

AI FOR GOOD Summer Camp



INDIANA UNIVERSITY
BLOOMINGTON

Day 5: Project design day

Introduction to Activity



What Are We Going to Do?

Get ready to embark on an exciting journey where you will become creators, innovators, and future thinkers! Let's practice AI knowledge and experiment how it can be used to tackle a real-world challenge.

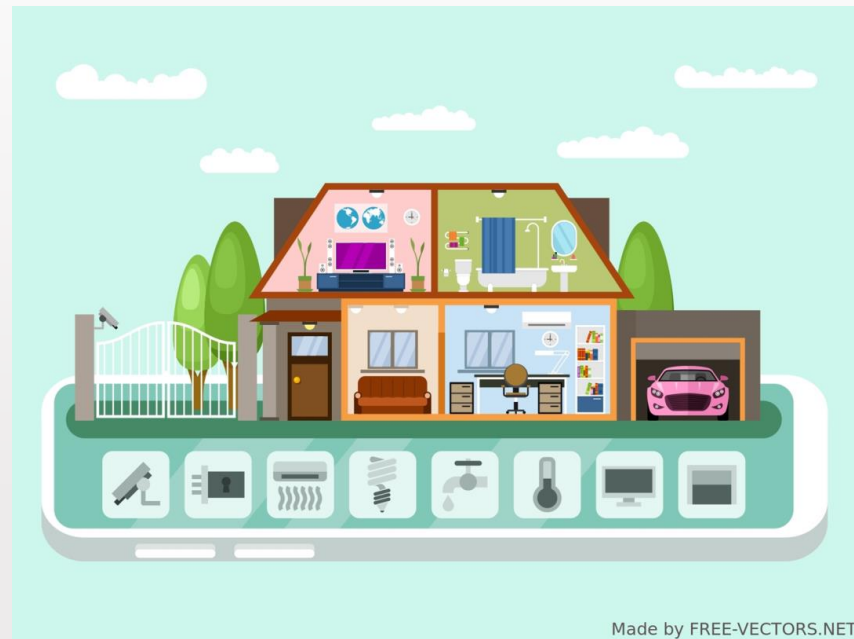
Ready??





Let's start with where we spend most of our time...

- Let's look at this image. If this is your home, where do you go when you first wake up?
- And then?
- What is happening when everyone is away?
- What happens when you get home?
- What can go wrong?





What could happen if this was a completely smart home?

What would we want to detect?

What would we want to automate?

What would we invent?



Made by FREE-VECTORS.NET





Back in the day...





Your challenge

Design a the smartest of all smart homes

- What will you detect?
- What will you automate?
- What will you invent?





The Smartest of all Smart Homes

Design Requirements

- What are the problems?
- Who is the user?
- What are your AI solutions?
- What are you detecting, automating, and inventing?
- What will happen where?

