

# 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

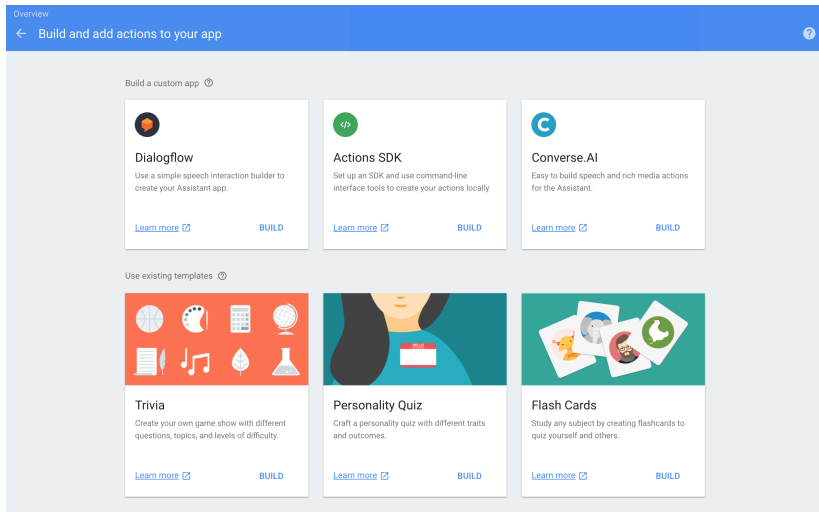


Figure: Actions On Google Console

# 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

⋮

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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

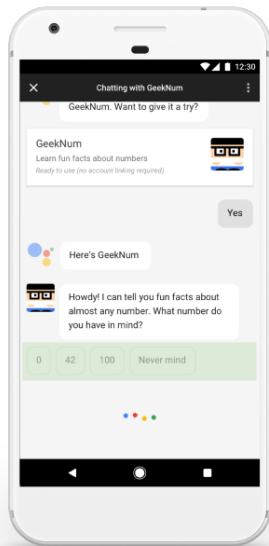
# Behaviour Steering: think freely I

## Suggestion Chips

*Use suggestion chips to **hint at responses to continue or pivot the conversation.***

*If during the conversation there is a primary call for action, **consider listing that as the first suggestion chip** (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 voice assistants ad-spend of **19 billions globally by 2022** (Juniper 2017)

## 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."



# Where is Technological Mediation?

1) Google Actions Policies and terms: designed towards privacy, content, branding, ... : what about technological mediation?

Ethical concerns arising from loss of freedom

# Technocracy

+ we may have the opposite problem: non technical people designing actions without having enough background!!!

# 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).