Duckify

304.1 Gen AI and robot control

Steps

3D Modelling / Printing (Alexandre)

- Design simpler prototype models
- Choose duck model
- Design supports (duck + pens) 😨

Steps

Design / GenAI (Kevin & Marco)

1. Create some pattern textures (SVG)
2. Maintain a pattern database containing all texture variants for each model part
3. **1st step**: choose patterns with colors from database (keywords) : use an LLM that has access to our database information to select according to the client need
4. In fine: LLM generates front/top/side textures (to give to the **mapping** group)

Steps

Mapping (Jeremy & Louis)

1. (Texture Projection)
2. Color separation
3. Topological separation
4. Contour & filling
5. Ordering
6. Output

Steps

Robot Arm (Cédric & π & Nathan)

- Library exploration
- Integration of physical objects in simulation
- Spacial calibration
- Tool grabbing
- Drawing
  - ‣ 2D line
  - ‣ 3D line on simple shape
  - ‣ 3D line on complex shape
- Full pipeline integration

Steps

Interface (Kevin & Alexandre)

1. Create a website *(local or public ?)* for the client:
   - The user would be able to select a duck model and write a prompt for his requirements of the duck decoration
   - An LLM selects suitable decorations for each duck component from the existing database (if available)
   - The user receives a preview of the result (3D model with applied textures)
2. Optional dashboard (progress bar, etc...)

Questions

- Single model ? Multiple models ? Modular model ?
- Licenses (images, code) ? Legal implications ?

Questions

Week	Milestones
W1	(Successful) hand-eye calibration (α) - Move robot programmatically: follow instructions, move arm A → B - Select material (pens, gripper, etc.) - Select generative AI solution to create textures from a textual prompt - Define interfaces between steps

Week	Milestones
	- Select unwrapping solution (projection, direct AI generation, …) - Lay out algorithmic steps for generating drawing instructions from a texture - Sketch supports, verified by expert - Print duck to experiment with 3D printer - Define robot range, constraints and precision - Precisely define MVP (what it is / isn't) and milestones
W2	

Week	Milestones
W3	• **MVP / Prototype**
W4	
W5	
W6	
W7	