

Foundational Research for Building a Data Product for AI

#Generative #Qualitative #UXStrategy #0to1 #ML #AI

Context

Pebblous, a two-year-old startup, had developed the first prototype of a web product that diagnoses the quality of datasets specifically used for AI algorithms. Leadership wanted an MVP with improved UX for showcasing it to potential investors, but they didn't know where to start.

Challenges

- Internal stakeholders, including leadership, had very limited understanding of UX.
- The highly technical nature of the product made it difficult to reach a broader audience.
- There were few similar competitors and benchmarking cases in the market.

Actions

To solve the problem, I chose generative research by adopting qualitative research methods. My strategy was to build trust with stakeholders through research democratization and transparency in process. Setting up the UX strategies, then I identified target users to proactively sought their needs and pain points to address in future iterations.

Heuristic evaluation: I conducted a heuristic evaluation session using Jacob Nielsen's 10 Principles of Usability Heuristics to evaluate the prototype's UX. To foster a shared understanding among stakeholders, I democratized this process and encouraged them to participate in a 2-hour hands-on session.

UX strategy and planning: Based on the heuristic evaluation outcome, I discussed with leadership to clarify resources and limitations for UX goals, and to define scope of target users, terms of iteration cycle, the design structure, and etc.

In-depth interviews: Due to the highly technical nature of the product, I convinced leadership to focus on users with data backgrounds only. I conducted 1-hour interviews with 5 data practitioners with various levels to understand their needs on data diagnoses.

User scenarios and flow: Based on the interview insights, I narrowed down into two user scenarios to guide the user flow design and development process for the first MVP.

Usability testing: To validate the MVP, I conducted 30-min usability testing sessions with 5 tech leaders to evaluate whether the product usability addressed their needs. The user group included senior ML engineers and data scientists. Think-aloud protocol was applied.

Results

Heuristic evaluation with a democratizing session helped to establish a consensus on current UX issues and possible solutions. Particularly developers and data scientists including leadership were convinced by the results that prioritize issues to be improved.

Below is the sample of the heuristic evaluation scheme customized by the prototype's state. Sensitive information has been anonymized while maintaining the core narrative.

Criteria		Page A	Page B	Page C
1. Visibility of system status	Purposefulness	Y	N	N
	Feedback	Y	Y	Y
2. Match b/w system and the real	Language	N	Y	Y
	Order	N	N	N
3. User control and freedom	Escape option	N/A	Y	Y
	Undo/Redo	Y	Y	Y
	Visual saliency	Y	Y	Y
4. Consistency and standard	Consistency	Y	Y	Y
	Redundancy	Y	N	Y
5. Error prevention	Error prevention	N/A	Y	Y
6. Recognition rather than recall	Memory minimization	N	Y	Y
	Readability	Y	Y	N
	Visual intuitiveness	Y	Y	Y
7. Flexibility and efficiency	Shortcuts	Y	N	N
	Customization	N/A	N	N
8. Aesthetics and minimal design	Irrelevance	Y	Y	Y
	Visual hierarchy	Y	N	Y

For **UX strategy and planning**, we decided:

1. UX goals were twofold: (1) Define the “right” target users and (2) they are willing to access data diagnoses again.
2. Target user scope should be limited to data practitioners including diverse domains.
3. Instead of targeting the entire AI market, focus on the needs of decision makers within target user groups. [Other confidential details redacted]

User interviews revealed the varying levels of data literacy and skills among users despite their expertise in the “data” field. For example, a non-ML data scientist needed more information about diagnosis standards, while a ML engineer wanted more details about dataset properties.

Two user scenarios were defined for ML data scientists and ML engineers to refine the target user groups better, including each user group's persona, contexts, needs, pain points, and etc. These were incorporated into the MVP's user flow design through extensive collaborations with designers and developer teams.

Below is an outcome of the update based on the user scenarios: Initially the filters were in the sidebar but moved to the center page to enhance data searching.

The image shows a user interface for filtering data. It includes sections for Data Type, Areas of application, Data type, Number of data, Data capacity, and Subject / Field. Each section contains a set of buttons or a slider to select or range values. An 'Apply' button is located in the top right corner.

Usability testing revealed three major needs of manager-level users:

- Overall – Flexible customization that fits to the team's contexts
- Dataset filter – Easy access to the domain of interest
- Diagnosis report – Quick executive summary of data quality


During a session, I recognized **distinctive user patterns revealing “deep interest”**:

- Jumping into the diagnoses tab and starting a search with domain keywords
 - Others linearly explored through the initial order of the tab menu
- Explicitly concerning about data security and reliability of diagnosis process
- Clicking data upload button several times

Through follow-up questions, I **learned that those participants were willing to purchase diagnoses but first they needed to see visible proof of trustworthiness in the product system**. I reported this insight to leadership and incorporated it into the action plan for the iteration.

Below is a sample page used for usability testing sessions.

Pabloius
DataClinic



Birds 450 Species - IMAGE Dataset Diagnosis Report

Subjects

Dataset Information

Report Information

Nature | Biology

Original Data | Image | 75,100

🏆 High | 📅 2023.09.08

Through level-wise diagnosis, we propose improvements to the dataset, addressing issues such as data integrity, class balance, and duplication/similarity among images. We suggest optimizing the lightweight dataset utilization, balancing data density across classes, and enhancing distinctiveness through the addition of synthetic data.

Summary of Target Dataset

Intro

Dataset Name

[Birds 450 species - IMAGE Dataset](#)

Dataset

One-line summary

A dataset of images for 450 species of birds

Target Task

Image Processing, Classification

Basic Information

Image Size

170x196 ~ 224x224

Color Information

RGB : 67,792, Gray : 0, Other : 0

Label Composition

Consists of 450 labels

Counts

89,885 for training

Sample Data

Impact

- After addressing the findings, the **MVP was showcased at CES 2024 and secured several business partnerships** including Hyundai Motors.
- Company gained critical insights into achieving business and UX goals.
 - Not all data experts are the same – thoughtful user targeting is critical
 - **Trustworthiness** can be one of the important criteria for potential customers
- UX strategies and target user groups were defined for the future product cycles.