Robotics 204: Introduction to Human-Robot Systems
Winter 2025

Lab Title: Design ideation

Submission Type: Team Submission

Learning Objectives:

1. Apply design ideation methods to support robotics design concept development.
2. Create storyboards to support understanding the human-robot interactions within the task.

Introduction:

Design ideation is defined as the process of generating a broad set of ideas on a given topic, with no attempt to judge or evaluate them.[1] Using your problem statement as a starting point, your team will create conceptual designs and task flows that address your defined needs. Your conceptual designs will include the idea for the physical embodiment, the form the robot will take, as well as the human interaction approach.

Lab Procedures:

Part 1: Design ideation

There are many different concepts that are possible for every need statement. In this part, you will begin to conceptualize possible solutions for your needs statement.

1. Provide your problem statement and describe a scenario where the goal aligns with a stated need. You will use this scenario to support your ideation process.
2. Define *at least* 4 functions that your system must include.
3. Use the morphological analysis to support design ideation. Use the functions from the previous step and come up with several options for each function. Create 3 principal solutions by combining at least one component from each function. Provide your morphological analysis chart and provide sketches and descriptions of your principal designs.
4. Select 3 heuristics from the card list provided in lecture. Apply each heuristic to each of your 3 principal design solutions. You should now have 9 additional design ideas. Provide sketches and descriptions of these new designs.
5. To create 3 additional design ideas, your team should now use the mash-up brainstorming approach. Provide your mash-up lists, as well as sketches and descriptions of your new designs.

You should now have 15 design ideas (3 from step 3, 9 from step 4, and 3 from step 5).

[1] https://www.nngroup.com/articles/ux-ideation/

Part 2: Downselecting from your design ideas

From your design ideas, you will downselect to 1 idea to use for the next part. To downselect, you will consider requirements you developed from Lab 9.

1. Fill out the table that considers whether there is potential for your design idea to meet the stated requirement. Use a plus 1 (+1) for good potential, a minus 1 (-1) for poor potential, and zero (0) for moderate potential. Use 4 of the requirements from Lab 9. Make sure to write out the requirements you are using. Provide a sum for each row.

Design	Requirement 1	Requirement 2	Requirement 2	Requirement 4	Total
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

2. Select the top design from your table based on the total. If there is a tie, you may select the idea from the top conceptual designs you would like to continue with for the next parts.

Part 3: Storyboarding to build details

Now that you have ideas related to the needs, we want to build understanding of the user interactions.

1. Define the persona of the nurse you will consider for your storyboard. Where do they work, what types of tasks they take on. You should use information from your interviews to describe details of the persona.
2. Using your scenario from Part 1, define key moments in the user's interactions with your system to achieve the stated goal.
3. For the selected design, create a storyboard. A template for a storyboard is provided in Appendix A. In your storyboard, consider the key moments in the user's interactions and describe those interactions.

Part 4: Revisiting design ideation

Now your team will revisit what you have conceptualized to iterate on the concept design. You should consider the designs in context with your defined requirements.

1. Critique the design concept selected and its storyboard. Critiquing is different than criticizing. In a critique, you are providing an assessment based upon a defined set of characteristics and goals. Do your concepts support your stated need? Do your concepts support your defined requirements? Justify your assessments.
2. Perform an iteration on your design concepts based on your critiques. The design concept you are iterating on will be used going forward for your final project. Take time to build out additional conceptual details for your design. How will the nurse interact with the system? Is there a physical interface with control inputs? Is there a graphical user interface? Is there a verbal interface that requires language mapping? Update your storyboard for the selected scenario for this iterated conceptual design.

Deliverables:

The following should be included in your submission.

1. From Part 1, provide your problem statement, the two functions selected, and process for each ideation type. A total of 15 concepts should be included.
2. From Part 2, provide the table summarizing the alignment of your design concepts with your requirements. State the design idea you will use for the next part.
3. From Part 3, provide your original and updated storyboards using the template provided.
4. From Part 4, provide your critique and iteration of your concept. Provide additional conceptual design details.

Appendix A - Storyboard Template

PERSONA:

USER STORY/SCENARIO:





PAGE #

PROJECT/TEAM:

DATE:

STORYBOARD NNGROUP.COM