Methodological introduction
Methodological introduction: Design & AI process

Double Diamond + AI Process

**Discover**
- Explore the problem space
- Analyze context, people, market
- Explore tech possibilities

**Define**
- Generate insights
- Frame and reframe the problem
- Identify existing data sources

**Develop**
- Brainstorm potential solutions
- Test (fast prototype) and select best option
- Match stakeholders’ needs with AI real possibilities

**Deliver**
- Develop final solutions
- Prepare and integrate data
- Model, evaluate, deploy AI system
- Deliver knowledge
- Design and develop UI

Tookit Phases

1. Context analysis

Prototyping

2. Envisioning solutions

3. Idea development

4. Testing
Context analysis
Context analysis

“Context Analysis” is about exploring and mapping the specific context of operation. This phase aims to obtain a complete understanding of the particularities of the context.

Particular attention has to be drawn on grasping its culture, the actors and the factors that could influence and even determine the success or failure of solutions developed within and for the context.

The context of operation is seen as a complex ecosystem where several factors are interconnected and interrelated.

In this phase, also the social and cultural factors related to the initial challenge are to be carefully analyzed.
Service Safari

WHAT IS IT?

Service Safari is an autoethnography research tool that helps designers develop interesting insights and inspirations by experiencing a service in first-person.

HOW?

You will immerse in the service experience to explore it on your own. It is important to document your experience for future reference. You can use the Service Safari - "Field" Notes to do that, noting, for example, perceived strengths and flaws in the different phases of your experience.
<table>
<thead>
<tr>
<th>STRONG SUITS</th>
<th>INTERACTION</th>
<th>END OF EXPERIENCE</th>
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Problem Framing

WHAT IS IT?

Design usually deals with wicked and ill-defined problems, and dealing with AI for the public sector makes no exception. To handle this complex matter and try to reduce ambiguity, framing the problem is an essential step to start with. Even when a brief or goal is provided, a visual synthesis helps to see thing in a specific and sharable light.

HOW?

There is no predefined order to address the boxes in the tool. Overall, you should identify:

- the specific problem you want to answer with your intervention (WHAT)
- one or two types of actors affected by the problem (WHO)
- the long-term impact of the problem, should it persist (WHY)
- the specific timeframe in which the problem is most relevant (WHEN)
- the physical or abstract space in which the problem manifests (WHERE)

TIP

WHEN and WHERE points may not be always relevant or distinguishable.
**Problem Framing**

**Overall goal:** sustainable cities and communities (SDG #11). The example is inspired by: Connected urban forest by CivicAI.

---

**Problem Statement**

*What* would you like to focus on to reach the goal?

Revitalize disused urban areas

---

**Target Audience**

*Who* is affected by the problem?

Local administrations

---

**Expected Impact**

*Why* is it relevant?

No or poor green areas could reduce the quality of urban life and pollution would be unopposed

---

**Context**

- **Time**
  
  *When* does the problem become critical?
  
  3 years (for deployment)

- **Physical or Abstract Space**
  
  *Where* does the problem become critical?
  
  Disused areas with green spaces
Stakeholder Map

WHAT IS IT?

The Stakeholder Map is a visual representation of all the stakeholders involved in a system according to how much they can influence the situation under investigation or be impacted by it. It answers the question “who are the groups, partner organizations, institutions affected?” and, in this case, is used to identify the main target audience.

HOW?

The Stakeholder Map is presented as a matrix, defined by two parameters: the impact a problem might have on a person/group of people, and the influence they have on solving the problem.

- Brainstorm all the possible categories of people that can be of interest for your project. Remember to consider also data-related stakeholders (data providers, controllers, stewards, etc.)
- Place them on the map according to the impact/influence criteria. Place those who are the most critical targets for solving the problem in the top-right corner (possibly, they overlap with the WHO of the Problem Framing tool).

It follows that stakeholders can be distinguished into direct and indirect. The former needing to be taken into account and involved more.
Example Stakeholder Map

1. Use the past its to list the different stakeholders related to your system.
2. Place them in the matrix according to how much they can influence the situation you are designing for or be impacted by it to have a clear representation of who are the most relevant people for you.

How much is the stakeholder impacted by the project?

How much can the stakeholder influence the success of the project?
Stakeholder Map

1. Use the post-its to list the different stakeholders related to your system.
2. Place them in the matrix according to how much they can influence the situation you are designing for or be impacted by it to have a clear representation of who are the most relevant people for you.

How much is the stakeholder IMPACTED by the project?

How much can the stakeholder INFLUENCE the success of the project?

- **Direct stakeholders**
- **Indirect stakeholders**

- **MAIN TARGET AUDIENCE**
Stakeholder Value Map

WHAT IS IT?

The Stakeholder Value Map is a visual representation dedicated to specifically elaborate on the values of key stakeholders. It allows to reason about what values might be important for them according to their needs. Different kinds of values can emerge, based on the character of needs.

- Practical needs relate to basic or primary necessities.
- Social needs are connected to values that take place in the relationships with others.
- Higher personal needs belong to a more abstract sphere of necessities linked to an individual sense of dignity and realization.

HOW?

1. Select (up to) 3 stakeholders in the top right quadrant of the Stakeholder Map and place them on the board.
2. Think about the different kinds of values associated to each primary stakeholder.
3. Place them in the corresponding area, according to need they refer to.
User Research Interview Guide

WHAT IS IT?

