CISLR: Corpus for Indian Sign Language Recognition

IIT KANPUR
Indian Institute of Technology, Kanpur

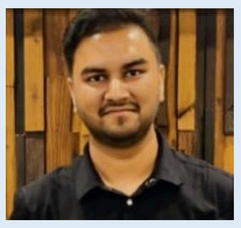
Exploration Lab
अन्वेषण प्रयोगशाला


Abhinav Joshi


Ashwani Bhat


Pradeep S


Priya Gole


Shreyansh Agarwal


Shashwat Gupta

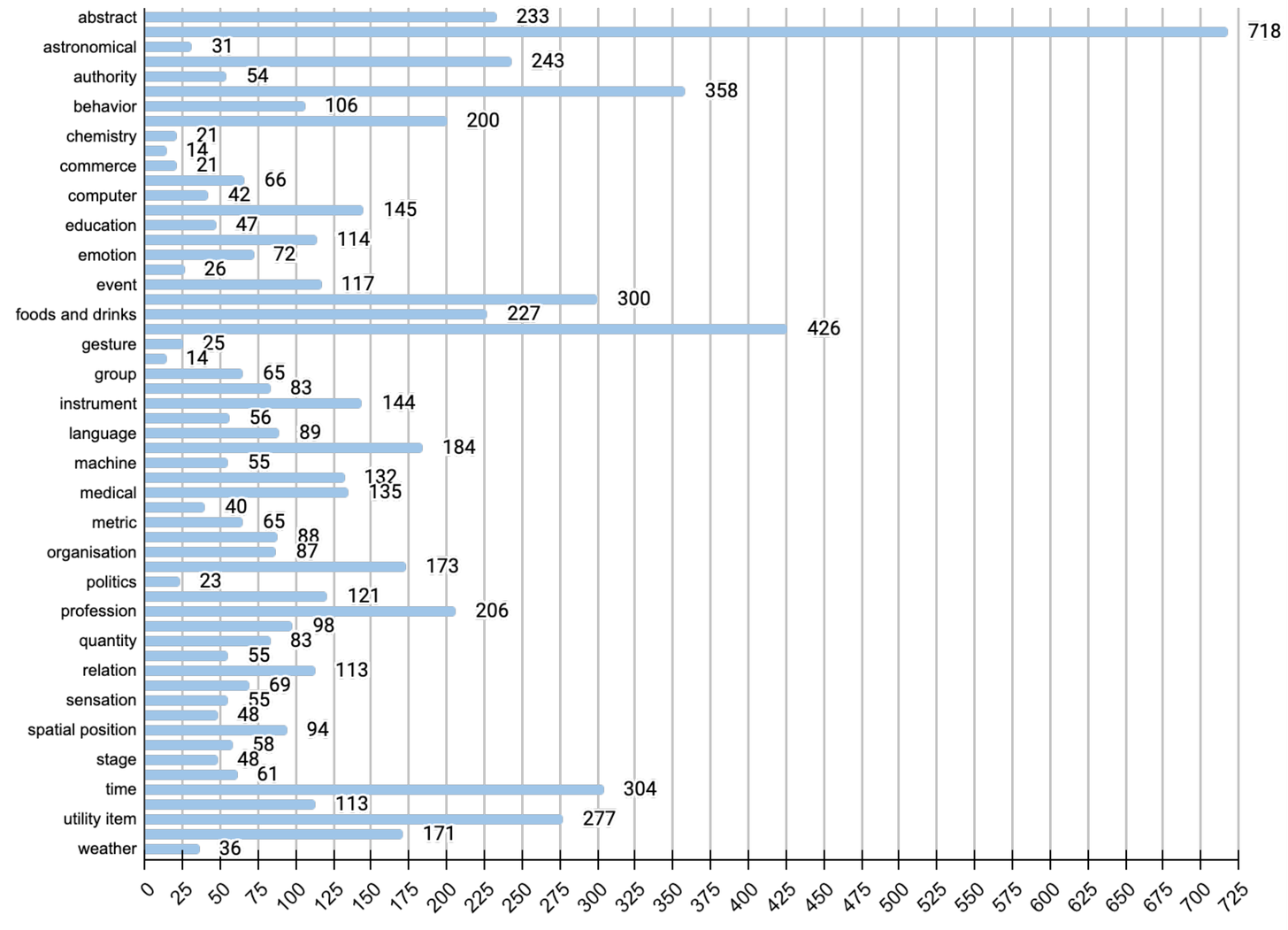

Ashutosh Modi

Introduction

- Indian Sign Language (ISL), though used by a diverse community (~6 million), still lacks well-annotated resources for developing systems that would enable sign language processing.
- Indian Sign language is still far from data-driven tasks like machine translation.
- To address this gap, in this paper, we introduce a new dataset **CISLR** (**C**orpus for **I**ndian **S**ign **L**anguage **R**ecognition), for word-level recognition in Indian Sign Language using videos.
- The corpus has a large vocabulary of around 4700 words covering different topics and domains.
- To handle the low resource problem in Indian Sign Language, the proposed model consists of a prototype-based one-shot learner that leverages resource-rich American Sign Language to learn features for improving predictions in Indian Sign Language.

Corpus

Datasets	Sign-Language	Words	Videos	Avg. Videos/ Word	Signers	Modalities	Categories
Boston ASLLVD	American	2742	9794	3.6	6	RGB	-
DEVISIGN-L	Chinese	2000	24000	12	8	RGB, depth	-
DGS Kinnect	German	40	3000	75	15	RGB, depth	-
GSL	Greek	20	840	42	6	RGB	-
LAS64	Argentinian	64	3200	50	10	RGB	-
LSE-sign	Spanish	2400	2400	1	2	RGB	-
Perdue RVL-SLLL	American	39	546	14	14	RGB	-
PSL Kinnect 30	Polish	30	300	10	-	RGB, depth	-
RWTH-BOSTON-50	American	50	483	9.7	3	RGB -	
