What's in this toolkit?

This toolkit contains a set of tools including exercises, worksheets, and card decks to assist designers at the different stages of the design thinking process.

Start here if:
You want to explore opportunities for AI within your context

You have a bunch of ideas and want to select and develop them in more detail

You have a handful of ideas and want to validate which to move forward with

You are ready to start building with your engineers and bring your idea to life

Worksheet:
Value proposition statement

[concept name]

using ....

[data]

to ....

[AI capability]

we can help ....

[user persona]

with a better way to ....

[job to be done]

with/without ....

[gain/pain]

because/so that ....

[value]

Data
Which input will you use to inform the model?

AI capability
What are you looking to do to turn data input into a valuable output?

Persona
Who is your user?

Job to be done
What user need does it solve or fulfill?

Gain/pain
What does your user gain in using this solution compared to what they're currently doing?

Value
Why is this important to the user or humanity at large?

Now go out and (in)validate your value proposition with user research.

Iterate and refine the statement, or even pivot or discard your idea, based on your learnings.

Lecture
AI Meets Design II

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Could you teach an intern how to do this task?

sure → (down)

nah → If an intern can't do it, neither can a machine (for now). → But, it may be the type of task that only a machine can perform. Check in with an expert or quick Google search before giving up.

Do you own or are you able to gather (open source / public or buy) sets of the data you need?

got it → (down)

no have → No data, no machine learning. Sorry. Go get yourself some data.

Is the data labelled and organized? Do you know what you're looking for?

yes it's supervised → (down)

no it's unsupervised → If you're out for detection, prediction, or generation, it's probably possible but might be costly $$.

How many labelled examples do you have per category?

>5000 → (down)

<5000 → Collect more data, brush yourself off and try again.

Do you have any in-house data scientists or machine learning engineers?

nope → (down)

yass → What are you waiting for?!

Is there an open-source SDK of API for what you're trying to do?

nope

I'm not sure / I can't find it but I've seen it in an app

yass → It's looking real hopeful. Go forth.

