



An Intelligent Assistant for Wellness
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Agenda

1. Intelligent Assistants ↔ Efficient Mobile Apps
2. Sofia: Multi-modal, multi-threaded Platform
3. Calio: An Intelligent Assistant for Wellness
4. Multi-modal metrics

Intelligent Assistant Properties

Natural

- free-form voice input
- User can use from multiple modality

Conversational

- Ability to conduct a conversation → multi-turn interactions
- Intelligence lays in utilization of context

Intelligent

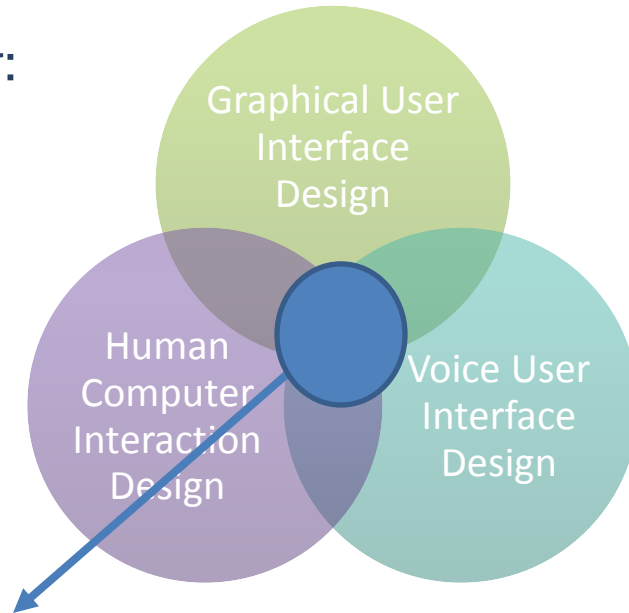
- Utilize machine-learning, natural language understanding, big data analysis to present the 'right' answer

Input Modality Comparison

Modality	Efficiencies or Advantage	Drawbacks
Voice	<ul style="list-style-type: none">• Multiple pieces of information• No knowledge of app structure required• Can be used with hands busy	<ul style="list-style-type: none">• Recognition inaccuracy• Not suitable for public environments• How inform users about functionality
Free-form Text	<ul style="list-style-type: none">• High accuracy except for typos, spelling errors• Allows for privacy	<ul style="list-style-type: none">• Slow speed• requires both hands
Touch	<ul style="list-style-type: none">• Fast• Accuracy	<ul style="list-style-type: none">• Requires button on screen, but limited real-estate on a mobile device
Gesture	<ul style="list-style-type: none">• Natural movement	<ul style="list-style-type: none">• Recognition accuracy• How inform users about functionality

Multi-modal Design Considerations

Design guidelines exist for:



- Which guidelines from these three areas apply?
- Match the modality, i.e. if voice in, then voice out?
- Use the most efficient modality? Voice in, Visual out?
- Let user set the preferred modality combination?
- Do the output via multiple modalities?



