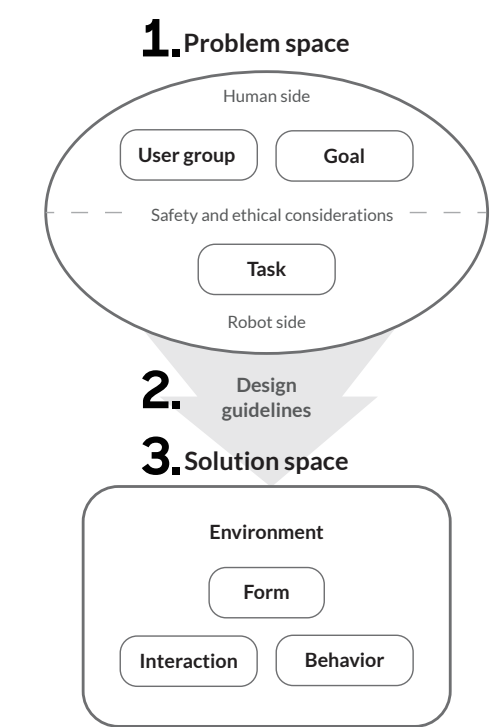


Canvases for the Process of Designing Social Robots



1. Defining the problem

2. Creating guidelines

3. Defining the solution

4. Iterate! After user and expert feedback, redefi-ne your problem space, guidelines, and solution.

1. The Problem Space

What is the problem worth solving? Define it clearly through the user and the robot.

PROBLEM SPACE OF DESIGNING A ROBOT

What is a problem worth solving? Define it clearly through the user and the robot.

| USER(S) | | |
|--------------|-----------------|-------|
| Group(s) | Characteristics | Needs |
| Goal(s) | | |
| Task(s) | | |
| Advantage(s) | | |
| ROBOT | | |

The Problem Canvas

Define who you are building for and why. What are the advantages? Always use this canvas first.

ETHICAL CONSIDERATIONS OF THE ROBOT

In a situation of ethical considerations and constraints, identify the ethical issues, consider the values at stake, and the possible consequences for the user and the robot.

| Physical safety | | Safety of data | |
|-------------------------|----------|-----------------------|----------|
| PROBLEM | SOLUTION | PROBLEM | SOLUTION |
| Transparency | | Equality across users | |
| PROBLEM | SOLUTION | PROBLEM | SOLUTION |
| Emotional consideration | | Behaviour enforcement | |
| PROBLEM | SOLUTION | PROBLEM | SOLUTION |

The Ethics Canvas

How are ethics considered already in the definition of the problem? Use these six ethical considerations.

2. Guidelines

Create guidelines for your future robot. How will your problem be answered by the design?

ROBOT DESIGN GUIDELINES

What are considerations that guide the design of the robot? Focus them back to the definition of your problem (the user(s), their needs and characteristics, the values at stake and the possible consequences for the user and the robot).

| Ethical guidelines | | Advantage guidelines | |
|------------------------|--|----------------------|--|
| Environment guidelines | | Form guidelines | |
| Interaction guidelines | | Behaviour guidelines | |

The Guidelines Canvas

How will the definition of your problem and the ethics be visible in the final design? Make guidelines for different dimensions of the robot.

3. The Solution Space

It's time to start designing your robot! The solution is visible in four dimensions: environment, form, interaction, and behaviour.

1. ENVIRONMENT OF THE ROBOT

You can modify the environment from the context and design it to fit your solution better. The aim of this canvas is to define the environment and the robot's role in it.

| Where? When? | |
|---------------------------------------------------|-----------------------|
| Where? | When? |
| End-users? Secondary users? | Simultaneous users |
| Name the role | Role of the robot |
| What situation(s) does interaction take place in? | Situation flow |
| Human facilitators? | Level of facilitation |

The Environment Canvas

What is the context of the robot's operation?

2. FORM OF THE ROBOT

The form of the robot is the outward appearance of the robot. It is the first dimension of the solution space.

| Appearance | | Draw a picture | |
|------------------|------------------|----------------|--|
| Appearance | Draw a picture | | |
| Voice | Sounds | | |
| Touch sensations | Smell sensations | | |

The Form Canvas

What are the robot's outwardly perceptible qualities?

OR

ROBOT DESIGN MVP

It is time to design your robot! The aim of this canvas is to define the robot's role in the environment and the robot's form.

| Where? When? | | Name the role | |
|---------------------|------------------------|---------------|--|
| Where? When? | Name the role | | |
| Personality | Data-based behaviour | | |
| Draw a picture | Interaction modalities | | |
| Interaction outline | | | |

The MVP Canvas

If you want to prototype rapidly, the "minimum viable product" canvas can act as a replacement for the four dimensions.

4. Iterate

Test your prototype, ask for expert and user feedback, and iterate.

3.

INTERACTION WITH THE ROBOT

How does the robot interact with users?

| Leadership | | Goal(s) | |
|---------------------|---------|---------|--|
| Leadership | Goal(s) | | |
| Modalities | | | |
| Interaction outline | | | |

The Interaction Canvas

How does the robot interact with users?

4.

BEHAVIOUR OF THE ROBOT

What drives the robot's behaviour?

| Personality | | Motivation | |
|----------------------|-----------------------|------------|--|
| Personality | Motivation | | |
| Data-based behaviour | Contextual adaptation | | |
| Social behaviours | Social awareness | | |
| Connectivity | Autonomy | | |

The Behaviour Canvas

What drives the robot's behaviour?