



## Thesis Project Form

**Title (tentative):** A portable version of the StanzaRosa VR system

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### Description

#### Motivation and application domain

The StanzaRosa project is a non-immersive VR system, developed for children affected by Rett syndrome (RTT), to enhance motor function and reduce stereotypic behaviors typical of the syndrome. The system is specifically designed to improve upper-limb motor skills in RTT patients, focusing on reaching and hand-opening tasks.

#### General objectives and main activities

Hand/arm tracking is currently obtained by leveraging the tracking capabilities of an RGBD sensor, specifically a ZED Camera. This solution requires purchasing an RGBD camera and using a high-end computer, thereby increasing the system's cost and limiting its adoption, especially at home.

The thesis aims to analyse the state of the art of 3D tracking with standard cameras, e.g., off-the-shelf webcams, to select the best solution in terms of the trade-off between computational cost and tracking accuracy, and to implement it in the StanzaRosa system. Moreover, the thesis should compare the performance of tracking with different techniques and provide an interface to select available tracking devices and save the tracking data accordingly.

Experimental validation, to understand usability but also performance in terms of rehabilitation outcome, should be conducted in collaboration with AIRETT, with a group of patients affected by RTT, in the AIRETT centre or at girls' homes.

#### Training Objectives (technical/analytical tools, experimental methodologies)

The student will perform the following activities:

- Study of the state of the art of markerless tracking, with a specific focus on the techniques that allow tracking the 3D pose of arms, head, and eyes.
- Implementation of the devised technique in the existing Stanza Rosa
- Experimental validation with healthy users, focused on the quantitative comparison of the accuracy of the actual tracking and the new one
- Usability validation with RTT patients

**Place(s) where the thesis work will be carried out:** DIBRIS - Valletta Puggia

### Additional information

**Maximum number of students:** 1