Need for flexible platform to experiment

Agenda

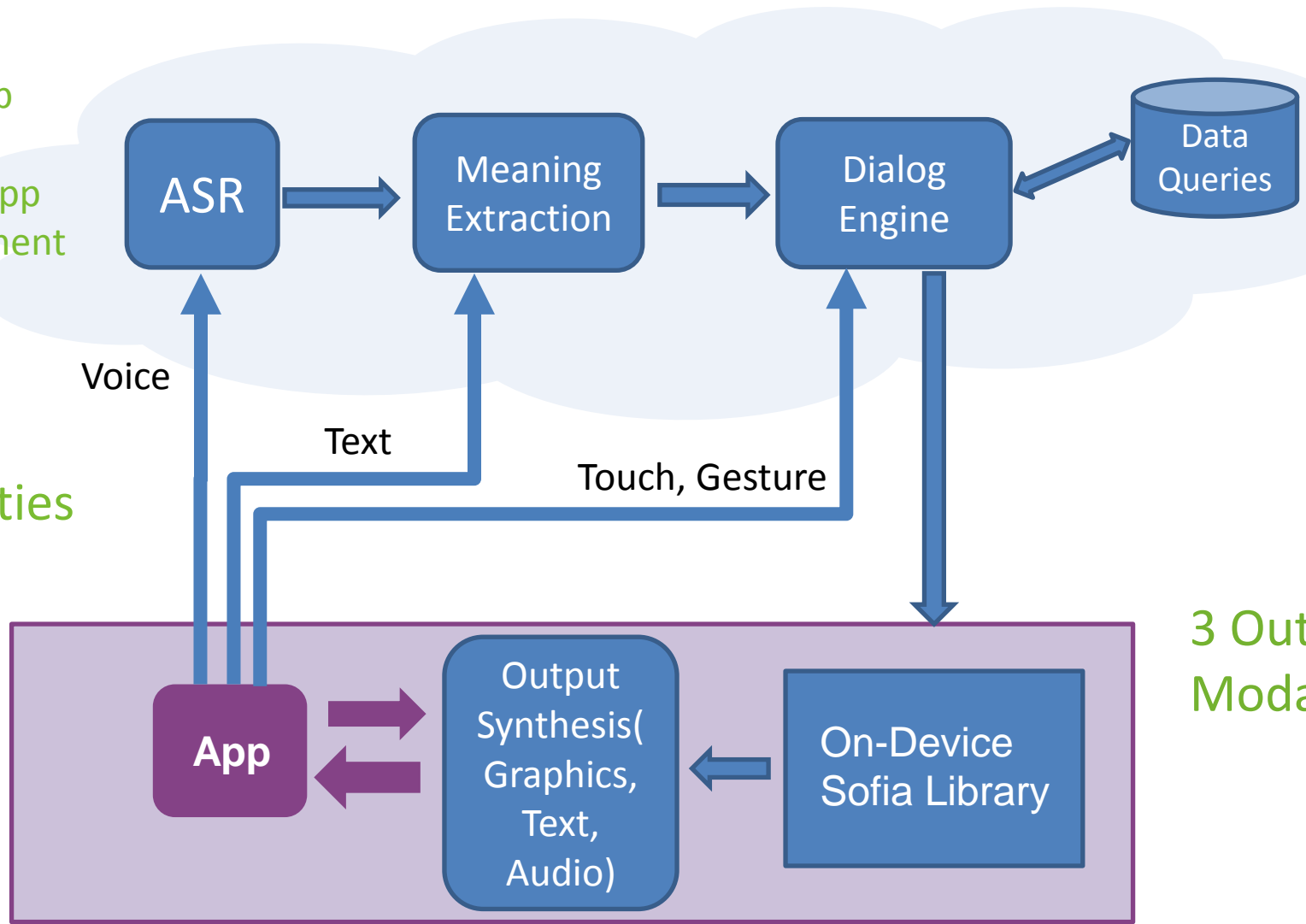
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Sofia: Multi-modal interaction engine and development platform

