

Problem owner name

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Problem title

Auslan Community Data Portal

What is the problem you want to solve?

Machine learning approaches require large datasets to train, and such a dataset is not available for Auslan (Australian Sign Language).

Why do you want to solve this problem?

A new project will be starting at the end of June: the UQ Auslan Communication Technologies Pipeline project. This will be a three-year project intended to develop prototype Auslan recognition, processing and production tools, using machine learning approaches. Possible outcomes for this project include:

- an Auslan chatbot;
- an Auslan digital assistant (e.g. “Siri for sign language”);
- an Auslan teaching tool; or
- a translation system.

This could provide increased access to technology-mediated and changeable resources, such as websites, with greater flexibility than can be achieved by embedding videos of signed translations, which is the current approach for Auslan-accessible online content.

This project will also lay the groundwork for further development of Auslan tools, and gestural human-machine interfaces based on Auslan. Longer term, successful machine learning approaches to Auslan could enable a suite of technology tools for Auslan, potentially including live translation, similar to Google’s Translate app.

A large and publicly available Auslan dataset could also be a learning tool for people learning Auslan, as it would contain examples of individual signs, phrases and sentences, which could assist in increasing vocabulary and grammar knowledge. If such a dataset had a community portal, it could assist in creating an Australia-wide community of Auslan learners who could collaborate to build resources and knowledge, based on examples provided by fluent/Deaf Auslan signers.

What do you envision as the ideal solution for this problem?

A community portal (app or web app), which would allow signers to upload:

- videos of signs and signing
- sign-by-sign or overall meaning of their video
- their signing fluency (e.g. self-reported fluency, years of learning/use)
- location/dialect of Auslan being used
- visibility permissions - open source, only for the UQ Auslan Communication Technologies Pipeline Project, or for researchers and the Community

Possibly also including:

- Moderation of uploaded videos (i.e. to weed out any inappropriate or incorrect videos)
- Explanations of risks involved in open sourcing videos, and ways of minimising those risks when submitting videos
- Recommendations for how to take videos from different angles in ways that are useful
- Community rating system for open source videos

- Ability for learners to browse/search for particular signs that other people have uploaded videos of
- Ability for uploaders to remove their videos, or change the visibility permissions
- Automated video slicing based on entropy of movement, to identify signs or sign components, enabling uploaders to identify “whole signs”
- Automatic sign translation suggestions, enabling uploaders to translate their videos more quickly or to correct incorrect translations
- Prompts for prospective uploaders
 - Single word prompts, either as English words or Auslan videos to be mimicked
 - Theme/category prompts (e.g. “Doctor’s appointment”, “At the supermarket”)
 - English sentences, possibly with Auslan grammar
- Elements of gamification to promote engagement

Such a community portal allows users to contribute sign video to a dataset, to be used by researchers as a resource for machine learning training; and/or by other members of the community as a learning resource.

What sort of Open Source solution do you think can be created in 48 hours, by a small team of developers, designers and data analysts?

Prototype or framework of the portal. Likely emphasis on the upload, metadata and visibility permission elements.

Are there datasets or people with domain knowledge that you will be bringing to work with? What/who are they?

Jessica has been involved in design research with the Deaf community on-and-off for almost a decade, and is a learner signer herself.

What are the current solutions for handling this problem?

One Auslan video corpus exists, but it was not collected for machine learning, and includes sensitive subject matter which precludes making it widely available.

Summary for website (up to ~ 1 page)

PROBLEM

Auslan (Australian Sign Language) signs could be recognised by a machine learning model, which could enable sign-based control of technology (e.g. “Siri for sign language”), and automated interpretation/translation for electronic media. Machine learning approaches require large datasets to train, and such a dataset is not available for Auslan. One way of creating a dataset is by crowdsourcing.

If there was a community portal available, expert and learner signers could contribute videos of their signing to the dataset, along with appropriate metadata about translations, their level of Auslan proficiency, and who they want to have access to their videos. Such a community portal could also become a useful tool for learner signers, if open-access videos were made available for viewing.

I propose a HealthHack team could create a prototype for such a portal. The ideal for this would be a system which enables:

1. fluent/Deaf signers to create videos of Auslan signs, phrases and sentences;
2. learners of Auslan to view sign, phrase and sentence-level videos of Auslan produced by fluent/Deaf signers and advanced learners;
3. learners of Auslan to create videos of their own Auslan signing, at sign, phrase and sentence levels, prompted by pre-existing videos or written prompts;
4. creators of videos to report metadata, such as Auslan dialect, their Auslan proficiency, and the visibility of their videos (i.e. for use by researchers only, available to the community, or available to anyone);
5. community members to downvote or report videos which are unclear or incorrect.

This portal could then be used to support a community of Auslan learners to communicate, practice, and learn from fluent/Deaf signers and more experienced learners, increasing their vocabulary and learning correct Auslan grammar, while also creating resources for use in machine learning training.