

Smart Home Ambient Intelligence: voice assistants

a new limit for our freedom

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Presentation Outline

Smart Home Ambient Intelligence: voice assistants
a new limit for our freedom

① Introduction

- Technological Mediation
- Definitions

② Case Study: Google Home - Google Assistant Actions

- Applied concepts of Technological Mediation limiting our freedom
- Ethical concerns arising from loss of freedom

③ Possible Remedies

Introduction

Technological Mediation

*While fulfilling their function, technologies do much more: they **give shape to what we do** and how we experience the world. And in doing so they **contribute actively** to the ways we live our lives (Verbeek 2011)*

- ▶ Technologies are not **neutral intermediaries**
- ▶ Technologies play an **actively mediating role**
- ▶ Artifacts are **bearers of morality** (Latour 1992)
- ▶ Morality is a matter of **human-technology associations**
- ▶ Two perspectives of mediation:
 - ▶ Perception
 - ▶ **Action**: I will focus on **human freedom**

Definitions I

Ambient Intelligence

***Ambient Intelligence** is an approach that combines two major technologies: Ubiquitous Computing and Intelligent User Interfaces (IUIs) (Brey 2005)*

Voice Assistant

*A **voice assistant** is a digital assistant that uses voice recognition, natural language processing and speech synthesis to provide aid to users through phones and voice recognition applications (WhatIs 2017)*

Definitions II

Freedom

Two forms (Brey 2005, 2006):

- ▶ Negative Freedom:

- ▶ act without obstruction or interference by others
- ▶ absence of limits and external constraints

example: artifact refusing to perform an action

- ▶ **Positive Freedom (Human Autonomy):** I will focus on this

- ▶ mastery over your own life
- ▶ **think freely, make your own decisions** to act

Case Study: Google Home - Google Assistant Actions



Google Assistant Actions

Actions on Google

HOME GUIDES REFERENCE SAMPLES COMMUNITY PROGRAM SUPPORT

Transactions ▾

Identity ▾

Localization ▾

Tools ▴
Overview
Actions Simulator
gactions CLI
Analytics and Monitoring

START WITH A SOLUTION

Templates ▾

Smart Home ▾

PUBLISHING

Overview ▾

Developer Console ▾

Apps for Families ▾

Node.js client library

We provide both an Actions SDK and Dialogflow variant of the Node.js client library to help you build fulfillment logic conforms to the [conversation webhook](#).

Actions Simulator


Type or speak to the simulator to test out your actions and hear the responses the same way you would on a hardware device. The tool gives you debugging information to diagnose issues and lets you test your experiences before deploying them.


gactions CLI


For those of you using the Actions SDK, `gactions` is a self-updating command line interface that lets you test and deploy your actions to production.

Action building tools

Some of the leading development tools for conversational end points are fully integrated with Actions on Google:

 Dialogflow

 Converse

 PullString

Starting from the **Actions on Google documentation** I will show:

1. **Applied concepts** of Technological Mediation limiting our freedom
2. **Ethical concerns** arising from loss of freedom

Applied concepts of Technological Mediation
limiting our freedom

Script: make your own decisions

Script

*A **script** is a prescription of how to act when using the artifact (Verbeek 2011)*

Interactions can be built in two ways (Google 2017):

- ▶ **With templates**

- ▶ build apps **without writing a single line of code** ...
- ▶ build apps quickly **without worrying about designing conversations** ...
- ▶ Google decides which interactions are good and what aren't

- ▶ **Without templates**

- ▶ **Dialogflow**

- ▶ machine learning
 - ▶ natural language understanding
 - ▶ extract parameters (data) from the user input
 - ▶ developers can decide the whole conversational interaction