Platform speeds up domain-specific app development

4 Input Modalities

3 Output Modalities



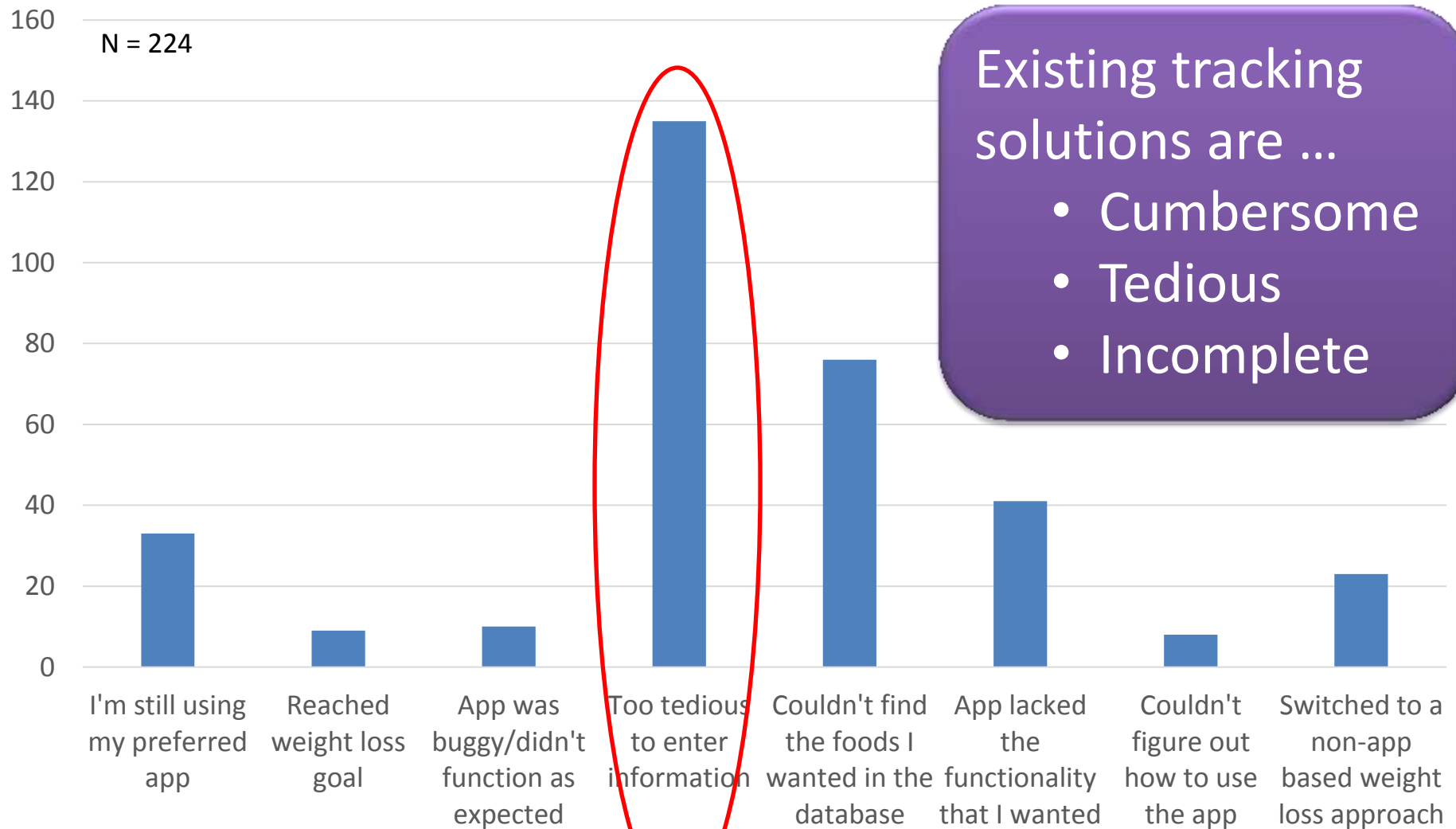
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Mobile Wellness Application

- Current mobile health apps are pervasive... but not sticky
 - 2/3 of health app users abandon app usage within 90 days
 - More than 1/2 of users find data input too difficult
 - 1/3 of users cannot find what they are looking for in the database
- Typical excuse is “I just don’t have the time”

Reasons for Keeping/Rejecting Wellness Apps



BUT ...

