Predicting the Future through our Voice

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Do you own a Voice Assistant?
In 2019, it has been estimated that 111.8 million people in the US alone, use a voice assistant at least monthly. That is 39.4% of Internet users and 33.8% of the total population.
Voice is not a passing technology fad

It’s here to change how we interact with computers, mobiles, vehicles, and other machines

IoT, 5G, long-life batteries, smarter radio-chips, are pushing end devices.

8 billion voice assistants will be in use by 2023
Voice Assistants can
- command devices to start or stop
- tell you the weather, the news and other information
- place orders with voice enabled vendors
- send messages, call your contacts
- set reminders
- search on the Internet
- and complete, several Skills*

*Skill is a small app, for Alexa assistants, with built-in capabilities, eg. controlling your thermostat. Alexa reached a milestone in Sep.19 with 100K unique Skills on its marketplace.
What does the Future look like for Voice assistants?

Ubiquitous
Pervasive

Emotionally Intelligent
They will share human like qualities, understanding, responsiveness, empathy and will be able to have a normal conversation with humans
Do you know what makes this Future possible?

**EQ** is the capacity to be aware of, control, and express one's emotions, and to handle interpersonal relationships judiciously and empathetically.

Why should we expect anything less from VAs, social robots or anything that wants to have a conversation with us?
EQ is what makes conversations ‘human’

Either between humans (H2H); imagine how a conversation without emotional intelligence (EQ) would sound like:

H: “I don’t feel well today”
H: “Great, do you have that Excel file ready?”

Or between human to machines (H2M)

H: “Hey Siri, I don’t feel well”
M: “You don’t say...”
H: “What should I do?”
M: “I can’t answer that”

(true story btw, try it out)
So how do we go about adding EQ to VAs and other inanimate objects?

It all starts from us humans. We teach machines how to understand and react to emotions by teaching them to learn from human to human conversations.

And although this might seem intuitive to our brain... it’s not easy for machines.

As humans, we differ between us, and perceive emotions completely different.

For some of us it’s easy and others much more difficult. Hence we say he lacks EQ or she is very good at empathizing.
So how do we do it?

We take Voice > extract tone, intonation, and other vocal cues (beyond the actual language or the words spoken) > we deduce emotions

You would think why not use text analysis to understand what they’re talking about and capture the emotions. Sure, you can do that but the vocal qualities of how we say something has much more to offer. It’s richer, language agnostic, and difficult to fake. Our tone of voice says more about what we’re saying... then our words

Let me show you an example of what I mean
Capturing Emotions in Voice: Analysis of 'how' something is being said regardless of spoken words
Where you able to capture the same emotions, as our models, in these scenes?
Here comes the really amazing part!

BEHAVIORAL PREDICTION

Scientists have discovered that if you can capture the emotions in voice, you can then predict how a human will behave, with pretty high accuracy.

You know what I’m talking about… the same way you knew what was coming next, when your mother started with “Do as you wish, but if I were in your place…”
How does Behavioral Prediction work?
Human behavior flows from three main sources: desire, emotion and knowledge

Plato, Greek Philosopher
This is not science fiction
It’s AI technology in the making
At Behavioral Signals, we use human conversations to train our machine learning models to capture emotions in voice and predict human behaviors
A few words about us

Tech leadership team has 50+ years of cumulative experience in engineering, computer science, linguistics and psychology

Research collaboration with Signal Analysis & Interpretation Lab of University of California

15 PhDs and PhD candidates on the team

20 people with Machine Learning/AI, Speech/NLP and conversational system expertise

Sustained research leadership and award-winning accomplishments
IP, Recognitions & Awards

6 time winner of the INTERSPEECH quality of human interactions & computational paralinguistics challenge

Winner: Sentiment analysis twitter challenge SemEval/NAACL 2016

Winner: Gold-standard Emotion Sub-challenge at the 2018 ACM Audio-Visual Emotion Challenge


Two provisional patents filed on “Deep Fusion for Emotion Recognition” and “Data Augmentation for Emotion/ Behavioral Profiling” (May 2019)

Exclusive patent license “Emotion Recognition System”

Numerous award winning papers
Going back to the question, what does the Future look like?

Real Use Cases we are working on
Better Conversations
- Key performance insights
- Conference calls with EQ feedback
- Better Customer Experience

#business analytics
Voice of the Customer

Measuring customer experience and satisfaction in real-time

Predicting customer engagement for churn, NPS and CLV

Measuring brand loyalty
Real-time tracking of emotions and behaviors of rep and customer, during a call, can help with rep coaching and enhance customer experience (e.g. alerts on lack of empathy, detachment, agitation, ...)

#real-time
Propensity to Buy

Predict customer intention, with over 82% accuracy, on purchasing a product or renewing a subscription, in real-time

#PtB
SoC
Chips with integrated emotional intelligence

#integration
Home Appliances with EQ
Emotion aware devices that know what you’re ...craving!

#smarthome
Esports/Gaming
With integrated voice for real-time emotion and behavior recognition

#entertainment
Movies

Emotion aware movie recommendation system

#entertainment
Patient Care
Assisted living with empathy
#healthcare
Thank you!

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