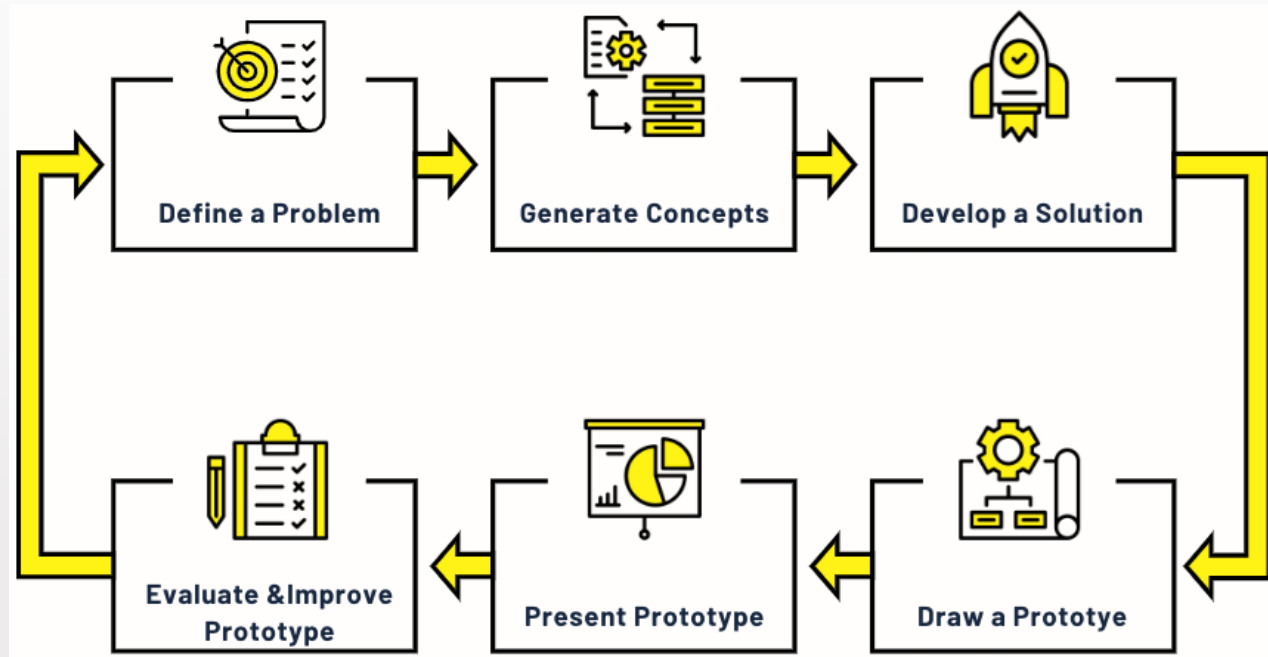
Constraints

- Real needs and solutions only
- Use machine learning, computer vision, and natural language processing (and any combination)





Your Design Process on AI-powered APP



*You can always **come back** to any of the finished step(s) to **make revisions** on your design!*



Step 0: The Wrong Theory Protocol



Silly or Bad Ideas

- Your task is to come up with the worst possible design, one that harms and humiliates
- Be ready to share your design and defend why it is the absolute worst
 - E.g., glass hammer, climate-controlled dog house that detects preferences but.... keeps the absolute most miserable temperature for the dog





Fill in Your Design Plan: Step 0

For this activity, you will be creating a prototype of an AI-powered application. Please try what you learned about **Artificial Intelligence (AI)** to the problem you've identified.

0. What can go wrong?

What are some situations that could harm or humiliate us **when using AI technology** at smart home?





Next steps...

1. Complete 4 designs: 1 temperature solution, 1 water solution, 1 chore/task/job/routine solution, and 1 entertainment solution
2. Draw your home showing where are the solutions are and what they do

Design Requirements

- What are the problems?
- Who are the intended users?
- What are your AI solutions (machine learning, computer vision, and natural language processing)?
- What are you detecting, automating, and inventing?
- What are your data needs?
- What will happen where?
- How will your designs be inclusive and not cause additional harm?



1. Define a Design Problem

What is the problem you want to address with your application? (Describe the problem that you think could be improved **by using AI technology**, and briefly mention why this problem is important to address.)

2. Generate Concepts

2-a. List the main function(s) you expect for this application.

2-b. Identify the purpose and type of AI you need for this application, based on 2-a.

Purpose:

(e.g., "make prediction", "recognize & classify items", "optimize workflow", "automate tasks", "support decisions")

Data Type:

(e.g., "image / text / audio / number / facial / gestures / emotion recognition")

3. Develop a Solution

3-a: Describe how you expect this application will work to solve the problem you identified in step 1.

3-b: You need an AI model to power your application. Describe all the technical steps you need to create your AI model.

Train model:

(Identify the type and amount of data that AI needs to achieve the desired function(s) in your app.)

x 4 + 1
Drawing

Step 1: Defining a Problem

Brainstorming an AI-powered application!



Group Discussion: Find an Applicable Problem!

- What are some everyday challenges or problems that you and your peers encounter?
- Are there any tasks or processes that you find repetitive/time-consuming, or, hard to manage smoothly due to large information workload?
- How could AI technology help in solving these problems? What tasks could it automate or assist with?





Fill in Your Design Plan: Step 1

*Please assign one group member to write for your group in the document!

1. Define Problem

What is the problem you want your application to address? (Describe the problem that you think could be improved by using AI technology.)

|



Step 2: Generate Key Concepts

Landing your app design on AI's capacities!



Desired Functions of Your Application

Reminders:

- Recall the **PROBLEM** your application aims to solve.
- Focus on the **MAIN** features or functions that will address the problem you identified.
- Consider how the application can make people's lives easier, more efficient, or more enjoyable.





Desired Functions of Your Application

Example functions that could be achieved by AI-powered app:

- *Speech recognition & language processing* – in apps with voice search or language translation
- *Recognition on target objects* – in apps that need to identify objects (faces, animals, or specific items) or patterns in images or videos
- *Personalized recommendations on materials* – in apps that suggest content, products, or activities based on personal preferences
- *Data analysis and insights for meaningful insights* – in apps that analyze sports statistics, weather patterns, or survey results etc.
-more you can think and relate!!!





Fill in Your Design Plan: Step 2-a

2. Generate Concepts

2-a. List the main function(s) you expect for this application.





Identify the AI You Need

Reminders: Think about what the application needs to do with the data it receives.

