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Sign Language Detection Using Machine Learning

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ABSTRACT:
The purpose of sign language detection technology is to use computers to recognize and decipher sign l anguage gestures and movements. This can improv e accessibility and communication for the deaf and hard of hearing community. Machine learning algor ithms are used to analyze and decipher the signer's hand, arm and body movements through the sign la nguage recognition process. Convolutional neural n etworks, short-
term memory networks, and hidden Markov model s are popular sign language recognition techniques. To detect and decipher sign language gestures, the se algorithms are trained on labeled sign language data using supervised learning techniques.
The trained model can then be applied to real-time applications, such as sign language translation applications, to convert sign language to text or au dio outpu.

I. INTRODUCTION:

Thanks to a technology called sign lang uage detection, computers and other electronic **dev ices can now** understand and **recognize** human sig n language **gestures.** For **people** who are deaf or ha rd of **hearing and** those who **cannot** speak, technol ogy is **designed** to **improve** accessibility and com munication.
Sign language detection is required for proper c onversion of sign language **gestures** and movemen ts into text or **speech. To** detect and decipher the **u nique** features of sign language, **the** technology **co mbines** computer vision and machine learning tech niques.
Communications, healthcare and **education are as diverse as the fields that could** benefit from the use of sign language **recognition technology.**
For example, it can be **used** to improve communic ation between **healthcare** professionals and deaf pa tients, to **provide** more accessible internet informat ion **to the hearing impaired** or **deaf, and** to enabl e more inclusive communication in **the workplace** and **in** public **spaces.**

II. LITERATURE SURVEY:

1. Realtime conversion of sign language **into** speec h and prediction of gestures using **artificial neural networks** Abey Abraham VRohini **To** verify and a nalyze **speakers** and speech, ML algorithms can be used. With the help of enough **data,** a program **ca n be trained** to **recognize** speech and **the speaker' s** identity.

2.Machine **Learning Approaches** for **Sign Langu age Recognition:** A **Critical Review** and **Analysis A. Adeyanju** O.O.Bello M.A.
According to **the** study, machine learning techniqu es have **shown** encouraging results in the field of si gn language recognition and have the potential to **i mprove system accuracy. However,** the authors **a lso** note **some issues,** including the **paucity** of train ing data, the diversity of sign languages, and the dif ficulty **of** defining sign language recognition. The a uthors **recommend** that future research **should foc us** on creating **methods** for **collecting** and annotati ng sign language data, as well as **exploring** new m achine learning algorithms for sign language recog nition, to **to** overcome these **problems.**

3 Tianchi Huang, RuiXiao **Zhang,** Chao **Zhou,** and Lifeng Sun, QARC: Video Quality Aware Rate Co ntrol **Based on Deep Reinforcement Learning** for Real-
Time Video **Streaming,** arXiv:1805.02482v1 [cs. MM] May **7,** 2018 The authors **argue** that **traditio nal bitrate** control **methods only vary the bitrate of** a video **stream based on** network **conditions, w hich can** result in **substandard** visual quality if **it i s unfavorable.** In contrast, their **proposed** QARC method **attempts** to **maximize both** data rate and v

ideo quality.

To do this, the authors use deep reinforcement le arning, a machine learning **method** that **allows age nts** to learn to **adopt behaviors** that **maximize** rew ard **cues.** The QARC algorithm **has been made** mo re flexible.

4.M. Jeballi et al. Extension of **hidden** Markov **mo dels** for **large vocabulary recognition in sign lang uage. According to this publication, the** authors' method for **recognizing gestures in** sign language has **been improved.**
To recognize a **wide** range of sign language **move ments,** the authors **propose** an extension of the Hid den Markov Model (HMM). By **using** more **compl ex** model **structures** and training **strategies,** the **pr oposed method outperforms traditional** HMMs. The system is **able to handle deviations** in **sign la nguage style** and has a higher recognition rate for a **wider range** of sign language **movements.**

