Amount of ECT

9ECT

240 hours

Research Elective | Machine Learning for Design

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Learning Objectives

- Develop proficiency in conducting design research and adeptly evaluating its outcomes.
- Acquire the capability to analyze Machine Learning models, comprehending the intricacies of the underlying programming.
- Cultivate the skills to design for data-driven and machine learning systems, with a focus on creating innovative value.

Context

This project is an extension of a prior research endeavor that successfully developed a machine learning system for classifying product usage events. Employing a range of machine learning techniques, the project has yielded a toolkit designed to empower designers in understanding and analyzing the data generated by their designs. The system takes input from various sensors that capture the product's actions.

The aim of this research elective is to delve into this toolkit and uncover new opportunities for further feature development and applications. This involves exploring scalability to reach a larger audience of designers, optimizing model performance, and enhancing general usability and added value.

Brief

This research elective is geared towards advancing the Machine Learning for Design toolkit to its next stage. Our objective is to pinpoint fresh opportunities and devise innovative ways to interact with the system, while also delving into design optimizations within the system itself. As we map out these new opportunities, we'll concurrently develop new features. Ultimately, the research will culminate in a thorough evaluation of the iterations made on the model, providing valuable insights into the enhancements implemented.

Research Questions

Possible research questions:
- How effective is an unsupervised data clustering system in creating accurately labeled events from product usage data?

- How does the accuracy of an unsupervised clustering system in identifying unique and average product usage patterns compare to that of an active learning system?

- What opportunities emerge when delving into the Machine Learning for Design (MLD) system, and how can these be leveraged for further enhancement and innovation?

Approach / Plan

The research will be divided into three sections, each being 3 ECT in total spread along 3 quarters

2023 Q2	**2023 Q3**	**2023 Q4**
3 ECT	3 ECT	3 ECT

Phase 1: Explore Opportunities During the initial quarter, the focus will be on immersing in the intricacies of the existing Machine Learning model. This entails a comprehensive exploration of current features and the proactive identification of opportunities for enhancement.

Phase 2: Design & Development The subsequent quarter will be dedicated to translating the opportunities unearthed in Phase 1 into tangible solutions. This involves the design and development of features and functionalities that align with the identified opportunities.

Phase 3: Value & Testing In the final quarter, efforts will shift towards validating the efficacy of the newly designed solutions. This phase will involve rigorous testing with users to ensure that the implemented design changes not only address the identified opportunities but also add significant value to the overall user experience.

Expected Deliverable

The three primary deliverables for this project include the documentation detailing the exploration of the current Machine Learning model, a set of tangible design solutions addressing identified opportunities, and a research report.