How can Amazon Echo listen to your health?

Alexa, what's the weather like this morning?

It is 61° and party cloudy right now.

Eric, it sounds like you're developing a sore throat.

Non-Invasive Detection of:
Heavy breathing
Chewing
Laughing
Mood
Eating habits
Stress
Fall detection
Parkinsons
Mental health
Hallucinations
Delusions
Depression
Acid reflux
Chronic Sinusitus
Thyroid problems
Laryngeal cancer
Fertility
Asthma
Autism spectrum disorders
Alzheimer's
Schizophrenia
Gait

Guidance (proactive, reactive):
Careplan
Notify caregiver
Notify clinician, nurse
Addressing symptoms
...

Voice Analysis Techniques

Voice Feature Classification:
Acoustic
Prosodic
Emotional
Lexical

Time Frequency based Extracted Voice Features:

Feature		
Frequency	Jitter	Variation in the pitch of the voice
Pulse	Standard deviation of period, period of pulses	Speech rate of speaker
Amplitude	Shimmer	Variation in loudness of voice
Voice	Unvoiced frames, voiced frames	Structure of voice
Harmonic	Noise to harmonic, harmonic to noise	Relative highness or lowness of voice
Pitch	Maximum/minimum pitch, mean/medium pitch	Peaks of the sound spectrum of voice

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Home, 1-4 people

1-2 Echo's   4 Smartphones

Eric, sounds like you have a light cough. Take some of your Vixx cough medicine now and tonight at 7pm. Let's catch this cold early!

:: cough, cough ::

Work, 1-15 people

4-6 Echo's   15 Smartphones

Detected Eric Benoit from his acoustic gait signature. Sounds like Eric has a minor limp this morning.

Eric Benoit

Import into Eric's computable medical record.

Update Eric's hScore.

Check in N hours if symptom is worsening.

Help self-diagnose, schedule appointment.

Resources
http://www.ncbi.nlm.nih.gov/pubmed/21096795 (Fall detection)
http://www.parkinsonsvoice.org/science.php (Parkinsons)
http://www.academia.edu/4917643/Synthesis_of_Walking_Sounds_for_Alleviating_Gait_Disturbances_in_Parkinsons_Disease (Parkinsons and Gait)
http://www.pitt.edu/~jeffcohn/biblio/tac_prosody.pdf (Depression)
http://www.medicaldaily.com/5-illnesses-your-tone-voice-can-reveal-about-your-health-299706 (Various)
http://rsbl.royalsocietypublishing.org/content/5/1/12 (Fertility)
http://iosrjournals.org/iosr-jece/papers/Vol.%209%20Issue%203/Version-1/I09314855.pdf (Voice analysis for disease detection)
http://www.ncbi.nlm.nih.gov/pubmed/8945666 (Cadence measurement)
http://www.ncbi.nlm.nih.gov/pubmed/25769144 (Gait analysis)

INVO LIFE LISTENER v01

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