5. **IEEE Fellow** Ken-Hao Liu, Ming-Fang Weng, Chi-Yao Tseng, Yung-Yu Chuang, and **Academician** Ming-Syan Chen, **"Exploring Temporal Associations** a nd **Rules** for **Detecting semantic concepts after fil tering.** in **video",** IEEE **Transactions** on **Multime dia,** VOL.
10 No. 2, February 2008 Finding and classifying **m eaningful** elements in videos is a method **called** se mantic concept detection. **However, the complexit y** and variety of **films makes** this **effort** difficult. A ccording to the authors, **the** semantic recognition **of ideas can** be made more precise by using post-filtering methods. **The**
authors **offer** a **two-step approach** to **doing** this. They **first used existing semantic concept recogn ition techniques to** create a list of possible ideas fo r each video **frame.** The second phase involves the use of association and **temporary rules.**

6. Vega, Maria Torres, Decebal Constantin Mocanu , Jeroen Famaey, Stavros **Stavrou** and Antonio Lio tta. "Deep **learning** for **real-time video stream quality assessment.**
"IEEE Signal Processing Letters 24, **Issue** 6 (2017): 736-740. The authors **first compile** a **large** dataset of **re al-time** video **sources** with varying degrees of **degrad ation. They then** train a CNN to **spatially** extract f rames and LSTM to predict **temporally dynamic s ubjective metrics of** the **perceived quality** of the video quality, **and** the **mean opinion score** (MOS) of the video **streams** is predicted by the combined model during training.
7. **T. Starner** and A. Pentland. **Real-time recognition of** American Sign Language from **video using** Hidden Markov Models.
International Journal of Pure and Applied Mathema tics Special Issue 1691 Computational Imaging and Vision, 9(1) The goal **of the system** is to convert ASL **movements** from video input **to** text or **speec h** and **recognize** them as ASL movements.
First, **the authors collected** a dataset of **American Sign Language movements from** deaf **signers.** Th ey then **preprocessed the video data using an arr ay** of HMMs trained to detect certain ASL **actions** to extract **information about the** hand **region.**

III. CONCLUSION:

Deaf and hard of **hearing populations can greatl y** benefit from improved accessibility and communi cation **through** machine learning
based sign language **recognition. Sign** language **ge stures** and movements **can be recognized and inte rpreted in real time and accurately using** machin e learning algorithms. By **integrating** this technolo gy into sign language **translation apps, people wh o are** deaf and **hard of hearing will** be able to com municate more easily in a **variety** of contexts.
Although challenges remain in creating accurate a nd **reliable** sign language **recognition** systems, **sig nificant progress has** been made recently. Convol utional neural networks, **long-term** memory networks, and hidden Markov model s are methods and techniques that **researchers** hav e **studied** to **improve** the **accuracy** of sign languag e **recognition.**

REFERENCES:

[1]. Real time conversion of sign language to speech and prediction of gestures using Artificial Neural Network Author AbeyAbrahamVRohiniProcedia Computer Science, Volume 143, 2018, Pages 587-594
[2]. Machine learning methods for sign language recognition: A critical review and analysis Author A.AdeyanjuO.O.BelloM.A.AdegboyeIntel ligent Systems with ApplicationsVolume 12, November 2021, 200056
[3]. Tianchi Huang, Rui-Xiao Zhang , Chao Zhou , and Lifeng Sun, QARC: Video Quality Aware Rate Control for Real-Time Video Streaming based on Deep

Reinforcement Learning, arXiv:1805.02482v1 [cs.MM] 7 May 2018

[4]. M. Jeballi et al. Extension of Hidden Markov Model for Recognizing Large Vocabulary of Sign Language. International Journal of Artificial Intelligence & Applications 4(2); 35-42, 2013

[5]. Ken-HaoLiu, Ming-Fang Weng, Chi-Yao Tseng, Yung-Yu Chuang, Member, IEEE, and Ming-Syan Chen, Fellow, " Association and Temporal Rule Mining for Post-Filtering of Semantic Concept Detection in Video", IEEE transactions on multimedia, VOL. 10, NO. 2, February 2008

[6]. Vega, Maria Torres, Decebal Constantin Mocanu, JeroenFamaey, Stavros Stavrou, and Antonio Liotta. "Deep Learning for Quality Assessment in Live Video Streaming." IEEE Signal Processing Letters 24, no. 6 (2017): 736-740.

[7]. T.Starner and A. Pentland. Real-Time American Sign Language Recognition from Video Using Hidden Markov Models. International Journal of Pure and Applied Mathematics Special Issue 1691 Computational Imaging and Vision, 9(1)