The tool supports the design of structured or semi-structured interview questions to directly involve relevant users or stakeholders for the problem at hand. Interviews are useful to investigate their needs, desires, expectations, as well as their current state, habits, or potential.

HOW?

For an appropriate preparation to conduct a (semi-)structured interview:

1. Define clear and limited scope and objective(s) for the interview.
2. Identify relevant interviewees for the investigation.
3. Understand the best context (preferable and possible time, place, modality) for a successful interview;
4. Define a structure for your interview:
   - identify the relevant dimensions to explore to achieve the objectives (you can select some among those proposed, or imagine new ones or different interpretations)
   - For each selected dimension, elaborate one or more questions. Pay attention NOT to overwhelm your interviewee!

TIP

Keep your questions simple and open. To gain interesting insights you must not be prescriptive.
### User Research Interview Guide

Interviews can be structured based on, but not limited to, the following dimensions.

**Profiling**
- Gathering of relevant info on the interviewee and/or the organization represented (e.g., role, domain, expertise, etc.).
- Inquiry into the extent of knowledge and interest in the topic under consideration (e.g., use cases, best practices, papers, etc.).

**Contents**
- Investigation of tools and services currently in use, those desired, or relevant references.

**Tools & services**
- Exploration of previous experience, expertise, and skills related to certain domains, activities, initiatives, tools, services, or other.

**Know-how**
- Investigation of existing or interesting ecosystems and networks where collaboration, sharing of solutions and expertise can take place and benefit.

**Ecosystem & network**
- Inquiry into data approach, availability, collection, use, sharing, and so forth.

**Data**
- Exploration of existing, required, or relevant training-related activities (e.g., upskilling, long-life learning, etc.) and/or of the attitude and desiderata towards them.

**Training**
- Inquiry into forms and/or scope of funding already available and accessed, existing or to be obtained.

**Funding**
- Exploration of the infrastructure - owned, to be implemented, or further existing possibilities (e.g., to support AI systems).

**Infrastructure**
- Inquiry into the attitude to events, communication and dissemination, their role and relevance.

**Initiatives & com.**

---

### Interview scope and objective(s)

Write here the specific scope and objective(s) of your interview.

### Dimensions | Questions
---
**Profiling**
1. Where are you currently working?
2. What is your role in the local administration?
3. Why is it relevant in relation to the improvement of disused green areas in the city?

**Funding**
7. How was the initiative funded?

**Initiatives & com.**
4. What kind of initiative did you implement to improve green urban areas?

**Know-how**
8. What problems did you encounter in the implementation of your solution?
9. What benefits have you observed as a result of your intervention?

**Ecosystem & network**
5. Who was involved in the solution implementation?
6. Did you reach out to other cities to reuse solutions already developed by them?

---

Elaborate your questions here:
1. ...
2. ...
## User Research Interview Guide

Interviews can be structured based on, but not limited to, the following dimensions:

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## Interview scope and objective(s)

**Write here the specific scope and objective(s) of your interview**

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From Needs to Insights

**WHAT IS IT?**

The tool is meant to build on the needs previously identified to infer relevant insights that might change or enrich your perspective towards the problem, in the form of a simple and synthetic sentence. This mental exercise can help you reframe the initial definition of the problem and guide you towards more effective solutions.

**HOW?**

The Stakeholder Value Map is the starting point for this tool.

1. Select one of your **primary stakeholders**, this will be the **subject** of the sentence.
2. Choose one of their **needs** and put it in the form of a **verb**.
3. Reason about **why your subject has this need** to see if something interesting comes up. **Keep an open mind and try to find latent and insightful motivations!**
4. If the **insight is valuable** for you, write it down on the board. Repeat this process for all the stakeholders and needs that you think might bring you to relevant insights.

**TIP**

Start from Practical needs. It can happen that Higher personal needs coincide with the insights / motivations.
<table>
<thead>
<tr>
<th>STAKEHOLDER</th>
<th>NEEDS</th>
<th>IS THERE ANY RELEVANT INSIGHT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Mother Nature</td>
<td>needs to be taken care of</td>
<td>because it needs human commitment and action to survive</td>
</tr>
<tr>
<td>#2 Mother Nature</td>
<td>needs to grow in suitable environments</td>
<td>because it can help human life</td>
</tr>
<tr>
<td>#3 Citizens</td>
<td>need to have healthy and safe public spaces</td>
<td>because they should also have an outdoor life</td>
</tr>
<tr>
<td>#4 Citizens</td>
<td>need to commit to public life</td>
<td>because they can contribute to environmental issues</td>
</tr>
<tr>
<td>#5 Citizens</td>
<td>need to contribute to environmental issues</td>
<td>because they can feel a sense of accomplishment</td>
</tr>
<tr>
<td>#6 The Local Administration</td>
<td>needs to reduce air and noise pollution</td>
<td>because it guarantees better life conditions</td>
</tr>
<tr>
<td>#7 The Local Administration</td>
<td>needs to have aesthetically appealing cities</td>
<td>because it guarantees better life conditions</td>
</tr>
<tr>
<td>#8 Add stakeholder here...</td>
<td>needs to verb</td>
<td>because now insight</td>
</tr>
<tr>
<td>#9 Add stakeholder here...</td>
<td>needs to verb</td>
<td>because now insight</td>
</tr>
</tbody>
</table>
# From Needs to Insights

<table>
<thead>
<tr>
<th>Stakeholder needs</th>
<th>Needs to</th>
<th>IS THERE ANY RELEVANT INSIGHT?</th>
</tr>
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<tr>
<td>#1</td>
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<td>#2</td>
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<td></td>
</tr>
<tr>
<td>#9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Bring here the needs derived from the insights mapped in the Sense-making wall and in the Stakeholder Value Map.*

You can group visually stakeholders by changing the background color.

