Industrial Engineering Journal
ISSN: 0970-2555
Volume : 54, Issue 4, No.3, April : 2025

PAPER REVIEW: SIGN LANGUAGE RECOGNITION USING MACHINE LEARNING AND DEEP LEARNING: A REVIEW

Prof. Rahul Bambodkar, Ganesh Nawale, Saurabh Shinde, Samiksha Jagtap, Harshal Parteti

Abstract
The language of signs is an essential way of communication for audition community and word. With the advancement in automatic learning (ml) and the deep learning (DL), the automatic acknowledgment of the signs (SLR) has become an important research area. This magazine item discusses different ML and DL techniques to SLR, focuses in Datasets, functioning extraction, temps and challenges. The study sets in rising the advanced recent and possible direction to improve SLR systems.
Keywords : Machine Learning (ML), Deep Learning (DL), recognition of the sign language (SLR), Architectures.

1. Introduction

Sign language is the main means of communication for the deaf and mute. Developing an accurate and efficient SLR system could facilitate communication between people with hearing impairments and people who do not sign. Traditional recognition methods rely on manually generated features, while ML and DL approaches rely on data-driven techniques to achieve higher accuracy and generalization[1].

Automatic learning approaches the methods of traditional slr in the ML include extraction and features classification. The current techniques include: Extraction of the features The orientated orientated oriented (Hog), processing from a little bit bingic (saft) and local (low pain) Binary patterns) Classification Models: vector machines (SVM), Markov Hidden (Hmm), rasual forests (Rf) and neighbors with (k-nn). Although ad ML adarrves to reach a reasonable accuracy, have trouble with large groups of vocabulades and complex gestures because of the features the hand[2].

The appointment approval for DL DL Techniques have revolutionaries slowly slr the hierarchical features. The current architectures include: • Divolutional nerve networks (CNN): Used for the static signs of drawing the spurs' spiky features. • Repeated Nerve Networks (RNN) and short memory network (LSTM): handling temporary dependencies in continuous signature. • Attempts and Mechanisms of Attempts: Maxers recognition focusing on the important gextural ingredients. • Hybrid Models: Combining CNNs with LSTM or Transformers for an extraction of strong features and sequence[3].

2. Literature Survey

Starner, T. "Real-time Recognition of American Sign Language Using Video on Desktop and Laptop Computers" 1998 Presentation of a real-time SLR system with Hidden Markov Models (HMM) for recognizing ASL gestures. Pabo, L. "Discover value assumes dormitriate", CNN 2012, and Dinamic and dynamic and dychified a large accurate. Sixz, n. C. "Neuronal Signs" 2018 developed a model of meters machine of machine for continuing acknowledge of the scrural language.. Coller, O. "Sign Dee: Hybrids Cnn-Hmm for continuing acknowledgment of the "2019 sign language. CNNS and Hmm combined to recognize sign language from beginning to the end of real -world scenarios. Zhang, X. "Afraid of Standard Sign Language Mispers" The 2020 models used on accurate exchanges of signal signal. Despite progress, some challenges continue in the slr. Signature styles variety: View, orientation and joints and differences accuracy accuracy. Rarely data: Limited data groups are generalizing generalization of models. Real -time treatment: tall costs of calculation and establish latency impact. Finish and noise in the background: Interference of the external elements reduces efficient recognition. Yanqiong Zhang, Xianwei Jiang Recent Advances in Deep Learning for Sign Language Recognition 2024. The emergence and continuous development

of deep learning techniques have inspired and provided impetus for the advancement of sign language recognition. This article presents a comprehensive and up-to-date analysis of the progress, challenges, and opportunities of deep learning-based sign language recognition, focusing on the past five years of research. We explore various aspects of sign language recognition, including sign data acquisition technologies, sign language datasets, estimation methods, and different types of neural networks.. Sarah Alyami, a comparative study of techniques to recognize the language of the 2024 language of the 2024 (CSLR) is concentrated In the interpretation of a sequence of sign language gestures performed without a vacation. In this study, we will drive an empirical assessment of the last teaching techniques in depths in different data groups and language of signs. Selected models to implement a range of approaches to draw important features and use specific training strategies. To determine their effectiveness in different languages, these models are estimated Using many data set, especially rwh-phoenix-phoenix-Weather-2014, Arabies and Grsl, each represents a language of signs. The shows of the models were tested with invisible signatories and phrases. The experiences have performed to create new standards in selected data groups and provides valuable information on sustainability and generally evaluate techniques. G. P. Karra, N. S. Kid's knowledge of the real - Iime language using proficiency lessons and learning transfer (2023). The people with the language of aid sign and speech for communication. However, other people can not understand sign language. A recognition recognition system of American signs American signs will help reduce this communication fight. This article presents a solution for real-time recognition of American Sign Language words. Enikeev, D. G A portable device for recognizing sign language for the deaf and mute (2023) Sign language is the most Running among deaf and mute people. Many communities do not even try to teach it, even though it is the most popular form of communication for a deaf and mute person, which creates isolation for people with physical disabilities. This problem requires a system that can understand physical hand gestures based on static movements and establish communication between normal and disabled people.

