**1-3 Assignment: Short Paper**

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**Describe a real-world problem that would benefit from the application of AI**

There's a lot to sign language, including its own vocabulary, grammar, and syntax. In this assignment, however, I'm talking about American Sign Language (ASL). As the name suggests, it is a language that uses hand gestures. However, it doesn't just rely on gestures. Faces and body language help convey meaning instead of spoken words. ASL is used in a way by people who have difficulty hearing to communicate with each other. It is not uncommon for them to need a hearing translator to sign so that they can communicate with hearing individuals.

The biggest challenge is that ASL is not written, so it is difficult to document or preserve outside of video recordings. ASL's complex structure can make it difficult for people to learn, especially for those not exposed to the language. Finally, there is a lack of qualified ASL interpreters, mainly when there is a high demand for interpreting services in legal and medical settings. Unfortunately, the need for qualified interpreters also leads to problems where unqualified or underqualified interpreters are used. Sometimes, individuals resort to writing words down on a notepad, which causes miscommunications issues and leads to serious unintended consequences.

There are only a few human-driven translating services for ASL users, such as in-person translators and video relay services. An in-person translator is costly, but fortunately, when an interpreter is needed in a hospital or courtroom, it is paid for through that organization. Video relay services are free to use and open 24 hours a day, but sometimes the wait times are quite long.

**Real World AI Solutions and Necessary System Components**

Developing an AI-powered system that can recognize sign language and convert them into written or spoken language can be an effective and cost-effective way to improve the current translating issues. Deep learning techniques such as "Convolutional Neural Networks (CNNs)" (Glossary of AI Terms, n.d.) and Image Captioning (Data Surge, Let the AI Describe Your Image, 2021) would be a great place to begin. CNNs and Image Captioning would be used for image recognition, processing, and captioning.

"SLAIT," a start-up company, is using Recurrent Neural Network models, and they are finding amazing results translating sign language in real-time, according to the CEO Evgeny Fomin and the CTO Antonio Domenech. However, I am still waiting to hear back from them on other AI technologies that were used to develop their program.

This could then be used to create sign language translation applications. Users can use the camera on their smart device or computer and sign what they would like to say. The app would then recognize their signs and output a translation in real-time into voice or text on the screen. As a result of the apps, the lack of qualified ASL interpreters can be addressed, and ASL speakers could be integrated into the hearing community.

**Potential Ethical Concerns**

The development of sign language translating application systems may have unintended consequences for the Deaf community, which has its own culture, language, and communication norms. There is a need to ensure that the development of these applications does not undermine the cultural identity of the Deaf community. While there is already a shortage of human interpreters, these applications may reduce the need for them and could jeopardize job security or any future employment for potential interpreters. Additionally, privacy concerns could be an issue, mainly when used for health care or legal matters. So, there is a risk if data is not collected ethically, stored securely, or used for purposes beyond its original intent. Finally, the more this application is popularized, it could result in a social stigma. This could result in fewer hearing people attempting to learn the language and attempting to integrate into the deaf community.

**Resources:**

*Data Surge - Articles - Image captioning - Let the AI describe your image*. (2021, April 1). Data Surge - Articles - Image Captioning - Let the AI Describe Your Image. http://www.datasurge.ai/articles/image-captioning-let-the-ai-describe-your-image/#:~:text=Image%20captioning%20-%20Let%20the%20AI%20describe%20your,which%20takes%20the%20encoding%20and%20generates%20a%20caption.

Glossary of AI Terms. (n.d.). expert.ai. https://www.expert.ai/glossary-of-ai-terms/

Narayanan, R. (2021, December 28). Understanding key terms in AI. Medium.

https://medium.datadriveninvestor.com/understanding-key-terms-in-ai-415baa8b37a1.

National Institute on Deafness and Other Communication Disorders. (2021). American Sign Language. Retrieved March 4, 2023, from https://www.nidcd.nih.gov/health/american-sign-language.

*SLAIT – Real-time Sign Language Translator with AI*. (n.d.). SLAIT – Real-time Sign Language Translator With AI. https://slait.ai