

A modular framework for data acquisition and annotation to support interaction scenarios

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Equipa de 4-5 elementos

CONTEXT

The ways we interact with technology are a major area of research that can strongly profit from machine learning approaches. Nowadays, companies such as Google or Microsoft depend on it to boost their ability to innovate and provide users with systems that are increasingly more adaptive to our needs and behaviours. At the core of these proposals are efficient methods for collection and annotation of data, e.g., regarding our interactions with Google Assistant, that is used to create and improve the service.

As major form of interaction, speech, comes with no surprise. Nevertheless, in present research @ IEETA we are interested in evolving how nonverbal cues can be considered in our interaction with technology. For instance, when talking with somebody, we often make small gestures, nod our head, or assume a certain posture, and these cues can have a well understood meaning in the current conversation, such as confirming something or showing disagreement. These make our communication with others very natural and efficient. However, much of these aspects are still far from being considered in our interaction with technology, one of the challenges being the lack of datasets that enable us to study those aspects and research novel ways to tackle them.

The gathering of data supporting the exploration of machine learning approaches is not a trivial task – especially if you are not Google or Microsoft -- and requires the investment of a huge amount of resources to ensure proper acquisition and annotation of the data, an effort that is yet to be made for several areas. Data, and particularly good data, is an important asset. In this context, is important to have a systematic way for data acquisition and annotation and, with this, boost a stronger study of these nonverbal aspects and exploration of machine learning approaches. Additionally, having such a framework would be valuable to create datasets that other researchers around the world can explore fostering collaboration and open science.

OBJECTIVES

This work aims to develop a modular interface to support the creation of datasets and test of machine learning approaches and showcase its usefulness by exploring its application for interaction.

TENTATIVE WORK PLAN

- Review the research context regarding frameworks for data acquisition and annotation
- Problem characterization, requirement definition and proposal of system architecture
- Iterative development and testing of the different modules concerning the creation and improvement of datasets (e.g., data acquisition and annotation, feature extraction)
- Integration of machine learning frameworks with the platform (e.g., model training and testing from the existing datasets)
- Showcase the developed system by applying it to create a simple system to support, for instance, gesture detection or human action recognition
- Write technical documentation of the work carried out

RESEARCH CONTEXT

The work to be developed is relevant for several ongoing research @ IEETA regarding human-machine interaction for scenarios including the smart home and assistive technologies and for evolving research on the consideration of nonverbal cues in those contexts.