Script: make your own decisions

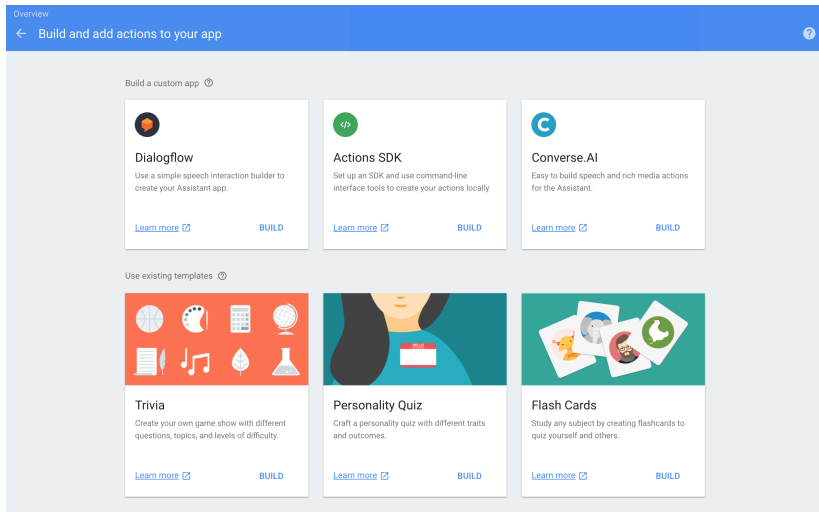


Figure: Actions On Google Console

Invitation/Inhibition: make your own decisions

Invitation/Inhibition

*The scripts of artifacts **suggest specific actions** and **discourage others** (Verbeek 2011)*

- ▶ Developers while creating the application logic (*fulfillment*) **enable some actions** and **disable some others**
- ▶ The conversational interaction doesn't go on if the user hasn't answered with **all the required parameters**

Invitation/Inhibition: make your own decisions

● make_name

SAVE

⋮

Contexts ▼

User says Search in user says 🔍 ^

” Add user expression

” the luckiest number i have is 12

” 23

” My lucky number is 23

” My lucky number is 23

PARAMETER NAME	ENTITY	RESOLVED VALUE	
number	@sys.number	23	×

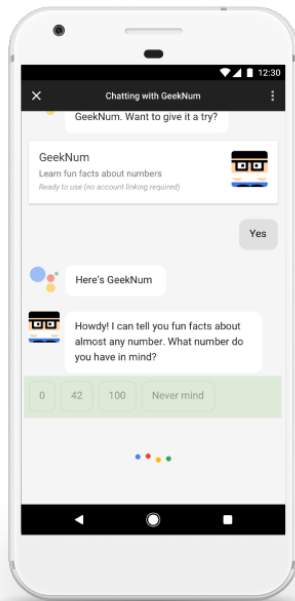
Figure: DialogFlow interactions

Behaviour Steering: think freely I

Suggestion Chips

*Use suggestion chips to **hint at responses** to continue or **pivot the conversation** (Google 2017)*

This happens in vocal interactions, but can be more easily visualized on mobile phones



Behaviour Steering: think freely II

*Smart objects could become **intermediaries between businesses and consumers**, using their intelligence to **persuade customers to buy products** ... Such influence could already be **exerted at the design stage** ...*
(Brey 2005)

Advertisements

- ▶ Google Assistant **advertised "Beauty and the Beast"** film, but Google claimed it was not an ad (AndroidPolice 2017)
- ▶ In future **Google Assistant will include ads**
 - ▶ make money by **promoting e-commerce from partners** (Recode 2017)
 - ▶ forecasted ad-spend of **19 billions globally by 2022** (Juniper 2017)
 - ▶ what about developers shaping behaviour based on analytics?

Behaviour Steering: think freely III

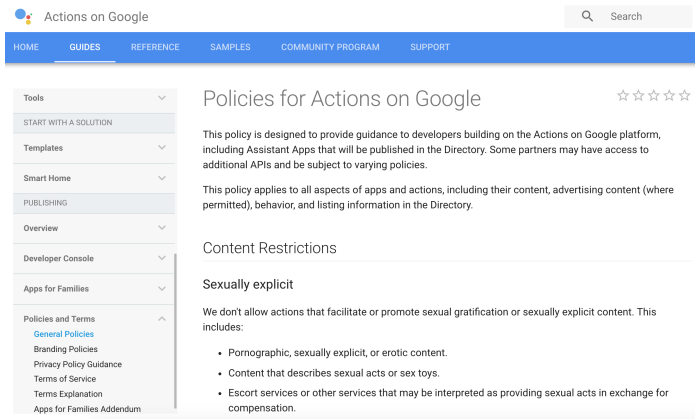
*Agent-based dialogue systems can be included in IUI's to monitor users and **make assumptions about their intentions and the task they are trying to perform***
(Brey 2005)

Implicit Invocation

*The Assistant opts to invoke an app because it can fulfill the user's intent, **without users calling it by name***
(Google 2017)

example: "Hey Google, book an appointment to fix my bike"

What about Technological Mediation?



