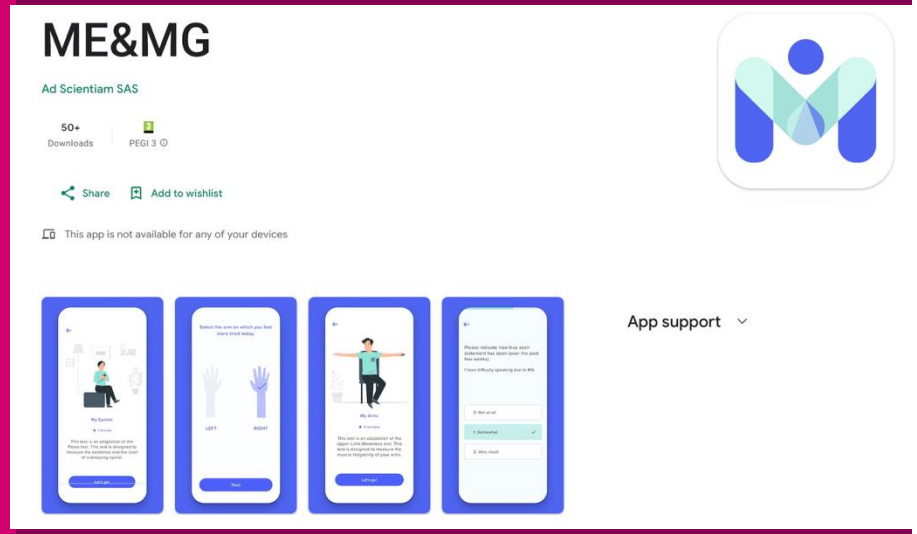
Name	Web	Description
Bridge2AI Voice	https://b2ai-voice.org/	The Bridge2AI Voice Consortium aims to integrate the use of voice as biomarker of health in clinical care to assist in screening, diagnosis, and treatment of a broad range of diseases. Read on to learn more about this project.
Colive Voice	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)



Identifying Digital Biomarkers for the Self-Monitoring of Patients Living with Generalized Myasthenia gravis: a Proof of Concept (P7-8.007)

Pascal Laforet, David Orlikowski, Guillaume Nicolas, Hélène Prigent, Edouard Berling, Ghislain N'Dah-Sekou, Clarissa Gorin, Ana Júlia Moreira, Juliette Narcy, Angéline Plaud, Emma Touré Cuq, Martin Keller, Brian Werneburg, Emrah Aras, and Michael Benatar SHOW FEWER | AUTHORS INFO & AFFILIATIONS

"We perceived a need for an unsupervised patient self-assessment digital solution to monitor symptomatology outside office visits. In 2023, development of ME&MG, a smartphone solution, will begin. It aims to inform and improve communication between patients and their care teams. International multicenter studies comparing ME&MG to clinical gold standards including the Quantitative Myasthenia Gravis score, will be deployed."

ME&MG, Novel Digital Device for Patients with Generalized Myasthenia Gravis: A First Step Towards Validation (P1-11.016)

Edouard Berling, David Orlikowski, Guillaume Nicolas, Hélène Prigent, Ghislain N'Dah Sekou, Loïc Carment, Clarissa Gorin, ... SHOW ALL ... , and Pascal Laforêt | AUTHORS INFO & AFFILIATIONS

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Clinical Trials on Medical Devices for gMG

The ME&MG Digital Solution for Autonomous Assessment of Myasthenia Gravis

ClinicalTrials.gov ID NCT05564936

Sponsor Ad scientiam

Information provided by Ad scientiam (Responsible Party)

Last Update Posted 2025-04-11

Summary: ME&MG is a standalone software (digital solution) running on patients smartphones, connected to a web portal for physicians. It is intended to be used as an unsupervised digital self-assessment tool for the monitoring of disabilities in patients living with MG. ME&MG contains digital active tests for the assessment of ptosis, breathing, dysarthria, upper- and lower-limb (arms and legs) weakness, treatment follow-up, and validated e-questionnaires related to daily activities, pain, fatigue, sleep, and depression disorders. The objectives of this study are to validate the accuracy, reliability and reproducibility of the unsupervised at-home self-assessment of symptoms on the patient's smartphone with ME&MG versus the standard in-clinic testing, as well as to evaluate the safety of the solution, its usability and satisfaction.