*new insight*
Problem Reframing

WHAT IS IT?
In the light of the research and reflections done so far, the problem reframing activity aims at **consolidating a deeper comprehension of the problem**.
Reaching a sharp understanding of the **real problem** can help you in the idea development phase to envision more effective and innovative solutions.

HOW?
Now that you have better analyzed your user, can you reframe your problem from a **different and more comprehensive** way?
1. Collect all the elements that might help you in this process from the previous tools (or create new ones if you need it), and place them in the corresponding spaces in the upper part of the tool.
2. **Synthesize** all the info you deem necessary in the form of an “**How might we ... to ...?**” question. It should allow several possibilities, without being too broad.
3. In this way, you should have your **scenario and expected impact** defined for the next steps.

TIP
Keep the question short and easy to understand!
How might we **revitalize and take care of green urban areas** to **improve people's lives quality**?
Problem Reframing

TARGET AUDIENCE

MAIN NEED

EXPECTED IMPACT

TIME

PHYSICAL OR ABSTRACT SPACE

INSIGHTS

How might we ... to ...?

SCENARIO

EXPECTATION
Sense-making Wall: Barriers & Opportunities

WHAT IS IT?

The Sense-making Wall is a versatile tool to help you organize and make sense of relevant information from the context. It can be useful after a first-person experience, an ethnographic research, or in any other step, and modified if needed. This tool encourages reflections on multi-level barriers and opportunities, derived from the collected info.

HOW?

Before envisioning ideas on how to respond to the problem you reframed, are there some issues that you think you might encounter?

1. Take 4 different aspects in consideration: use context, AI & technology, socio-cultural values, organizational context (of the organization that will use/deploy the solution).
2. For each, identify possible barriers (darker post-its on the left) and opportunities (lighter post-its on the right).
3. If some elements from different domains are linked, visually connect them with arrows.
Sense-making Wall: Barriers & Opportunities

- **USE CONTEXT**
  - Barriers
  - Opportunities

- **AI & TECHNOLOGY**
  - Barriers
  - Opportunities

- **SOCIO-CULTURAL VALUES**
  - Barriers
  - Opportunities

- **ORGANIZATIONAL CONTEXT**
  - Barriers
  - Opportunities
Envisioning solutions
Envisioning solutions

Envisioning solutions is a phase dedicated to the ideation of new solutions aimed at meeting and solving the identified problem.

The first part is dedicated to further explore the problem, in order to move to its reframing and hence identifying effective solutions.

Through ideas elicitation, a large quantity of ideas is to be developed that are then discussed, grouped and eventually combined leading to one single concept of the final solution. Brainstorm and reason even on ideas that are impossible to implement bring to consider aspects that can be combined in new ideas that narrow down to a feasible concept able to meet the needs of all stakeholders and users.
Ideas Elicitation

WHAT IS IT?

Having built the right question is fundamental to start exploring possible solutions that meet the problem. Your How Might We (HMW) question should help you generate lots of creative ideas as possibilities to be discussed to extract the best solution. These can be further explored through the Desktop Walkthrough prototype.

HOW?

1. Report your HMW question in the opposite box.
2. Keep in mind the assumptions you made earlier about what is of value to your primary target audience.
3. With the acquired sensitivity, use the space on the board to brainstorm various ideas to answer it. There is no right or wrong in this phase, any suggestion can be an inspiration for you and your design team.
4. Among the ideas proposed, choose one to develop. You can do this freely within your design team or use an Evaluation Matrix to facilitate the decision.
How might we revitalize and take care of urban green areas to improve people’s life quality?

Every problem is an opportunity for design. Properly framed How Might We doesn’t suggest a particular solution, but gives you the perfect frame for innovative thinking.

- Replanting urban greenery by having AI systems identify the best species for greater pollution reduction in relation to the location
- Giving up the management of green areas to cultural associations
- Organizing events to foster collective action towards green areas
- Hiring private contractors to maintain green areas
- Predicting when trees are going to have a disease
- Generating inventory of green areas of the city and how they are used by people
- Having people and AI systems collaborate for the monitoring and maintenance of urban greenery
Every problem is an opportunity for design. Properly framed How Might We doesn't suggest a particular solution, but gives you the perfect frame for innovative thinking.
**Evaluation Matrix**

**WHAT IS IT?**

The Evaluation Matrix allows to **weight different ideas**, rating them based on predefined criteria, in order to identify the most promising ones.

**HOW?**

As a starting point, the evaluation criteria presented in the matrix are: the level of **implementability** within the scenario, and the **value for all the people** involved and impacted if it would be addressed. But, if you want, you can collectively change the criteria according to two factors that can be relevant for your situation.