Tool:
Assessing feasibility for idea selection

Use this flowchart to quickly assess how feasible / viable your AI idea is
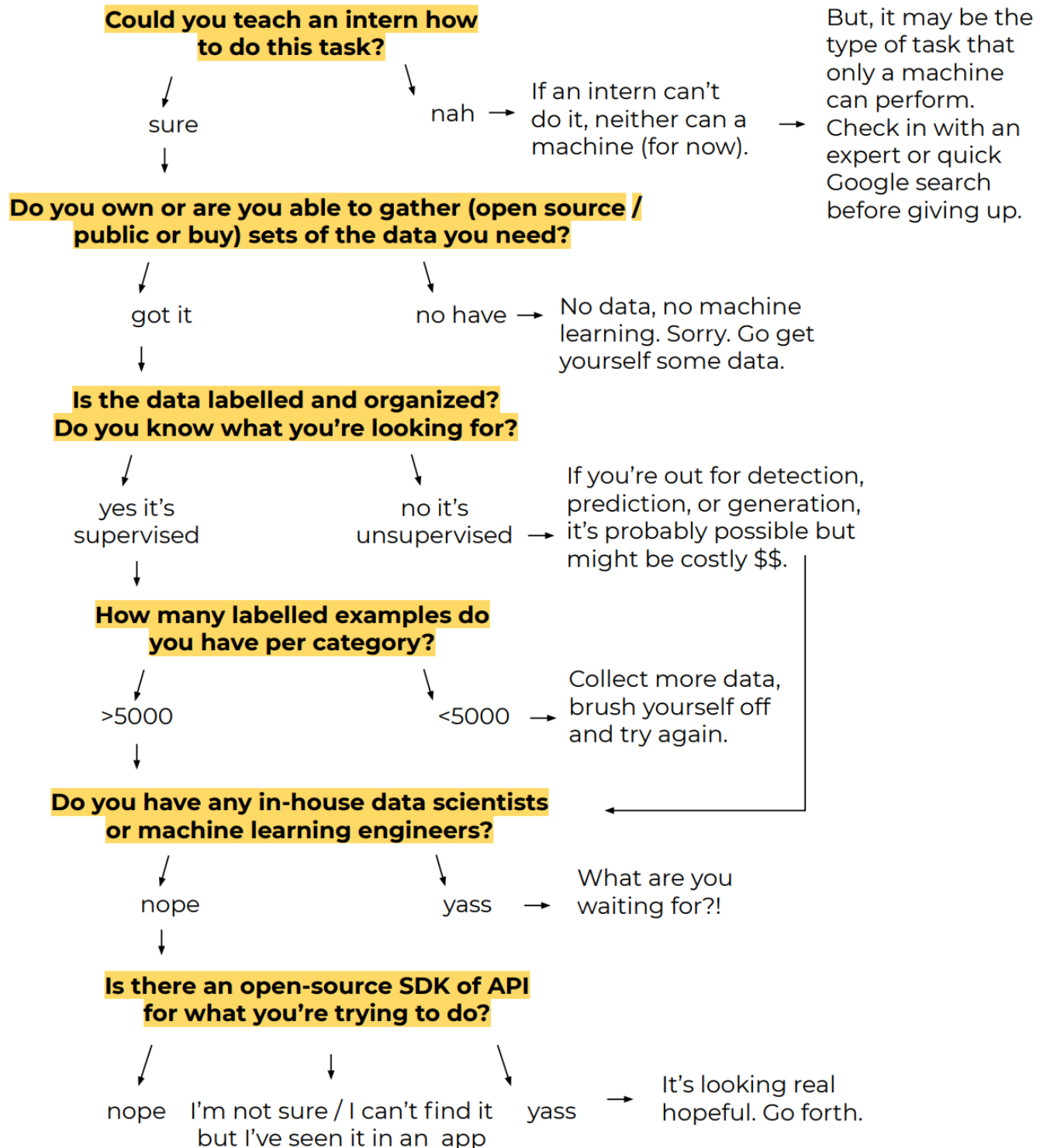
Activity:
Framing your task for concept development

The strength of machine learning is that we don't have to program the rules explicitly. At this stage of the process, it is helpful to think about them and try construct a logic based on how we humans perform the task.

1
Start with the classic exercise: describe the way a human expert would perform the task or answer the question.

If you were to ask 10 people, would they agree on the method (for the most part)? If some do it better or differently - what can we learn from their approach?

Especially if what you're predicting is (highly) subjective, spend extra time on this step.

In the example of Spotify's Discover Weekly, **the human expert** would be a music lover on the hunt for new music.

Do you have data of past well-executed and completed tasks? This could be used as an initial training data set.

2
Imagine you're onboarding a new person for this job. What do they need to understand? What assumptions would you want them to make? How would you respond so they improve over time?

3
What's the nature of the task? Can you box it as an clustering, classification, or regression problem? Refer back to the crash course in the beginning of this toolkit to find the vocabulary. Knowing this will help you understand the task as well as communicate with your tech team.

Tip:
Draw a diagram of the current workflow including IFTT statements and data required to make decisions.

Activity:
Plotting your model for concept development

By plotting a simple flowchart, we can begin forming a rough idea of the inputs, outputs, and logic required for our model to create value. We're also surfacing our assumptions and unknowns in the process.

1 **Objective** - What is the question we're trying to answer and asking the machine?
Output - How is the machine's answer presented and interpreted?

AI answers (mostly) in probabilities with a confidence level. Formulate your output as a **probability**.

2 **Features** - What data points do you need or are important factors in answering the question?
Input - Which data sets does that data reside in? What data will the model be trained on? What data does the user input?
+ Draw connections between the assumed features and data sets they reside in.

Do you know which features go into the answer? Think about the variables and patterns humans look at when performing this task or answering this question.