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3. Research Methodological

Dataset Diversity:

Curate a diverse dataset that includes a wide array of sign language gestures with varying degrees of accumulative motion. The goal is to ensure the training data reflects the richness and diversity of real-world sign language expressions.

User-Friendly Interface:

Design an intuitive and user-friendly interface for the sign language recognition system. Interactive framework for effective interpretation of sign language for various technological fields.

Adaptive Feature Extraction:

Investigate and implement adaptive feature extraction methods that highlight relevant information in accumulative video motion sequences. The objective is to extract discriminative features that contribute to accurate sign language recognition.

4. Proposed System

1. Data Collection:
2. Record a diverse dataset of sign language gestures with a focus on capturing accumulative video motion. Include variations in signing styles, lighting conditions, and environmental factors.
3. Data Preprocessing:
4. Apply preprocessing techniques to normalize the dataset. This involves resizing, cropping, and normalizing the video frames.
5. Feature Extraction:
6. Implement feature extraction methods to identify relevant patterns in accumulative motion sequences.
7. Model Training:

8. Spilt the overall datasets into outcome based validation sets to train the model and increase the accuracy of model.
9. User Testing and Feedback:
10. Conduct user testing with individuals from the deaf and mute community to gather feedback on the system's usability and accuracy.

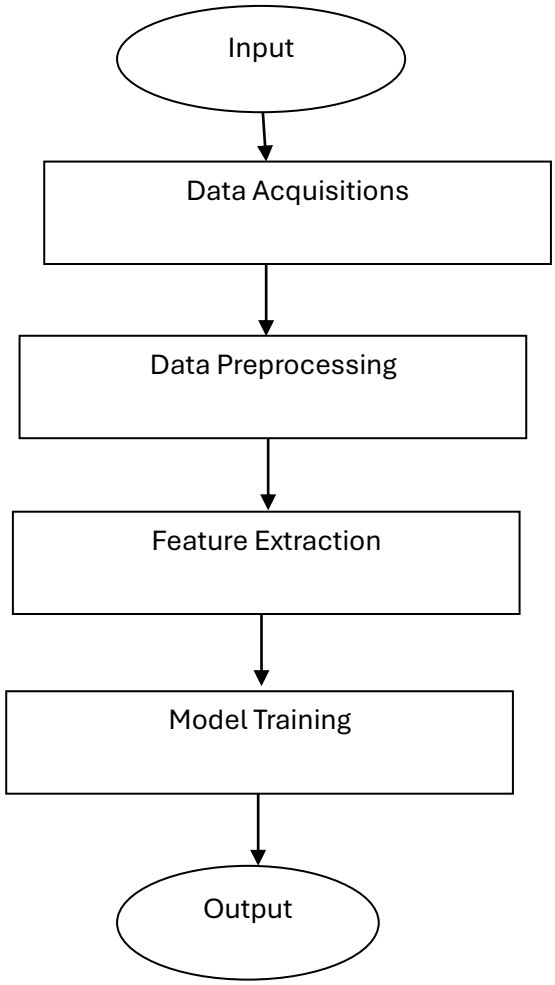

Figure 1. Flow Diagram

The discussion highlights the system's ability to address personalization in AI-driven Q&A systems. It emphasizes the modularity of the LangChain framework, which allows developers to integrate it with a wide range of data sources and AI models. Challenges include:

- The computational cost of embedding large datasets.
- Handling ambiguous queries, which occasionally led to irrelevant answers.

The authors propose solutions such as hybrid retrieval techniques and fine-tuning the LLM on specific datasets.

5. Conclusion

The paper contributes to the ongoing development of personalized AI systems, especially for use in web apps. Further exploration into the adaptive learning process for individual users will provide insights into enhancing Q&A system performance. This structure allows you to critically engage with previous literature while also positioning the new paper as a continuation or improvement of existing work. Let me know if you'd like help writing a specific part or more details!

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