Once your axis are defined:

- Start discussing about the positioning of the ideas brainstormed in the *Ideas Elicitation* board.
- Place them in the matrix.
- Select the one that convinces you the most.
Evaluation Matrix
Idea development
Idea development

The phase is dedicated to the development of the idea identified in a multi-dimensional way. The idea development unfolds from ethical implications to system requirements.

A first part is dedicated to unpack the ethical issues and implications of a project, reasoning on the role of data by focusing on specific aspects one at a time. Then, it is required to reason on the solution as a system consisting of data to be inputted in order to run certain tasks and obtain specific outcomes, ruminating on implications, even unintentional. A high-level description of the solution and a reasoning on its technological feasibility completes the provision of a multi-level understanding of the idea.
Idea Description

WHAT IS IT?
To properly communicate, share, and develop an idea, it is very important to define it in a **synthetic and immediate** way. Therefore, this tool allows this process encouraging the identification of a title and a catch phrase.

HOW?
In a “fake it before you make it” approach, try to describe the idea identified in the HMW activity as you should sell it to a possible customer or funder.

1. Give a **name/title** to your concept, leveraging its most characterizing qualities.
2. Compile a **catch phrase** that identifies the **substance** of your idea (what is it in a nutshell?) and its main **function**. You can use the space at the bottom of the board to gather ideas.

TIP
Remember, the key is to be as synthetic and clear as possible in the message you want to send.
Idea Description

Connected urban forest

A platform to engage people and collaborate with AI systems to monitor and take care of green areas.

what is your idea?

Having people and AI systems collaborate for the monitoring and maintenance of urban greenery.

what is its function?

To monitor and maintain green areas, both AI and people efforts are needed to achieve a win-win situation.
Desktop Walkthrough

WHAT IS IT?

Desktop Walkthrough is a low-fidelity prototyping tool. It’s useful (i) to get a shared understanding within your team about the experience you are designing, (ii) to identify the critical steps in the journey, (iii) to identify any other key elements or problem areas that need to be addressed.

HOW?

To have an overview of the experience you want to propose:
1. Identify the key actor of the journey.
2. Visualize the steps with the necessary (digital) props,
3. Create maps and stages,
4. Iterate your idea through different – complete – walkthroughs.
5. Document your results in the Journey Map.

TIP

Remember: the goal of this prototyping tool is to help you envisioning the development of your idea in a clear and sharable way.
Desktop Walkthrough
User Stories

WHAT IS IT?
User stories are short and straightforward descriptions of something that users of your product/service/system want to achieve (need and desired outcome), written in a simple and non-technical way.

HOW?
After having identified and collected a set of users’ needs (e.g., from interviews with end-users):
1. Start writing an explanatory description of a possible user story. You can provide general information (e.g., describing a short user journey), examples of use cases, and pictures (if needed).
2. Synthesize the description in a straightforward structure, identifying the subject, the objective, and the motivation of the story.
3. Identify some general conditions that could validate the implementation of the user story (sort of acceptance criteria). Note that they should bring some value to users.

TIP
In the end, User Stories should be synthetic and immediate to understand. Remember: they should not provide solutions.
User Stories

EXPLANATORY DESCRIPTION

When a notification for intervention is displayed on the platform, as a citizen who wants to help, I need to be able to understand where the plants requiring attention are located and which kind of assistance is needed. If it is something that I can handle, like watering them or give them some nutrients, I can go in the right location and I should find clear information on how to provide the correct assistance. For instance, I need to know where I can find the tools I need, if I have to bring something from home, and what specific actions I have to perform.

A citizen should be able to understand how to intervene to assist urban plants so that necessary actions can be accomplished.

You can also add pictures or other complementary material

SORT OF ACCEPTANCE CRITERIA

- Plant location
- User location on the map
- Plant identification
- Clear understanding of the problem / needed intervention
- Identification of the modality of intervention
- Identification of the required tools (Is a watering can needed? Where to find it?)
User Stories

EXPLANATORY DESCRIPTION

Insert your description here

OBJECTIVE / VERB

MOTIVATION

[A (user/item) should be able to (do something) so that (an outcome can be achieved)]

use the bg for adding IMG or color clusters

You can also add pictures or other complementary material

SORT OF ACCEPTANCE CRITERIA

- Add condition useful to validate the user story implementation
- Add condition useful to validate the user story implementation
- Add condition useful to validate the user story implementation
- Add condition useful to validate the user story implementation
Human Agent Journey

WHAT IS IT?

Journey maps are a common UX tool that visualize the process that a person goes through in order to accomplish a goal. They are characterized by an Agent, a Scenario and Expectations, some Phases, Action and Opportunities/Insights.

HOW?

After or while developing your Desktop Walkthrough, you can fix your ideas into a Journey Map.

1. Frame the Agent, Context and Expectation (you can find them in your Stakeholder Map and HMW question).
2. Identify and write down the different phases of the experience you are prototyping.
3. List the actions that your actor carries out during the different phases.
4. Look for opportunities or insights in each phase.

