DES 646 :AL /ML FOR DESIGNERS

LAB 1

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Part A: Text-to-Image Tools:

1) Basic Prompting:

- A **retro-style kitchen toaster** in pastel blue.

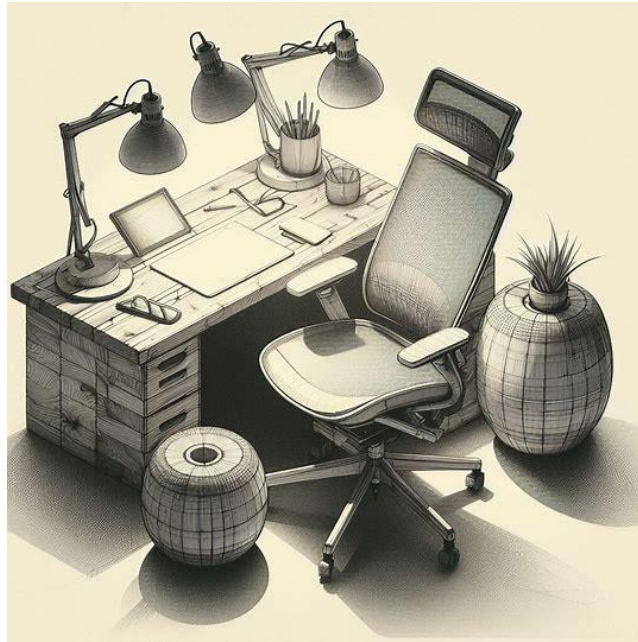
- A smart backpack for urban commuters, concept art.

2)Advanced Prompt Engineering:

- A portable camping stove, **sleek industrial design**, with **interlocking modular components** and **brushed aluminium finish**, soft studio lighting, adventurous mood.

- An ergonomic office chair, made of recycled ocean plastics and wood, top down lighting, focused and calm mood, sketch art

3)Output Evaluation

- **Realism** - The AI demonstrated good realism across diverse styles. It generated a photorealistic toaster, a convincing concept art render of the backpack, a realistic hand-drawn sketch for the office chair till some extent, and a tangible metallic stove. The lighting, textures, and materials were consistently believable within each requested style.
- **Creativity** - The tool showcased high amount of creativity, cleverly fusing retro and modern styles for the toaster. While the chair's design was standard, its creativity lay in the overall composition that set the requested mood. The camping stove was a creative and complex render.
- **Feasibility** - The feasibility of the designs varied widely, underscoring the need for human judgment. The toaster and office chair were highly feasible concepts, whereas the smart backpack was impractical due to its fragile screen and bulky components. The camping stove was entirely unfeasible as a stove, lacking any functional parts for cooking.
- **AI Misunderstanding** - The AI's comprehension weakened as prompt complexity increased. It flawlessly handled simple prompts for the toaster and backpack, but struggled with advanced instructions. For the office chair, it misapplied

materials and lighting, it ignored the core function of the "camping stove," generating an abstract object based only on stylistic keywords.

Part B: AI-Assisted Ideation

1) Brainstorming with AI:

- We were wondering , how can we improve indoor air quality and provide ambient lighting in urban homes using a single, sustainable, and aesthetically pleasing object that connects us with nature?

2) Visual Storyboarding and Concept Development:

✳ Ideas we explored

AI - Assisted Prompt ✏

Text to Image Generation

Initial Product Concept ⚡

Problem Statement :

- How can we improve indoor air quality and provide ambient lighting in urban homes using a single, sustainable, and aesthetically pleasing object that connects us with nature?

AI-Brainstormed Ideas :

- Here are 10 ideas generated by an AI for "futuristic furniture, made from sustainable materials, concept design":
1. Mycelium Modular Lounger: A self-growing sectional sofa made from mushroom root structures.
2. Kinetic Rocking Chair: A chair made from reclaimed wood that harvests kinetic energy to charge devices.
3. Algae-Powered Air-Purifying Lamp: A living lamp that uses algae to clean the air and generate its own light.
4. 3D-Printed Ocean Plastic Bookshelf: A customizable shelving unit 3D-printed from recycled ocean plastics.
5. Smart Bamboo Desk: A desk made of sustainable bamboo with an integrated self-watering planter.
6. Phase-Change Material Coffee Table: A table with a core that absorbs and releases heat to regulate room temperature naturally.
7. Compressed Hemp Fiber Chair: An ultra-lightweight and durable armchair molded from compressed hemp fibers.
8. Bio-Luminescent Wall Panels: Living wall panels containing bioluminescent bacteria that provide a soft, natural glow at night.
9. Recycled Cardboard Cocoon Pod: A hanging reading chair made from compressed, water-resistant recycled cardboard.
10. Self-Assembling Cork Stools: Flat-packed stools made from cork that take their final shape when exposed to steam.

Selected Concept:

- We will develop the "Algae-Powered Air-Purifying Lamp".

This visual was created using the prompt:

The Algae-Powered Air-Purifying Lamp's base is a clear, sculptural glass bioreactor filled with vibrant green microalgae. Delicate tubes circulate the algae, while the top of the lamp glows with a soft, warm, diffused light powered by the biophotovoltaic process. The lamp sits on a minimalist wooden table in a modern, plant-filled living room. Hyper-realistic, product design photography style

Make the tubes less convoluted , and add more tubes

Final Image

Inital Concept :

We call this concept "Aura," the living lamp. It is a piece of living furniture that functions as both an air purifier and a light source. The glass base is a mini bioreactor containing microalgae that absorb CO_2 and release oxygen, actively cleaning the room's air. Through a biophotovoltaic process, the energy from photosynthesis is harnessed to power a soft, ambient light; making Aura a self-sufficient, living object in the home.

- Usability
  - Minimal Maintenance: Requires adding a nutrient solution and water only once a month via a small, hidden port.
  - Air Quality Sensor: An integrated sensor provides feedback on the room's air quality via a companion app.
  - App Control: The app allows users to monitor the algae's health and control a supplemental, low-energy LED for brighter light when needed.
- Materials
  - Bioreactor: The main body is crafted from durable, recycled borosilicate glass for clarity and strength.
  - Base/Top: The non-glass components are made from sustainably sourced cork or bamboo to complement the natural aesthetic.
  - Electrodes: Transparent, non-toxic carbon-based electrodes capture the energy from the algae without harming them.
- Aesthetics
  - Living Art: The lamp is a dynamic piece of decor. The gentle bubbling and swirling of the green algae create a calming and ever-changing visual.
  - Natural Glow: The primary light source is a soft, warm, ambient glow, perfect for creating a relaxing atmosphere.
  - Biophilic Design: The lamp's form and function are designed to create a direct connection to nature within the home

Final Concept Features for the lamp :

1. Photosynthesis Air Purification: Actively removes CO_2 and pollutants while releasing oxygen.
2. Bio-Photovoltaic Power: Generates its own electricity from photosynthesis to power a soft, ambient light.
3. Smart Home Integration: Connects to a mobile app for monitoring and control.
4. Sustainable and Living Decor: A functional and beautiful piece of furniture that is alive and helps the environment.
5. Educational Aspect: Teaches users about algae, photosynthesis, and sustainable energy in an interactive way.