Future of Voice Agents

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Observation, Values and Mission

- The advent of large language models have enabled a new bridge between everyday people and computing
- AI should allow everyday people to harness the power of computation
- People should be in control of their computing, not vice versa

Big Tech Voice Assistants (Alexa, Gemini, Siri)...

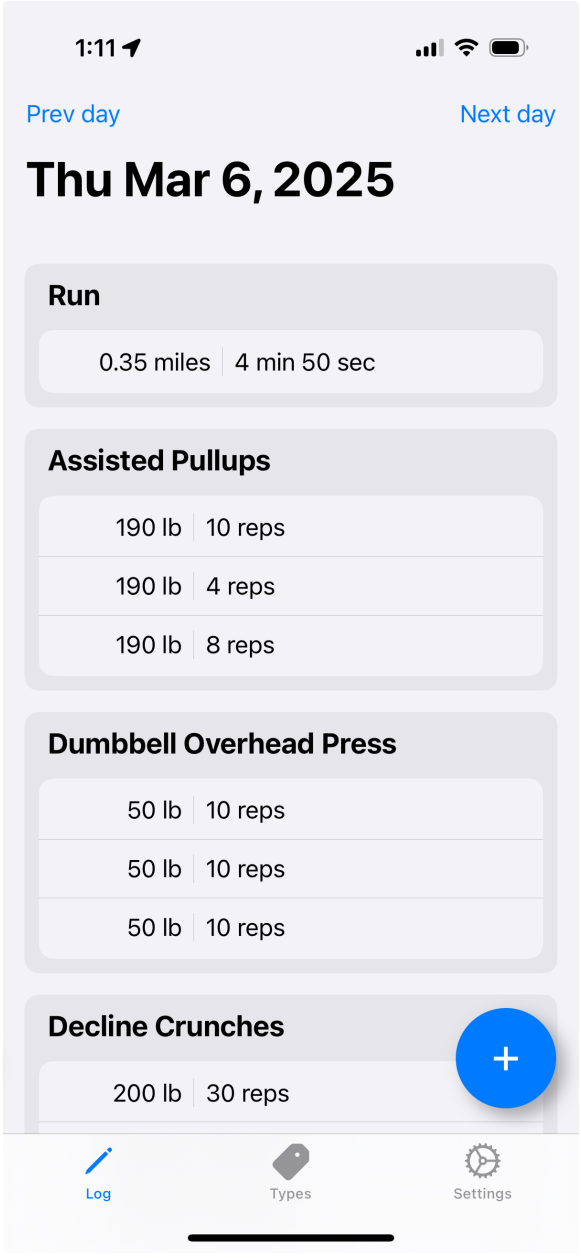
- ✓ Do well at some basic pre-programmed tasks
- ✗ Don't grasp the context of voice commands
- ✗ Don't integrate well or at all with third-party applications
- ✗ Fail to transcribe words accurately that humans have no problem given a situational context (ex. "hot words" in speech recognition research)
- ✗ Don't compose appropriate action for more complex user requests

Solution

- Bridge user-intent to application-specific code using (large) language models
- Imbue automatic speech recognition with contextual capability for short-form transcription
- Give application developers the tools to contextualize voice assistance