TIP

You can adapt the number of phases, actions and opportunities to your needs.
# System UX map | Human Agent Journey

<table>
<thead>
<tr>
<th>Phases</th>
<th>ONBOARDING</th>
<th>MAPPING</th>
<th>MONITORING</th>
<th>MAINTAINING &amp; CARING</th>
<th>IMPACT MEASURING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action(s)</td>
<td>Gets to know about the initiative</td>
<td>Contributes to identify where the green areas are in the city</td>
<td>Complements the information about trees characteristics (height, trunk diameter, etc.)</td>
<td>Can take action when plants need ordinary maintenance (e.g., watering)</td>
<td>Leaves feedbacks about the outcomes of the programme</td>
</tr>
<tr>
<td></td>
<td>Takes action to participate and be involved</td>
<td>Contributes to identify the species of plants living in the city</td>
<td>Contributes with information about the health of urban plants</td>
<td>Can advise the system when plants need special attention (e.g., pruning)</td>
<td>Is involved in making project and funding decisions based on simulated outcomes</td>
</tr>
<tr>
<td>Opportunities</td>
<td>What are the best strategies to involve citizens?</td>
<td>Citizens can send geolocalized photos to complement an automated mapping.</td>
<td>There can be a gamified system to encourage citizens to give their contributions over time.</td>
<td>Citizens can feel the responsibility to personally take action if the project directly speaks to them.</td>
<td>Have people live outdoor spaces more</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Important to keep track of the value the project has to attract funds.</td>
</tr>
</tbody>
</table>

**Specific human agent | USER**
- Citizen

**Scenario**
- Revitalize and take care of green urban areas

**Expectations**
- To improve people's life quality
### System UX map | Human Agent Journey

#### Specific human agent | USER

The protagonist of the journey. It gains a person perspective for the experience.

#### Scenario

A high-level description of what happens. It’s associated with the specific agent and is enriched with an enriched view on events and specific observations. It can be used in the creation of a mindset by exploring realistic scenarios.

#### Expectations

The goals that the user agent is to reach at the end of the experience.

#### Phases

<table>
<thead>
<tr>
<th>Phases</th>
<th>PHASE #01</th>
<th>PHASE #02</th>
<th>PHASE #03</th>
<th>PHASE #04</th>
<th>PHASE #05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action(s)</td>
<td>High-level description of what happens. It’s associated with the specific agent and is enriched with an enriched view on events and specific observations. It can be used in the creation of a mindset by exploring realistic scenarios.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunities</td>
<td>Reflections and insights gained from mapping the experience. They can be valuable for further steps in the design process.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table represents the phases of the User Journey Map, detailing the actions and opportunities for each phase.
# System UX map | Human Agent Journey

## Specific human agent | PROVIDER
The protagonist of the journey. It gives a personal perspective for the experience described.

## Context of intervention
Usually referred to as the situation that the map is addressing. It is recorded before the action begins or ends and specifies expectations. It can be an event (e.g., research or existing product/service), or any external context for design stages.

## Expectation/Goal
The goal of the actor relates to each of the main stages of the experience.

## Phases
Key high-level stages of the service experience.

<table>
<thead>
<tr>
<th>PHASE #01</th>
<th>PHASE #02</th>
<th>PHASE #03</th>
<th>PHASE #04</th>
<th>PHASE #05</th>
</tr>
</thead>
</table>

### Action(s)
High-level behavior and steps taken by users. They have concrete steps; they are not meant to be a step-by-step or every discrete interaction.

### Opportunities
Reflections and insights gained from mapping the experience. They can be useful for further steps in the design process.
Ecosystem Map

WHAT IS IT?

The Ecosystem Map is a synthetic representation capturing all the stakeholders that populate an ecosystem. While the Stakeholder Map aims to identify the most relevant stakeholders (who might be involved in developing the solution), the Ecosystem Map aims to portray a broader picture and the connections between actors in the form of a loop, in which value is exchanged.

HOW?

In order to uncover gaps and identify opportunities for synergies:
1. Identify and categorize your stakeholders with post-its of different colors according to their roles, like those related to data/knowledge, service providers, users, impacted parties, etc.
2. Place them in the related levels of the map.
3. Draw logical connections and exchanges (loops) between the different actors: they can be materials and physical relationships, as well as emotional and invisible links.
4. Identify relevant issues to depict in the Integrated Journey.
Ecosystem Map

1 | USE POST-ITS OF DIFFERENT COLORS TO IDENTIFY THE ROLES OF YOUR STAKEHOLDERS.
Define the categories according to your project.
Some examples might be:

DATA OWNER, PROVIDER, CURATOR, CREATOR, ...

SERVICE PROVIDERS

USERS

IMPACTED PEOPLE, ORGANIZATIONS, ...

OTHERS (TO DEFINE)

2 | PLACE THEM IN THE MAP

3 | DEPICT THEIR RELATIONSHIPS

Highlighting:

1. An objective they might share
2. The concrete or abstract values they can exchange in order to reach their goal.

This should give you an idea of the possible interactions that might happen within your system.
Create all the connections that you feel necessary.
You can also use the blank space to zoom in more elaborated loops.
Integrated Journey

WHAT IS IT?

The Service Blueprint is a map that visualizes complex service scenarios, enlarging the perspective of a Journey Map to comprehend the relationships between different service components (e.g. touchpoints, technology support processes, etc.).

HOW?

1. Report the title and catchphrase you defined in the Idea Description.
2. List all the relevant actors involved in the service process on the vertical axis (you have one user and provider example but you can add more if necessary), and all the steps required to deliver the service on the horizontal axis.
3. Represent the flow of actions that the agents and technical artifact of the socio-technical system need to perform along the process.
4. Finally, connect the related actions to show their consequentiality.