Consistent
tracking is the
most significant
predictor of
weight loss
success

Behavior Change
is the key
indicator for long
term weight
maintenance

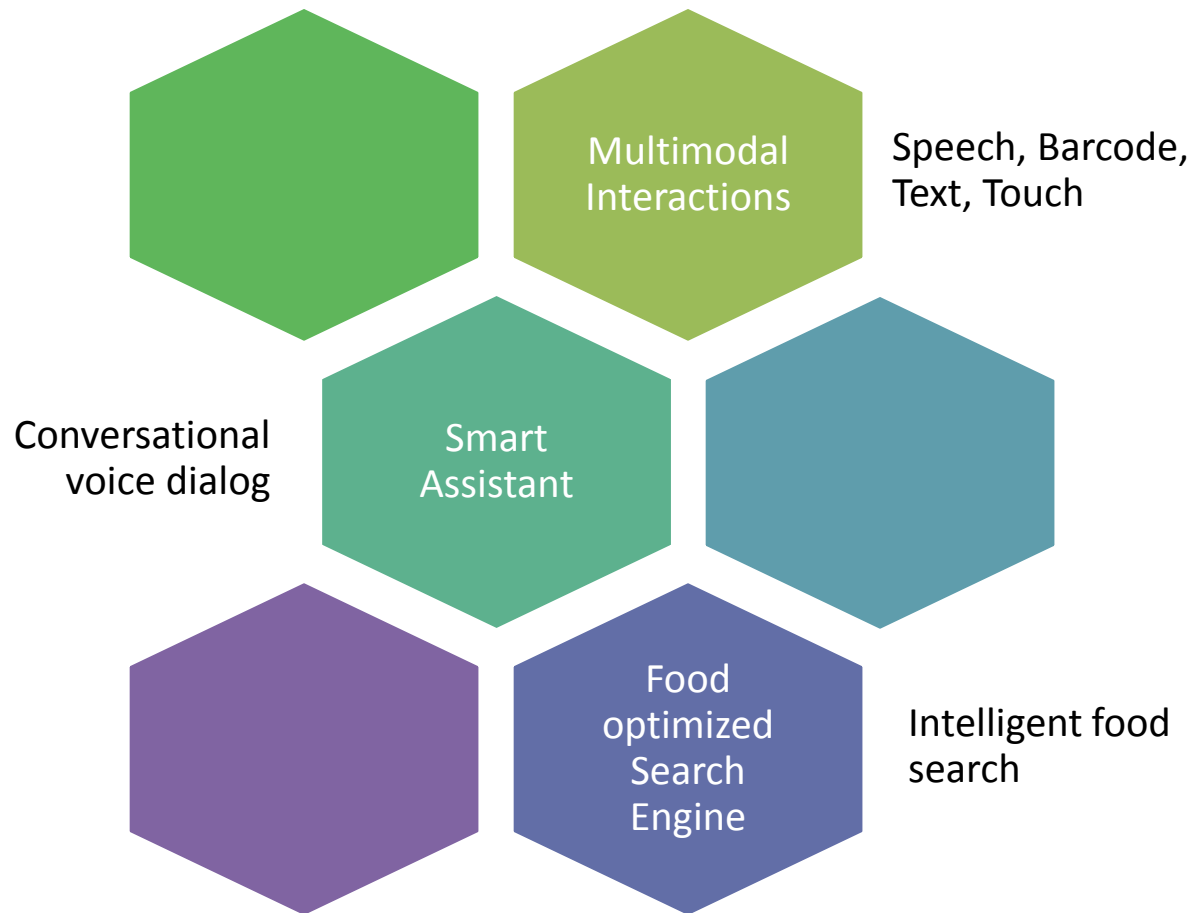
Solving the tracking challenge:



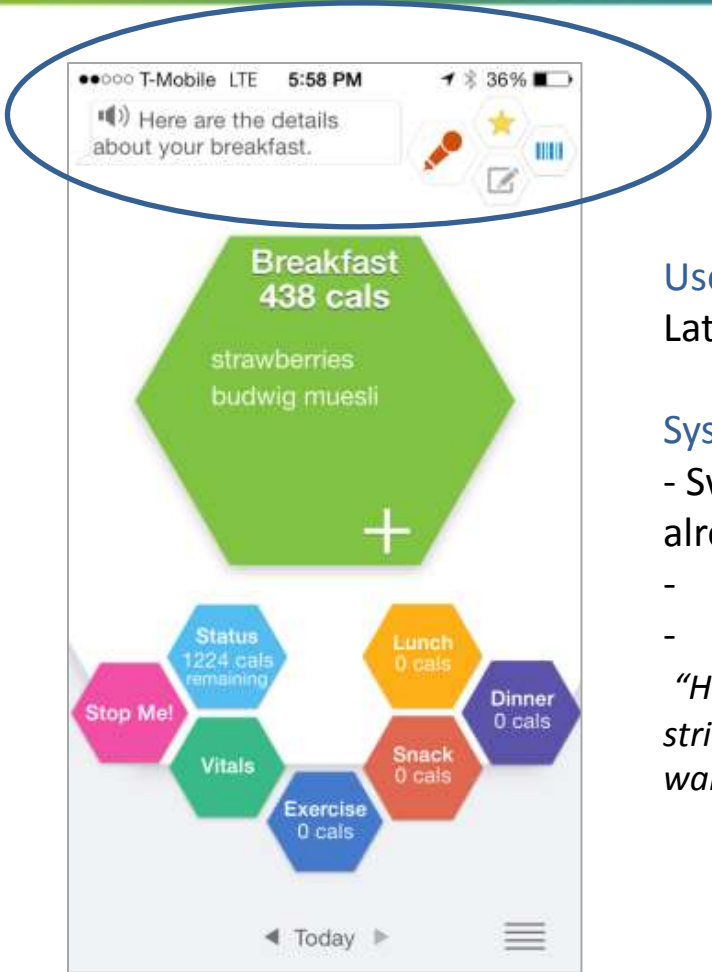
4 Modalities to add Food

1. Voice (ASR, NLP)
 - “For breakfast I had 1 cup of coffee and 1 bagel with cream cheese.”
2. Text (spelling correction, NLP)
 - Use in public environment, error fallback
3. Touch
 - Favorite food speed add
4. Barcode