- Consider whether the application needs to make predictions, classify items, or perform other specific tasks.
- Consider the types of data the application will be working with, such as images, audio, text, or numbers.





Identify the AI You Need

The **pool** of AI for you to consider:

- **Purpose** of AI:

"make prediction", "recognize & classify items" , "support decisions",
"optimize workflow", "automate tasks"

- **Type** of AI:

"image recognition", "text recognition", "audio recognition", "number
recognition", "facial recognition", "gestures recognition", "emotion
recognition".





Examples of AI

Function	Purpose of AI	Type of AI
<i>Personalized book recommendations</i>	<u>Making predictions</u> on which books a user might enjoy based on their reading history and preferences.	<u>Text recognition</u> and analysis to understand the user's book choices and recommend similar books.
<i>Identifying plant species from images</i>	<u>Classifying plants</u> based on their visual characteristics.	<u>Image recognition</u> to analyze the features of plants and identify their species.





Fill in Your Design Plan: Step 2-b

2-b. Identify the purpose and type of AI you need for this application, based on 2-a.

Purpose:

(e.g., "make prediction", "recognize & classify items", "support decisions", "optimize workflow", "automate tasks")

Type:

(e.g., "image / text / audio / number / facial / gestures / emotion recognition")



Step 3: Develop a Solution

Make your action plan with AI model!



Clarify Your Expectation:

How will this app solve the problem?

Reminders:

- Think about **how the application's main functions can directly address or contribute to** solving the identified problem.
- Consider the **specific process and concrete steps of using the application** to achieve the desired outcome.
- Imagine **how users will interact with the application** and how it will provide value or benefits to them.





Fill in Your Design Plan: Step 3-a

3. Develop a Solution

3-a: Describe how you expect this application will work to solve the problem you identified in step 1.





Power Your App by Building AI Model

Recall the foundation of AI: Machine Learning

Reminders:

- Consider the **amount and diversity of the data you plan on** to ensure accurate and robust performance. Sufficient data ensures better performance.
- Relate the main steps of machine learning to **the context of your own project!**





Fill in Your Design Plan: Step 3-b

3-b: You need an AI model to power your application. Describe all the technical steps you need to create your AI model.

Train model:

(Identify the type and amount of data that AI needs to perform tasks)

Test model:

(Identify the type and amount of data that AI needs to see how well the trained model performs.)

Implement model:

(Describe how the trained and tested model is used to provide the desired functionality.)

Evaluate model:

(List all the **possible factors** you think that may influence the performance of the above AI model.)



Step 4: Create Prototype

Visualize your application on paper!



Draw the Prototype of Your Application

Use **tables, diagrams, flowcharts, mind-maps, or other visuals to illustrate** the workflow – picture a complete process of how your application will work to solve problem in the real world!





Draw the Prototype of Your Application

Reminders:

- Step 1: Look at the big picture: recall the **problem** to be addressed and decide the **overall outlook** (the optimal way to **demonstrate your application to others.**)
- Step 2: Demonstrate the **key components** of the application that embody the main functions of this application.
- Step 3: Sketch out the mechanism of your application. Organize everything into a **logical structure** that visualize the relationship of the key components!



Step 5: Present Prototype

Showcase your application to others!



Key Elements for Presentation

- Description of problem you are working on: what it is & why you choose this problem to solve
- Identification on the AI (type & purpose) you are using, and accordingly, how it work to power your application.
- Brief description of your AI model

Answer any possible questions from your peers and teachers!!



Step 5: Evaluate & Revise

Offer/Receive Feedback for Improve!



Fill in Your Design Plan: Step 6

Evaluation from Other Groups & Teachers on Step 1-3	Revisions on Solution by the Group (* based on evaluation that you think right and fair)
Define a Problem 1. Is AI really capable of solving this problem? 2. Can this problem be solved without AI?	
Generate Concepts 1. Are the main functions completed and appropriate for the problem to be solved? 2. Do the identified type and purpose of AI work for the problem to be solved?	
Develop a Model 1. Is the type and amount of data appropriate in the "train model"? 2. Is the type and amount of data appropriate in the "test model"? 3. Are the listed influential factors appropriate in "evaluate model"?	





Evaluation across Groups

- Select another group to evaluate your design plan. (switch your laptop with this group)
- Offer feedback on the design by another group, by following the prompts we give in the **first column of Step 6**)

***Don't change anything else from another group's project design, only fill in the first column of step 6 for evaluation on their work.**





Reflection within Groups

- Check on the evaluation left by another group (and teachers) in the first column in Step 6.
- Identify the parts you think right and fair from evaluation.
- Make revision on those parts!

