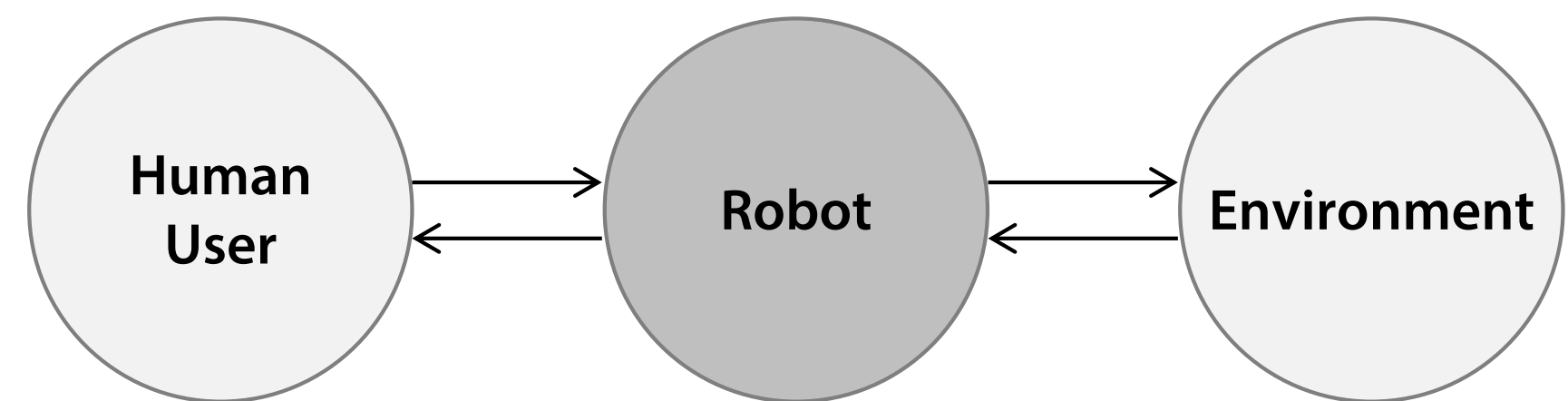


A Product-Service System Approach for Designing Mobile Robots

An Application to Industrial Design Studio Projects

As robots become more prevalent in homes and public spaces, there is a growing need for their development in industry and inclusion in industrial design curricula. However, teaching robot design poses challenges due to their unique nature of autonomous and dynamic behavior, service aspects, and connectivity to a larger system. Such complex nature of robots asks for new design approaches and methods by expanding the focus of users to include non-human agents like robots in the design process. This paper proposes to design mobile robots from a **product-service system** approach and examines the design process and methods for mobile robots. **Visual mapping tools** are introduced for the initial system analysis and design. **Concurrent design of product and interface, integration** of the two, and **visual storytelling** are shown as methods for designing a product-service system holistically. Using three years of studio projects in a university's industrial design program as case studies, the proposed approach, process, methods, and outcomes are examined with reflections on their effectiveness and limitations.



Conceptual Framework

Design Process

Context Research & Analysis	System Design	Product & Interface Design	Integration	Storytelling
2 weeks	3 weeks	3 weeks	4 weeks	2.5 weeks
<ul style="list-style-type: none"> Secondary research Primary research: deployment space, stakeholders Task flow analysis 	<ul style="list-style-type: none"> Ideation sketches Concept sheets Robot service blueprint Storyboard 	<ul style="list-style-type: none"> Product architecture, information architecture Prototype and human factors analysis CAD development 	<ul style="list-style-type: none"> Refinement Product and interface integration Engineering design 	<ul style="list-style-type: none"> System map Storyboard revision Storyboard Animation

Studio Project Outcomes



Campus Escort Robot



Airplane Disinfection Robot



Hospital Hygienic Robot



Grocery Fulfillment Robot

Storyboard Example