Brief Summary

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AI listens for health conditions

Voice recordings, examined by artificial intelligence, might provide new biomarkers for conditions such as heart disease and Alzheimer's.

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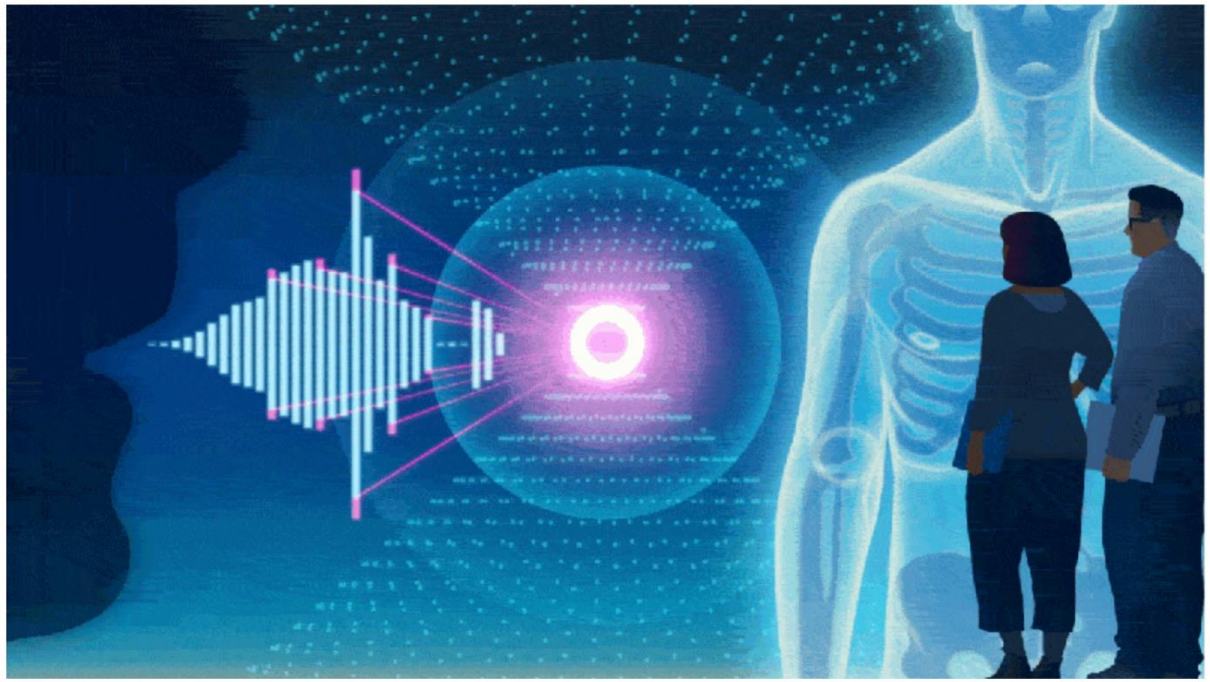
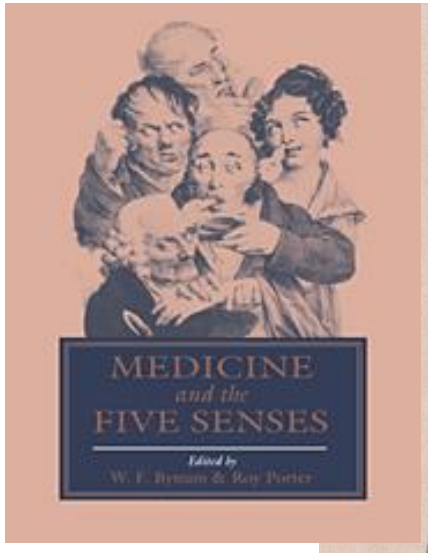
By Neil Savage



Medicine and the five senses

From the days of Hippocratic 'bedside medicine' to the advent of the CAT scanner, doctors have always relied on their senses in diagnosing and treating disease.

Medical education, from the apprenticeship, to the rise of the laboratory, has sought to train the senses of students who must act like medical detectives. At the same time, debate since antiquity has pondered the hierarchy of the senses - from noble vision to baser touch and smell.



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