TIP

You can adapt the number of phases, actions and opportunities to your needs.
### System UX map | Integrated Journey

**Title**: Catch phrase

<table>
<thead>
<tr>
<th>Phase</th>
<th>PHASE #01</th>
<th>PHASE #02</th>
<th>PHASE #03</th>
<th>PHASE #04</th>
<th>PHASE #05</th>
<th>PHASE #06</th>
<th>PHASE #07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taskflow</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
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<td><img src="image14.png" alt="Image" /></td>
</tr>
<tr>
<td>Human agent journey (user)</td>
<td><img src="image15.png" alt="Image" /></td>
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<td><img src="image27.png" alt="Image" /></td>
<td><img src="image28.png" alt="Image" /></td>
</tr>
</tbody>
</table>
Data & Knowledge Catalogue

WHAT IS IT?
When working with AI and ML systems data play a key role to have effective and trustworthy results. This tool helps you identify and describe primary and secondary data sources and portals.

HOW?
Identify useful sources of data and knowledge for your purposes and fill in the canvas to gain a good overview. Based on the information you collect here, you can make your decisions.
For each data or knowledge source:
- Identify basic descriptive information (name, primary/secondary, internal/external nature, where and how the source can be retrieved, who are the relevant figures involved, whether there is a license, and the cost)
- Better specify them based on parameters that can help you define their quality (format, frequency of update, availability, main concepts & attributes, possibly missing information)
 DEFINE YOUR DATA / KNOWLEDGE SOURCE

City parks and gardens location

Is the data/knowledge source:
- [x] PRIMARY
- [ ] SECONDARY
- [ ] INTERNAL
- [x] EXTERNAL

What is the source? (URL or any other reference)
https://dati.comune.milano.it/dataset/d589_infogeo_parchi_giardini_localizzazione

Who are the owner, provider, curator?
Data owner: Comune di Milano
Data editor: Direzione Innovazione Tecnologica e Digitale

Is there a license?
Creative Commons Attribution 4.0 International (CC BY 4.0)

How much does it cost?
Free dataset

IS IT SUITABLE FOR YOU? CAN YOU TRUST IT?

What is their format (images, audio, video, categorical, numbers)?
GEOJSON (map), Shapefile, CSV

What is their quality (completeness, correctness, consistency)?
Green areas identification in Milan municipality, old data (2012)

What is the frequency of update? (realtime or not?)
None

What is the availability (in terms of formats, downloads, API, etc.)?
CKAN Data API (for CSV only), download

What are the main concepts (knowledge) & attributes?
Zone (num), Area code (num), Area mq (num), Perimeter m (num), Park or garden (txt), Longitude centroid (num), Latitude centroid (num)

What's missing?
Smaller urban green areas (parks and gardens are usually already taken care of), trees classification, up-to-date information
Data & Knowledge Catalogue

DEFINe YOUR DATA / KNOWLEDGE SOURCE

Name your data/knowledge source

Is the data/knowledge source:
- PRIMARY
- SECONDARY
- INTERNAL
- EXTERNAL

What is the source? (URL or any other reference)

Who are the owner, provider, curator?

Is there a license?

How much does it cost?

IS IT SUITABLE FOR YOU? CAN YOU TRUST IT?

What is their format (images, audio, video, categorical, numbers)?

What is their quality (completeness, correctness, consistency)?

What is the frequency of update? (realtime or not?)

What is the availability (in terms of formats, downloads, API, etc.)?

What are the main concepts (knowledge) & attributes?

What’s missing?
AI System Core

WHAT IS IT?
The AI system Core helps you outline the main components of an AI system, connecting the dots between the problem you are addressing, data collection, artificial intelligence capabilities, and the final output. Hence, it is meant to help you reflect on how to use AI.

HOW?

If you have a precise problem to solve using AI:

1. Identify what output you might need.
2. Understand which AI task can provide you with it.
3. Start reasoning on the inputs that the system might need (and how to collect them).

If you already have (or plan to have) data as inputs:

1. Understand which problem they might help you address.
2. Identify a task consistent with your that outcome.
3. Define the output you can and aim to obtain.

REFERENCES


The doctoral thesis offers a specific focus on the core components to communicate ML systems in a clear and sufficient way also for non-ML-experts who deal with the design of ML-infused products or systems.
# AI System Core

## AI Problem

Identify the issue(s) that you want to overcome thanks to AI systems

Recall the expectations of your project (e.g. synthesized in the VFM question and in your Human Agent Journey). What problem underlying them can be uniquely solved with AI systems?

To have revitalized, healthy and good quality green areas what is needed is:

- mapping
- support maintenance and care
- measuring impact

## Data Sources

Identify which sources are relevant to address the problem.

Reason on the data that the learning system needs as inputs both to adjust its functioning model to get better results according to the goal it has to reach, and to perform its function when deployed.

To have revitalized, healthy and good quality green areas what is needed is:

- Satellite images: ESA’s Sentinel 2
- Ad hoc dataset generated by users pictures taken with their mobile phones
- Sensors
- Users and biologists data

## Inputs

Identify the input(s) that your system needs.

Reason on the specific data that the system needs as inputs both to adjust its functioning model to get better results according to the goal it has to reach, and to perform its function when deployed.