3 **User experience** - How does the outcome get presented to and help the user?
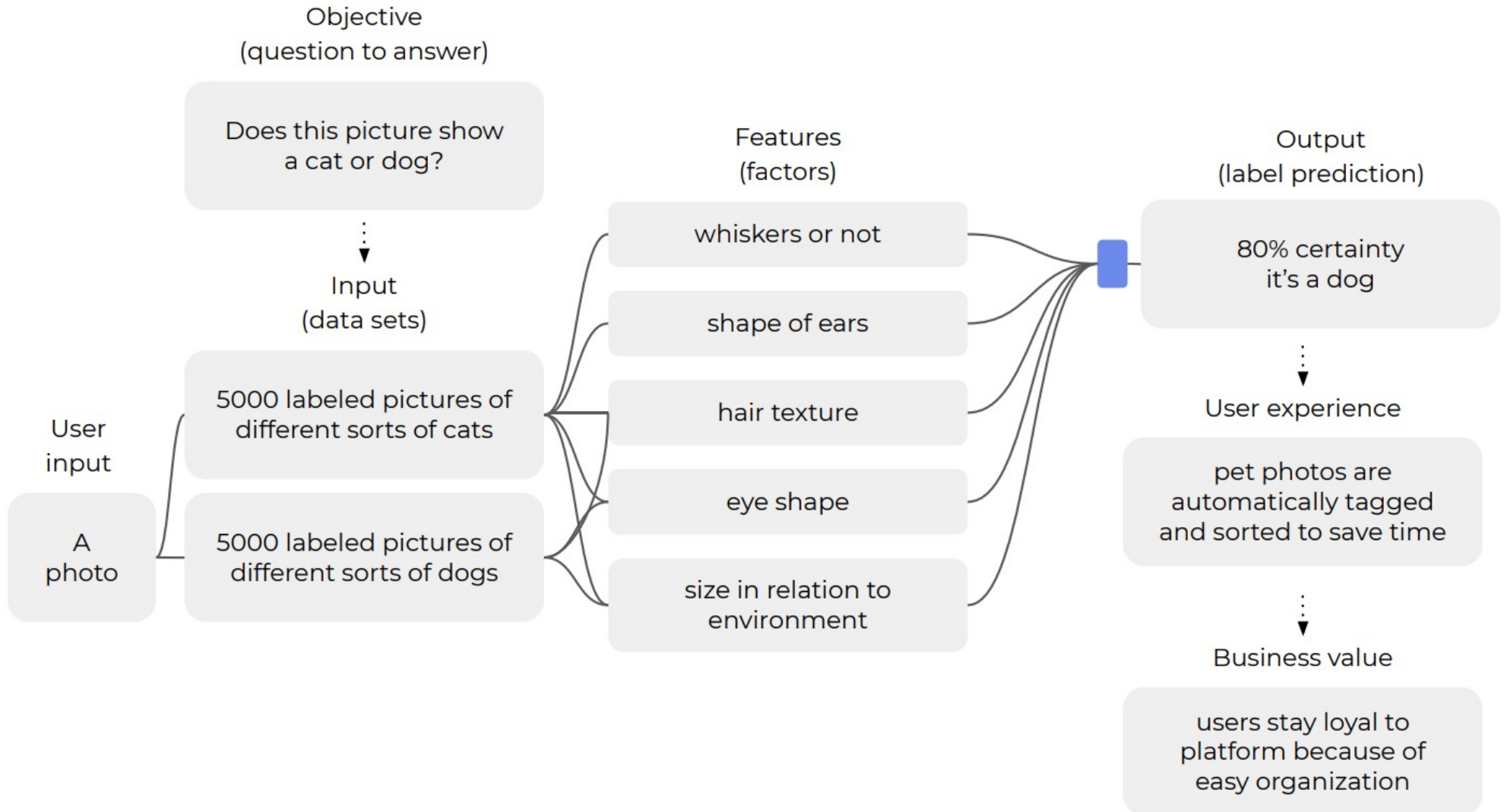