MESISI474624: Cobotics
Project work: Santé-Biotech
Proposal of a robot catalog for dental scanning

S.Venkateswaran
Assistant Professor: Mechatronics, ESILV/DVRC
swaminath.venkateswaran@devinci.fr

A cobot for a customer

De Vinci Research Center (DVRC), a laboratory affiliated with ESILV, is currently working on deploying cobots to assist dentists in performing intraoral scanning. Intraoral scanning, typically carried out by dentists, requires a high degree of precision. To minimize errors and enhance repeatability, DVRC proposes deploying a cobot to assist the dentist.

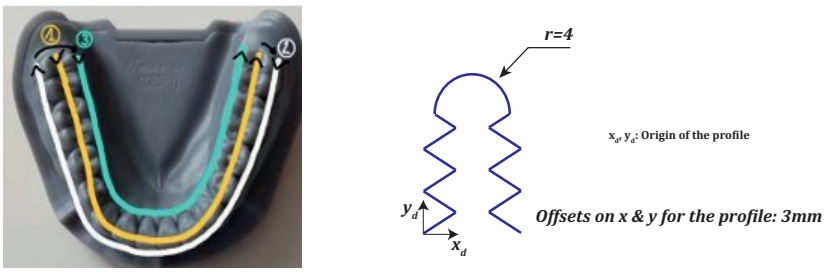
While 6-axis cobots are a common solution, their size can be a limitation in practical deployment. To simplify the process, a more compact 3-DOF configuration, such as RRR, RRP, or RPR, could be employed. DVRC is actively seeking a cobotic startup with expertise in this domain and has approached your firm. Using the architecture selected by you in DVL, the goal is to successfully perform intraoral scanning using the robot's end-effector near the molar region.

As a startup specializing in cobotics, your company is well-positioned to present its catalog to DVRC. The catalog, provided in PDF format, should feature the product name and your company logo on the first page. Including a company or product logo is optional but encouraged. For reference, an example of a comprehensive catalog is Universal Robots brochure, available here:
`https://www.universal-robots.com/media/1802432/e-series-brochure.pdf`

The catalog must address all questions outlined in Part 1 of the project work and be organized into clear sections. While the arrangement of sections is flexible, it is mandatory that all requested details are included.

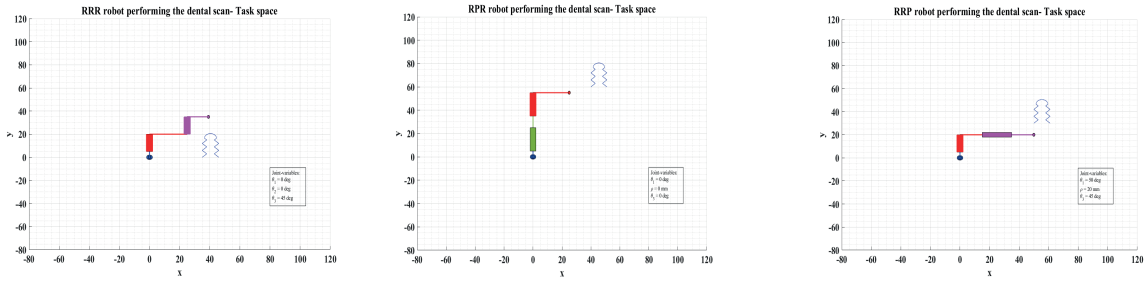
Regarding the MATLAB codes, it is recommended to provide them as script files alongside the catalog. Alternatively, you can upload the script files to GitHub and include the corresponding links at the end of the catalog. Video files can be provided to have your proposal being considered on priority.

The trajectory of the simplified scan profile to be performed is provided as a MATLAB function **coorddentaire.m** using which the inverse kinematics can be solved to perform the simulation. During the TD session on 09/12/2024, there will be a discussion about this project. Feel free to ask as many questions as you need to better understand the requirements from the customer.



(a) (b)

Figure 1: (a) Overview of the overall dental profile, (b) simplified profile of the scan to be performed for the project



(a) (b) (c)

Figure 2: Overview of the placement of the dental profile in the robot environment: (a) RRR, (b) RPR, (c) RRP

Information & Dates

1. The project will be an individual submission (no team work)
2. Ensure that the catalog you submit is unique and corresponds to the group choice made in DVL.
3. The deadline for the project is 10/01/2025 (before 23h59) and you can find the submission link in DVL
4. Submissions by email are not acceptable and will be graded ZERO
5. The catalog must be submitted as a PDF file. For the MATLAB codes, they can be provided in a single zip file along with the PDF or uploaded on GitHub (include GitHub links in the catalog).
6. For the trajectory planning related to the proposed problem statement, use the frequency and trajectory profiles suggested in Part-1.
7. Include position and velocity profiles for the trajectory planning.