Geo-localized pictures and coordinates

Images + Categories

Real-time data on plants’ status (soil humidity, temperature, wind, appearance, etc.)

Plants’ characteristics (dimensions, oxygenation capacity, etc.)

## AI Task

Identify the AI task to be used to process inputs.

AI tasks are the probability-based actions that a system performs by processing available data to address a problem. Common ones include classification, regression, clustering, generation, etc.

CLASSIFICATION

Green area detection

Map definition

CLASSIFICATION

Categorization of plants according to different factors

PREDICTION

Notification of required action

PREDICTION

Estimation of captured CO2

## Outputs

Identify the output/s obtained from the task.

The desired output, which is obtained by applying AI tasks, is given data as inputs.

Detection of existing urban green areas on a map
**AI System Core**

**AI PROBLEM**

Identify the issue(s) that you want to overcome thanks to AI systems.

Identify the expectations of your project (e.g., synthesized in the HRI question and in your Human Agent Journey). What problem underlying them can be uniquely solved with AI systems?

**DATA SOURCES**

Identify/select which sources are relevant to address the problem.

Reason on the data that the learning system needs as inputs both to adjust its functioning model to get better results according to the goal it has to reach, and to perform its function when deployed.

**INPUTS**

Identify the input(s) that your system needs.

Reason on the specific data that the system needs as inputs both to adjust its functioning model to get better results according to the goal it has to reach, and to perform its function when deployed.

**AI TASK**

Identify the AI task to be used to process inputs.

AI tasks are the probability-based actions that a system performs by processing available data to address a problem. Common ones include classification, regression, clustering, generation, etc.

**OUTPUTS**

Identify the output(s) obtained from the task.

The desired output, which is obtained by applying AI tasks(s) on given data as inputs.
System UX Map | Artificial Agent Journey

🔍 WHAT IS IT?
The Artificial agent journey helps you visualize your idea from the technological perspective, considering when and how the core elements of an AI/ML system are generated and needed. It also allows to highlight in the map the necessary relationships with human agents.

🗂️ HOW?
1. Identify and **place the AI task** you need in the related phase of the Artificial agent journey level.
2. Write and **link the needed inputs and expected outputs** to the AI task. If they are produced or impact some agent or touchpoint in the system, **visualize the relations with lines and arrows**.
3. If inputs and/or outputs are already in the system map, just connect them to the AI task.

💡 TIP
Copy and paste the elements in the previous levels from the System UX Map | Integrated Journey
# System UX Map | Artificial Agent Journey

<table>
<thead>
<tr>
<th>TITLE</th>
<th>Catch phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>PHASE #01</td>
</tr>
<tr>
<td>Touchpoint journey</td>
<td></td>
</tr>
<tr>
<td>Technical agent journey</td>
<td></td>
</tr>
<tr>
<td>Human agent journey (human)</td>
<td></td>
</tr>
<tr>
<td>Human agent journey (provider)</td>
<td></td>
</tr>
<tr>
<td>Artificial agent journey</td>
<td></td>
</tr>
</tbody>
</table>
Value-driven Design Map

WHAT IS IT?

Any project should provide for intentional reasoning and discussion about which values it should promote or preserve. This is a tool to incorporate and express values to be embedded in a product, service or system, while the idea is still being generated.

HOW?

1. Report your service phases identified in the System UX Map.
2. Identify which phases need to embed and foster values.
3. Define which value(s) should be most evident in each phase and place it/them in the corresponding column. You can select them from the post-its or identify new ones.
4. For each, try to envision significant possibilities to preserve or promote it/them and connect them to the related value. You can also go back to the System UX Map and look at the actions already set in that phase: can you modify or add something to reinforce the related value? Get inspired by the tools linked in the references.

TIP

Your project is not only about the technology. You can act on any part of the socio-technical system, not only the artificial agent.

REFERENCES

For the rational and research behind the value selection, please, refer to:


To have an overview of possible AI-related issues that can be addressed by the explicit integration of values in the design process, you can look at:
Value-driven Design Map

Transcribe here the phases you identified in the System UX Map. For each, which value(s) do you think might be beneficial to preserve or promote? Place the related sticky note from those below (or create new ones) to better fit with your context in the middle of the phase and brainstorm ideas to do it.

To reflect on some critical points you might find when dealing with the design of AI systems, you can get inspired by the references provided in the instructions.
System UX Map | Value Journey

WHAT IS IT?
With the Value Journey, the relationships between values and the solution you are conceptualizing become more evident, as they enter into the System UX Map.

HOW?
1. Starting from the Value-driven Design Map, select the values you believe are most important and for which you envisioned valuable possibilities for preservation or promotion: max 1 per phase.
2. Place them in the corresponding Values journey level.
3. Color the background of the phase column of the same color.
4. Write down and connect the ideas that help embedding the value inserted in each phase.

TIP
Copy and paste the elements in the previous levels from the System UX Map | Service Blueprint
Prototyping & Testing
Prototyping & Testing

Testing entails the transformation of the developed concept into prototypes to be tested with end users and stakeholders, also understanding its possible multi-level implications. The testing is fundamental to verify the validity and functionality of the solution obtaining insight for further improvement. The activity should be conducted in a period of the design process when changes are still possible, before implementing the final solution.