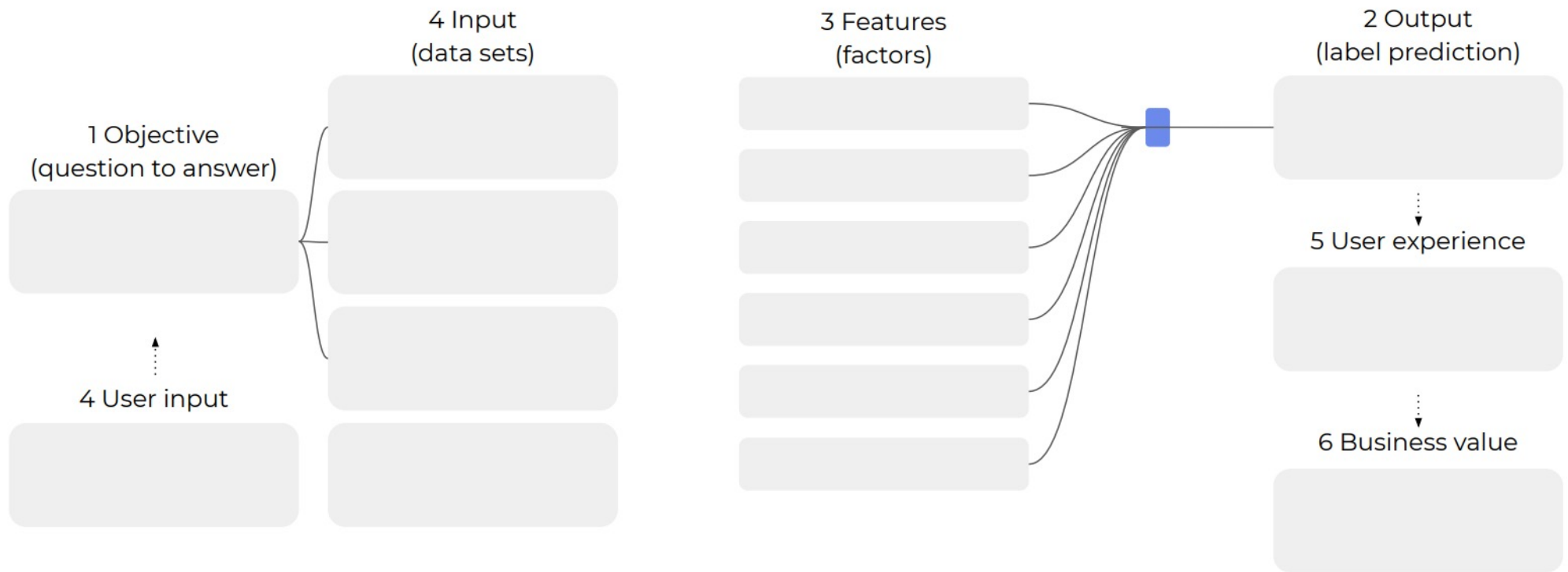**Business value** - How does the solution return value to the organization?