Calio: Factors aimed at Ease of Use



Calio: Multi-modal integration



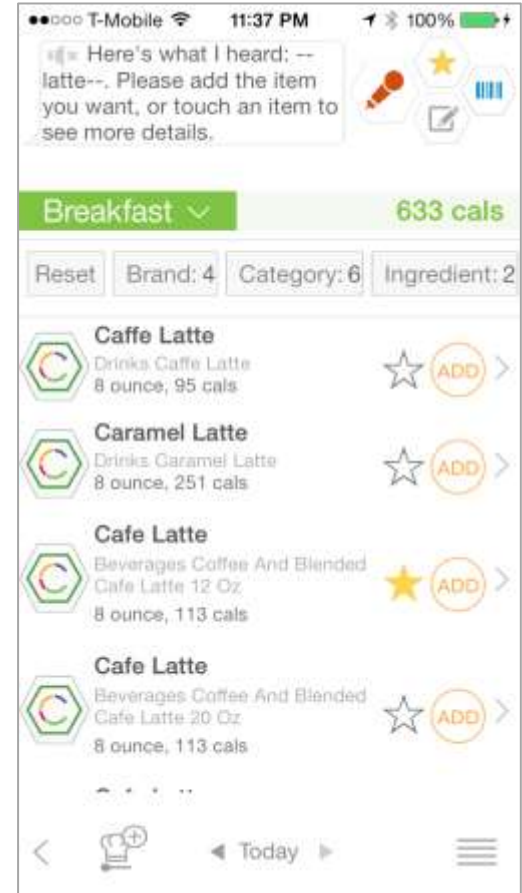
Consistent modality input Interface throughout app

User: "I also had an 8z Vanilla Latte"

System:

- Switches to Food Entry if not already there.
- Displays search results.
- textBox:

"Here's what I found for" + FOOD string(s) + "Please add the one you want."



Fastest for new data entry: Voice, intelligent search then touch

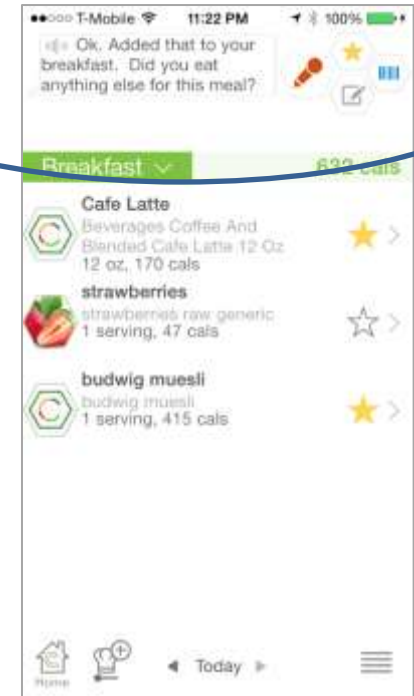
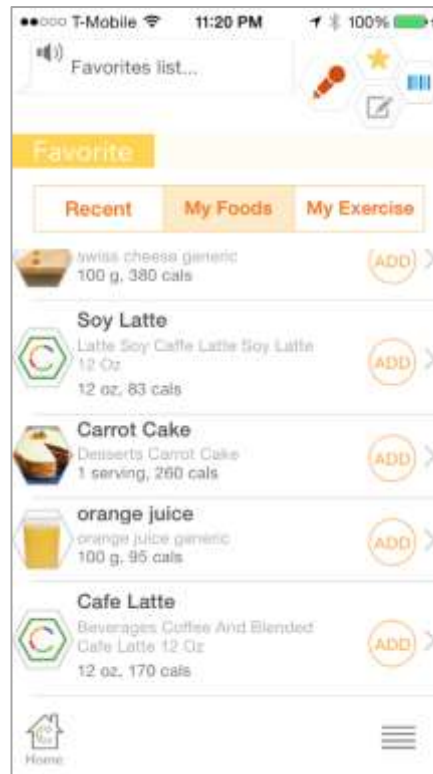
Intelligent Assistant: Food Search