WLASL	American	2000	21,083	10.5	119	RGB	-
Nandy et al. (2010)	Indian	22	600	27.3	-	RGB	-
Kishore and Kumar (2012)	Indian	80	800	10	-	RGB	-
INCLUDE	Indian	263	4287	16.3	7	RGB	15
ISL-CSLRT	Indian	186	700	3.8	7	RGB	-
CISLR (Ours)	Indian	4765	7050	1.5	71	RGB	57

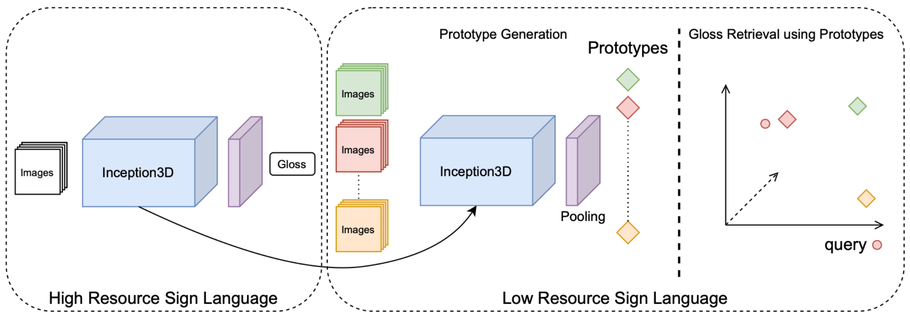


Challenges

- Low Resources
- Diverse Dialects
- Missing Real-world conditions
- Fine-grained Annotations
- Lack of gesture grounding to Real-world Concepts

Baseline One-Shot Learners

Dataset	# Videos	# Prototypes	# Test Samples
CISLR_v1.0-a	7050	4765	2285
CISLR_v1.0-b	7050	4765	2285
CISLR_v1.0-ab	9692	4765	4927



	Top-1	Top-5	Top-10
I3D Classifier	30.2	55.1	63.6

Performance in WLASL Benchmark

Dataset	# Test Samples	Top-1	Top-5	Top-10
CISLR_v1.0-a	2285	16.81	20.04	22.58
CISLR_v1.0-b	2285	16.11	19.61	21.97
CISLR_v1.0-ab	4927	43.41	48.06	49.83

Performance in CISLR Benchmark

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- Prem Selvaraj, Gokul Nc, Pratyush Kumar, and Mitesh Khapra. 2022. OpenHands: Making Sign Language Recognition Accessible with Pose-based Pretrained Models across Languages. In Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers), pages 2114–2133, Dublin, Ireland. Association for Computational Linguistics.
- Advaith Sridhar, Rohith Gandhi Ganesan, Pratyush Kumar, and Mitesh Khapra. 2020. INCLUDE: A Large Scale Dataset for Indian Sign Language Recognition. In Proceedings of the 28th ACM International Conference on Multimedia (MM '20). Association for Computing Machinery, New York, NY, USA, 1366–1375. https://doi.org/10.1145/3394171.3413528