Do you have this **data to input**? If not, how do you acquire it?

Activity: Plotting your model for concept development

Objective
(question to answer)

Does this picture show a cat or dog?

Input
(data sets)

User input

A photo

5000 labeled pictures of different sorts of cats

5000 labeled pictures of different sorts of dogs

Features
(factors)

whiskers or not

shape of ears

hair texture

eye shape

size in relation to environment

Output
(label prediction)

80% certainty it's a dog

User experience

pet photos are automatically tagged and sorted to save time

Business value

users stay loyal to platform because of easy organization

Worksheet:
Plotting your model

4 Input
(data sets)

3 Features
(factors)

2 Output
(label prediction)

1 Objective
(question to answer)

4 User input

5 User experience

6 Business value

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1 Objective
What is the question we're trying to answer and asking the machine?

2 Output
How is the machine's answer presented and interpreted?

Formulate your output as a probability.

3 Features
What data points do you need or are important factors in answering the question?

Do you know which features go into the answer? Think about the variables and patterns humans look at when performing this task or answering this question.

4 Input
Which data sets does that data reside in? What data will the model be trained on? What data does the user input?

Do you have this data to input? If not, how do you acquire it?

+ Connect
Draw connections between the assumed features and data sets they reside in.

5 User experience
How does the outcome get presented to and help the user?

6 Business value
How does the solution return value to the organization?

Prototyping
+ testing

You're with a handful of ideas and it's time to get more in-depth with your user research. Through prototyping and testing, you (in)validate your AI ideas and their design and implementation specs.

Do users want and need your solution? Are they open to adoption? Are they willing to share data and invest themselves into training the model (if necessary)? How can we test rather than just ask? How can we prototype the experience of adaptive intelligent systems?

In this chapter you will find:

User research & feedback
to know what to inquire about in addition to the usual

Prototyping & testing
to explore how to prototype and test AI applications

Activity:
User research & feedback
for assessing desirability

1 Assuming you did initial user research to inform your concepts so far, now it's time to go out and (in)validate your value proposition in more detail. First assess your need as you do for any problem, asking:

- What problem does it solve or opportunity does it tap into?
- Who benefits and in what scenario?
- How pressing is the problem? For how many?

- What do they gain from the new solution? How and how much better is it than the current solution? What other advantages do they see?

Activity:
User research & feedback for assessing desirability

Iterate on your value proposition statement based on your learnings and get ready to prototype for deeper insights.

2 Once you've validated that this is indeed a problem worth solving, gather insights about your users' perspective on the AI aspects of your concept(s).

Mental models
What are their notions about having an intelligent, adaptive system work for them? Are they willing to adopt it? How important is transparency? Depending on how visible your AI elements are, this might be more or less important.

Defining success and failure
How accurate must the model be to offer user value? How high are the costs of mistakes? What would best vs worst behavior look like?

Machine teaching
What does the user need to invest to get value out of the system? Are they willing to share the data your model needs? Are they willing to provide the necessary feedback and teach the model?

Ethical & experiential concerns
What concerns do they have? Do major ethical concerns arise? Unintended consequences, edge cases, and extreme users?

Activity:
Prototyping & testing
for assessing desirability

1 Prototype

To test desirability, opt to simulate the experience without building the model and observing the responses.

Testing the concept offering can be done with product / service posters or app marketplace.

Common prototyping techniques for AI are:
Role playing
Wizard of Oz
Personalized wireframes.

Where possible, gather and use real-life personal data in your prototypes rather than placeholder content.

Provotypes (prototypes that provoke) can also be a great way to build an understanding of your users' needs.

"Fake it till you make it. If forced to choose, it's leaps-and-bounds more useful to prototype your UX with a user's real content than it is to test with real ML models - as it affords you genuine insights into the way people will derive value and utility from your (theoretical) product."

by Google Clips' team on UX of AI

Activity:
Prototyping & testing
for assessing desirability

2

Testing
Do user testing as usual and observe users' behavior. Ask them to think out loud as they're interacting with your artefact.

Keep in mind that while testing is important to understand your user, working with adaptive systems requires the designer to sacrifice a certain level of control over the final user experience exactly because it will adapt to each user and over time.

3

Analysis & selection
Analyse and synthesize your findings. Based on all your findings, decide which idea(s) (if any) to move forward with.

It can help to revisit some of the activities in idea selection phase and reconsider feasibility, viability, desirability, and responsibility.

Interim Review Preparation

- Please email your draft to me on Sunday and I will give comments so that you have time to elaborate before Tuesday.

- Please prepare your slides to include but not limited to the following contents:

1. 前期调研
   - What is the problem the proposed AI application trying to solve?
   - Or what is the positive changes the proposed AI application aims to bring to the users.
   - Who are the potential users that will benefit from it? (Do user interviews to confirm your idea)
   - What are the current existing solutions? pros and cons of these solutions?

2. 设计创意过程
   - What is your current design or proposal as an AI-powered product?
   - How do you develop your ideation so far?
   - What are the key considerations that lead to your current design, such as AI capabilities or limitations, data availability, interfaces collecting information from users and environment (如何收集信息), and interfaces conveying information to users (如何传达信息和影响用户).
   - **Use diagram to convey your ideas!!!**

3. 目前原型进展情况和未来计划
   - Include here your trained AI model, data collection process, any sensors and devices used.
   - Work to be done in next two weeks.