- Hide complexity from user
- machine learning to prioritize food results

Results from a popular tracking app	Results From Fluential's Engine
Peanut Butter Chocolate Silk Whole Pie (Sodexo Workplace)	peanut butter pie (Western Sizzlin)
Peanut Butter Chocolate Silk Pie (Sodexo Workplace)	Peanut butter pie (recipe)
Peanut Butter Banana Whoopie Pie (ARAMARK on Campus)	Peanut butter pie (recipe)
Peanut Butter Pie (Homemade)	Peanut butter pie (recipe)
Chocolate Peanut Butter Pie (Homemade)	Peanut butter pie (recipe)
Frozen Yogurt - Peanut Butter Pie (Turkey Hill)	Peanut butter pie (Turkey Hill)

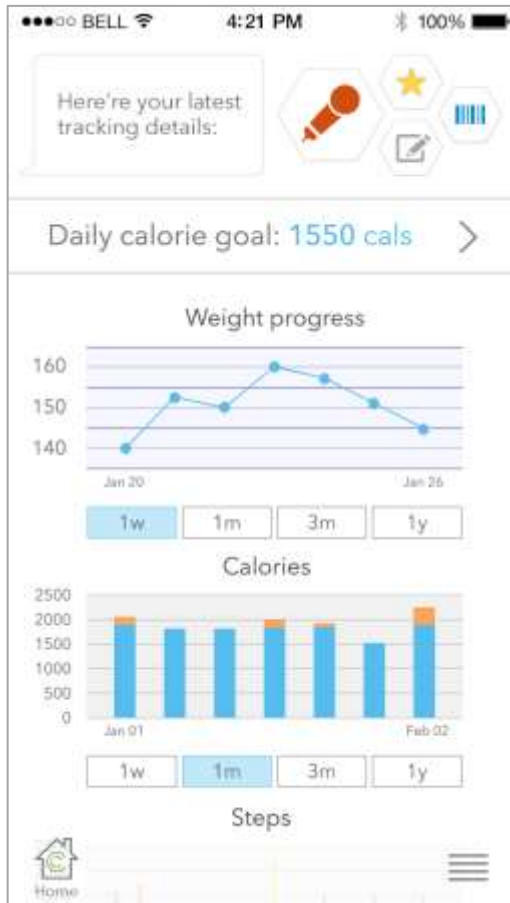
Calio: Multi-modal integration

Replaces menu-structure



Fastest saved food entry: Touch favorites, touch 'add'

Intelligent Assistant: Guidance & Personalization



Progress Reports



Nutrient tracking



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Metrics

1. Standard user metrics for mobile applications

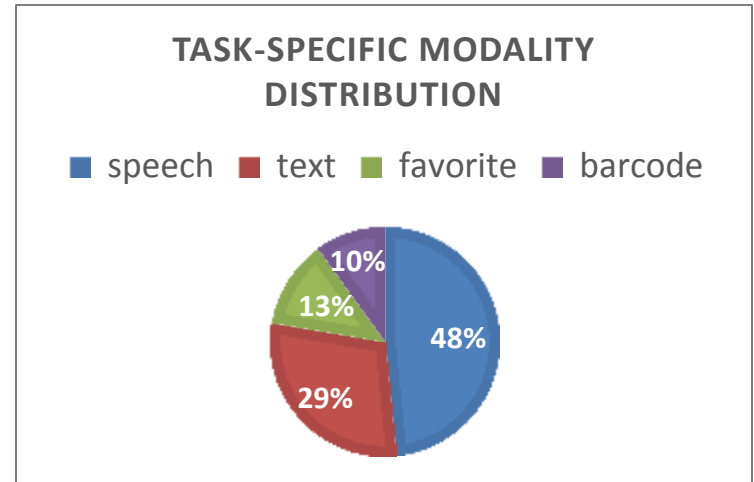
- New/active users
- Session lengths
- Task success
- Event statistics

2. Need for multi-modal specific metrics:

- Task duration by modality
- Identify situations when users use which modalities (time of day)
- User paths by step & modality

3. Per turn and end of interaction scoring of user experience

- Each turn gets assigned a score depending on the success/problem with a turn
- Hotspot identification



Efficient mobile applications require:

Seamless modality integration

- User has choice of multiple modality at any time

Intelligence

- Natural language understanding, dialog beyond 'speech to text'

Metrics

- Need for expanded set of metrics for modality interaction and modality usage