The screenshot shows the 'Actions on Google' website. The top navigation bar includes 'HOME', 'GUIDES', 'REFERENCE', 'SAMPLES', 'COMMUNITY PROGRAM', and 'SUPPORT'. A search bar is located in the top right. The left sidebar lists various categories: Tools, START WITH A SOLUTION, Templates, Smart Home, PUBLISHING, Overview, Developer Console, Apps for Families, and Policies and Terms. Under 'Policies and Terms', 'General Policies' is highlighted. The main content area is titled 'Policies for Actions on Google' and includes a star rating. It contains two sections: 'Content Restrictions' and 'Sexually explicit'. The 'Sexually explicit' section lists prohibited content: Pornographic, sexually explicit, or erotic content; Content that describes sexual acts or sex toys; and Escort services or other services that may be interpreted as providing sexual acts in exchange for compensation.

Actions on Google

HOME GUIDES REFERENCE SAMPLES COMMUNITY PROGRAM SUPPORT

Tools

START WITH A SOLUTION

Templates

Smart Home

PUBLISHING

Overview

Developer Console

Apps for Families

Policies and Terms

General Policies

Branding Policies

Privacy Policy Guidance

Terms of Service

Terms Explanation

Apps for Families Addendum

Policies for Actions on Google

☆☆☆☆☆

This policy is designed to provide guidance to developers building on the Actions on Google platform, including Assistant Apps that will be published in the Directory. Some partners may have access to additional APIs and be subject to varying policies.

This policy applies to all aspects of apps and actions, including their content, advertising content (where permitted), behavior, and listing information in the Directory.

Content Restrictions

Sexually explicit

We don't allow actions that facilitate or promote sexual gratification or sexually explicit content. This includes:

- Pornographic, sexually explicit, or erotic content.
- Content that describes sexual acts or sex toys.
- Escort services or other services that may be interpreted as providing sexual acts in exchange for compensation.

Google Actions Policies and Terms are designed towards:
privacy, content, branding . . .

- ▶ following the **Guidance For Conversation Design** is enough?

Ethical concerns arising from loss of freedom

Technocracy

- ▶ **Experts** will shape our mediations
 - ▶ Unforeseen mediations ...
 - ▶ Not humans but **technologies are in control** (Verbeek 2011)
- ▶ **Opposite problem:** people without enough background may design mediations and publish them
 - ▶ today are very limited mediations
 - ▶ what about the future?

Moral Laziness

commodification of morality

Moral responsibility of designers

What if in the future developers will shape morality???

Responsibility vacuum

What about behaviour change?

what if we want to change our behaviour towards what we think is good to us and not towards what is good for the designers?

Possible Remedies

Possible Remedies

Bibliography I



AndroidPolice (2017). *Google Assistant promoting "Beauty and the Beast"*. URL:

<http://www.androidpolice.com/2017/03/16/google-assistant-promoting-beauty-and-the-beast/> (visited on 11/12/2017).



Brey, Philip (2005). "Freedom and privacy in ambient intelligence". In: *Ethics and Information Technology* 7.3, pp. 157–166.



Brey, Philip (2006). "Ethical aspects of behavior-steering technology". In: *User Behavior and Technology Development*, pp. 357–364.



Google (2017). *Actions On Google Developers Documentation*. URL: <https://developers.google.com/actions/> (visited on 11/12/2017).



Juniper (2017). *Amazon Echo & Google Home To Reside In Over 50% Of US Households By 2022*. URL:

<https://www.juniperresearch.com/press/press-releases/amazon-echo-google-home-to-reside> (visited on 11/12/2017).

Bibliography II



Latour, B. (1992). "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts". In: *Shaping Technology-Building Society: Studies in Sociotechnical Change*. Ed. by Wiebe Bijker and John Law, pp. 225–258.



Recode (2017). *Google Assistant e-commerce revenue*. URL: <https://www.recode.net/2017/5/23/15681596/google-assistant-ecommerce-revenue> (visited on 11/12/2017).



Verbeek, Peter-Paul (2011). *Moralizing technology: Understanding and designing the morality of things*. University of Chicago Press.



WhatIs (2017). *Definition: voice assistant*. URL: <http://whatis.techtarget.com/definition/voice-assistant> (visited on 11/12/2017).