Computer vision

a.y. 23/24

Touch to vision project

Motivations

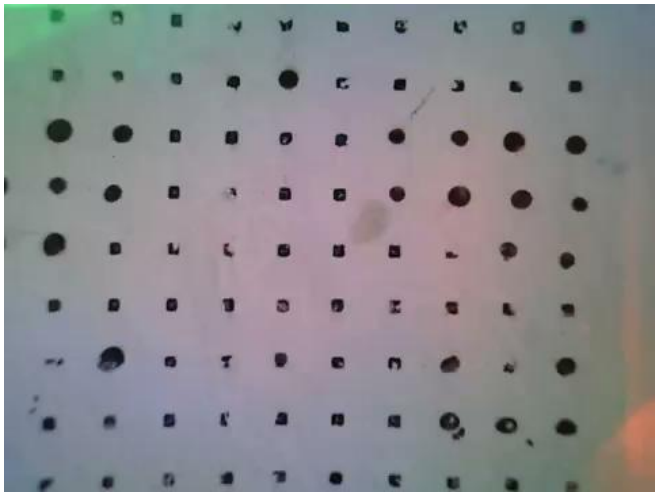
- Haptics is still an unexplored topic
- Modeling the haptic properties of surfaces requires specific sensors, making the sampling process expensive and time consuming

→ our big question:
is it possible to identify the haptic properties of a surface without scanning it with specific tools?

Some researchers have tried to answer this question by creating neural networks capable of transferring data from the image domain to the haptic domain.

Project goal

One of the last dataset created is the Touch&Go dataset.



- Can we create profiles of an object by starting from these videos?
- How similar are the profiles extracted from the videos?

Project steps

The project consists of 4 different phases:

RGB video:

1. Using Optical Flow to inpaint hand/sensor within the video
2. Using Monocular Depth algorithms to generate an object profile

Haptic data video:

3. Using Optical Flow to generate an object profile considering the points movement

4. Compare the two profiles extracted (Optional)

What you are going to study/use

- Dataset: Touch & Go
- Algorithm 1: Optical Flow
- Algorithm 2: Inpainting (maybe useful: segmentation)
- Algorithm 3: Monocular Depth
  Monocular Depth (using NN)
- Profile comparison (optional) → develop your own idea based on the results obtained

What if…?

- Do I have to stop working on the project for some time?
  - No problem at all, just let Antonio know
- Am I facing a very difficult problem?
  - Read literature
  - Look for other works doing similar things
  - Ask to my colleagues, maybe they have found a solution
  - Send an email to Antonio
- Do I need resources to make things work?
  - Do I really need those resources?
  - Try using Colab
  - Ask Antonio if it is possible to have some lab resources

Contacts

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