The prototype can be low or high-fidelity, and the testing can be conducted in different ways, with different aims.
Emotional Journey Feedback

WHAT IS IT?
Imagined as an extension of the System UX Map, this tool associates an indication of the emotional status of the user at each stage of the experience. The emotion is represented by a single line across the journey phases, literally signaling the emotional “ups” and “downs” of the experience.

HOW?
While you present your idea, ask your potential users to express the level of satisfaction or frustration characterizing their emotional reaction to each phase. They should:
1. Click on a colored line.
2. Select the white dot corresponding to a phase.
3. Move it up or down depending on the supposed emotional reaction for each phase.
4. (optional) Multiple white dots can be added within a phase to assess specific actions.

TIP
Emotional Journey here does not represent the researcher's subjective perception, but directly involves potential users to express their feedback.
## System UX Map | Emotional Journey

**Title**

_Catch phrase_

<table>
<thead>
<tr>
<th>Phase</th>
<th>PHASE #01</th>
<th>PHASE #02</th>
<th>PHASE #03</th>
<th>PHASE #04</th>
<th>PHASE #05</th>
<th>PHASE #06</th>
<th>PHASE #07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touchpoints</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
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<td><img src="image6.png" alt="Image" /></td>
<td><img src="image7.png" alt="Image" /></td>
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<tr>
<td>Technical artifact journey</td>
<td><img src="image8.png" alt="Image" /></td>
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<td><img src="image13.png" alt="Image" /></td>
<td><img src="image14.png" alt="Image" /></td>
</tr>
<tr>
<td>Women's agent journey (user)</td>
<td><img src="image15.png" alt="Image" /></td>
<td><img src="image16.png" alt="Image" /></td>
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</tr>
<tr>
<td>Women's agent journey (provider)</td>
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<td><img src="image27.png" alt="Image" /></td>
<td><img src="image28.png" alt="Image" /></td>
</tr>
<tr>
<td>Artificial agent journey</td>
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<td><img src="image34.png" alt="Image" /></td>
<td><img src="image35.png" alt="Image" /></td>
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<tr>
<td>Values</td>
<td><img src="image36.png" alt="Image" /></td>
<td><img src="image37.png" alt="Image" /></td>
<td><img src="image38.png" alt="Image" /></td>
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<td><img src="image41.png" alt="Image" /></td>
<td><img src="image42.png" alt="Image" /></td>
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<tr>
<td>Emotional journey feedback</td>
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</tbody>
</table>
Red and Green Feedback

WHAT IS IT?
Red and Green Feedback is a closed feedback method to gather as much feedback as possible. In a human-centered design perspective, this is meant to be integrated in future iterations and refinements of an idea.

HOW?
Present your idea focusing on the most important aspects (5 mins). Then the audience will:
1. Ask questions if they need explanations on unclear points
2. Express (orally and in writing) what they liked or loved about the proposal, and what should be kept or expanded on in future iterations. (Green feedback)
3. Share and motivate their worries or doubts by giving constructive suggestions. (Red feedback)

TIP
The presenting team just responds “thank you” now. Discussion will follow the collection of feedbacks.
Red and Green Feedback

If the functioning of the system is not clearly explained, it can demotivate people to use it.
The advertising of the initiative needs to be clear and engaging for citizens, if not well informed, they won't use it.
A course on green energy and the related ecosystem

The active participation of citizens needs to be furthered and awarded.
Once the app has been developed, the fees have to put little effort and money.
If well developed, the app can be engaging for citizens.
People can immediately see the results of their actions.
The initiative helps citizens and PA to work together towards an important cause.

example
Red and Green Feedback

<table>
<thead>
<tr>
<th>Red</th>
<th>Green</th>
<th>Red</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
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<tr>
<td>Red</td>
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<td>Green</td>
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<tr>
<td>Green</td>
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<td>Green</td>
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</tr>
</tbody>
</table>

Note: The image contains a grid of red and green sticky notes, with red sticky notes indicating issues and green sticky notes indicating positive feedback or suggestions for improvement.
A (user/item) should be able to (do something) so that (an outcome can be achieved)

- Add condition useful to validate the user story implementation
- Add condition useful to validate the user story implementation
- Add condition useful to validate the user story implementation
- Add condition useful to validate the user story implementation
A citizen should be able to understand how to intervene to assist urban plants so that necessary actions can be accomplished.

- Plant location
- User location on the map
- Plant identification
- Clear understanding of the problem / needed intervention
- Identification of the modality of intervention
- Identification of the required tools (Is a watering can needed? Where to find it?)
Ecosystem Map

1 | USE POST-ITS OF DIFFERENT COLORS TO IDENTIFY THE ROLES OF YOUR STAKEHOLDERS.
Define the categories according to your project.
Some examples might be:

DATA OWNER, PROVIDER, CURATOR, CREATOR, ...
SERVICE PROVIDERS
USERS

KEY FIGURES FOR SYSTEM DEVELOPMENT

Biology
ML experts

FUNDING BODIES

EDUCATIONAL / SENSITIZING INSTITUTIONS

Local schools

2 | PLACE THEM IN THE MAP

3 | DEPICT THEIR RELATIONSHIPS
Highlighting:
1. An **objective** they might **share**
2. The **concrete** or **abstract values** they can **exchange** in order to reach their goal.

This should give you an idea of the possible interactions that might happen within your system.
Create all the connections that you feel necessary. You can also use the blank space to zoom in more elaborated loops.