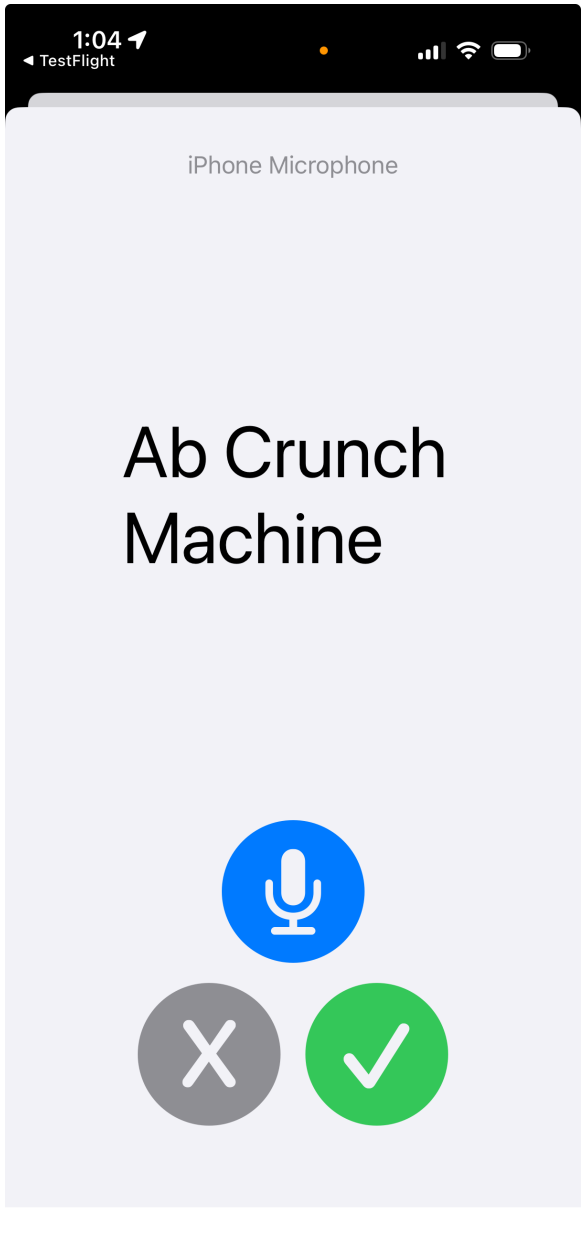
Prototype case: Gym Working Logging App

Suppose, in a workout logging app, the user wants to switch to recording a different type (eg. "Ab Crunch Machine"). How can the user invoke a voice assistant to specify it quickly?



Prototype case: Gym Working Logging App

Instead of using a platform or SaaS API from Apple, Google, etc., use a tailored automatic speech recognition pipeline to control quality and viability.



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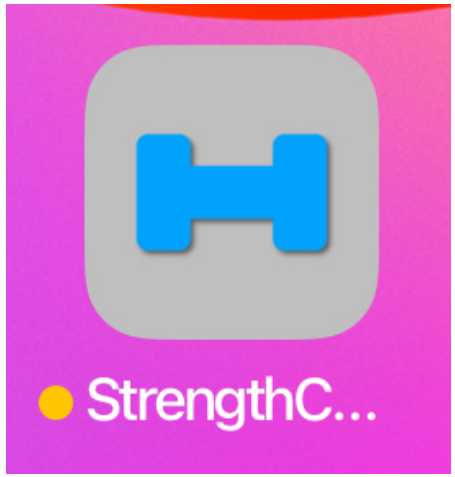
The iOS app is a polished minimum-viable product that will be launched soon from the time of creating this presentation.



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Research results below compares "Custom" to SaaS APIs demonstrate the need for better contextualizing tools

The following table shows the accuracy and precision results for the baselines/models evaluated on the datasets. Note that for each baseline the first row and second row indicate the non-streaming and streaming APIs.

	Google Speech Commands	Workout Types Self Recorded	Workout Types Synthesized
Apple SFSpeech	.946	.544	.857
" (streaming)	.709	.500	.719
Google TTS	.773	.632	.941
Custom	.919	.860	1.0

Table 1: Accuracy

Prototype case: Gym Working Logging App

For a whitepaper that delves further in the technical aspects and justification, visit

https://cs.brown.edu/people/ycheng79/csci1952qs23/Top_Project_3_Christopher%20Hong_Low%20Latency%20Streaming%20Speech%20Selection.pdf

Other Potential Markets

- A Desktop app for personal trainers to quickly organize routines for their clients
- Voice control for people with upper-body physical impairments
- Field operators (in various industries) who need quick access to proprietary information

A Disruptive, General Purpose Technology

- Context aware short-form speech recognition is potentially a *disruptive* technology, in the sense used in The Innovator's Dilemma
- Big Tech's strategy with voice assistants is to be useful to a wide swath of customers and gravitate them towards their own product ecosystem
- However, this leads voice assistants to be useful to nobody
- The right approach is to meet the needs of niche applications first
- In the end, the invested technology and capabilities can grow into mass-market general purpose technology of connecting voice to code