Draw My Life: Multi-modal Emotions detection from Drawings and Text

The Draw My Life research project aims at using a social robot and a visual storytelling activity to elicit children's self-disclosure of personal issues, with a specific focus on bullying at school. While the first part of this project deals with the development of the robot behavior to elicit children's self-disclosure, the second part emphasizes on the analysis of the collected data from the children and on the detection of their issues. To detect the issues being discussed by a child, we aim to use emotion detection. We choose to use emotion detection because we hypothesize that the parts of the story associated to negative emotions are likely to be the parts related to the child's issues. While text transcripts are a well-known medium to perform emotion detection and sentiment analysis [1], one challenge arising is to know whether data from drawings can be used to effectively perform emotion detection (**RQ3.1: Does your way of drawing reveal your emotions?**). In the current body of literature, several works used deep learning techniques on children's drawings to infer their emotions [2, 3]. While seemingly effective, these methods do not allow to infer which characteristics of drawings are the most effective in predicting emotions. Additionally, some features of drawings, such as pen pressure, are currently underexplored and require further research [4]. To answer RQ3.1, we thus aim to perform a correlational study, in order to discover whether a correlation exists between the features of a drawing (colors used, pen pressure, etc), and a child's emotion with respect to the drawing. If a correlation exists, we aim to perform emotion detection on the multi-modal data at our disposal, to isolate with higher confidence the parts of the child's story disclosing their personal issues (**RQ3.2: How can multi-modal emotion detection be used to isolate and identify a child's personal issues?**).

Concretely, in this work, you will: (1) review the existing literature on emotion detection, sentiment analysis and children's drawing analysis; (2) explore the Wacom API to collect drawing data from a tablet; (3) integrate the data collection into an already existing drawing application; (4) collect a dataset of drawings and associated emotions; (5) conduct a correlational study to explore potential correlation between drawing data and children's emotions; (6) Explore how to perform multi-modal emotion detection from both text and drawing data, (7) summarise the work carried out in a scientific article.

This work requires you to have experience with the Python programming language. Familiarity with ROS, and code versioning (Git/GitLab) can be advantageous.

This work will give you the opportunity to (1) gain experience in Python and ROS programming; (2) learn how to conduct user studies; (3) write and potentially publish a scientific article.

Starting date: As soon as possible

Number of students: 1

Supervisor(s): Romain Maure (romain.maure@kit.edu)

References:

[1] Nandwani, Pansy, and Rupali Verma. "A review on sentiment analysis and emotion detection from text." *Social network analysis and mining* 11.1 (2021): 81.

[2] Çiftçi, Serdar, et al. "Emotion Analysis of Children's Drawings." *IEEE Access* (2025).

[3] Ali, Nashva, et al. "Artificial intelligence-based mobile application for sensing children emotion through drawings." *Advances in Informatics, Management and Technology in Healthcare*. IOS Press, 2022. 118-121.

[4] LaRoque, Sean Davis, and John E. Obrzut. "Pencil pressure and anxiety in drawings: A techno-projective approach." *Journal of psychoeducational assessment* 24.4 (2006): 381-393.