

Collection and Preprocessing of Czech Sign Language Corpus for Sign Language Recognition

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Corpus

Czech Sign Language corpus **UWB-07-SLR-P** for training and testing of SLR systems

Content

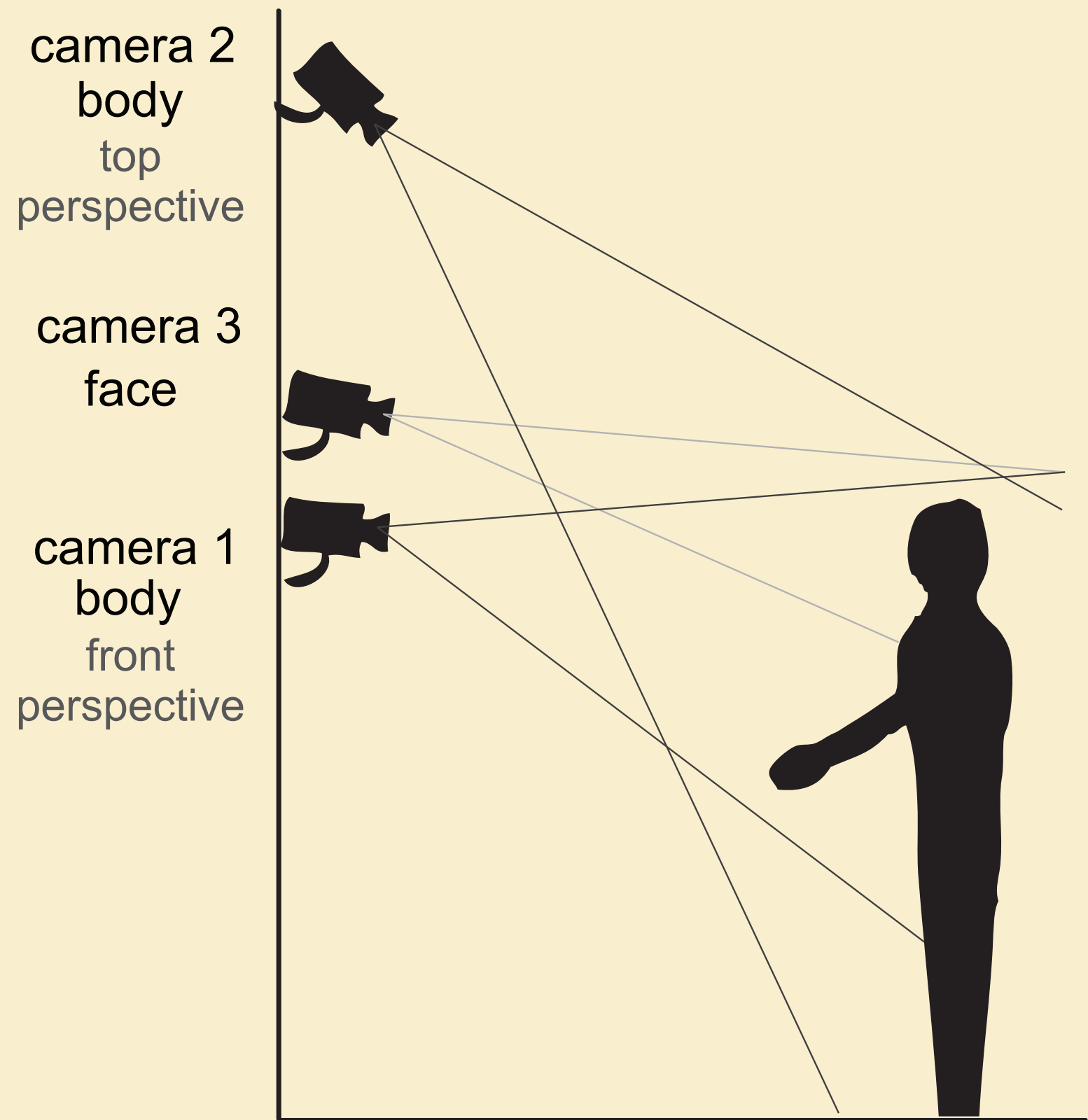
- ▶ 378 signs from Czech Sign Language
 - ▶ 35 numbers
 - ▶ 19 day and month names
 - ▶ 64 finger alphabet (one- and two-handed)
 - ▶ 35 town names
 - ▶ 225 other signs (most frequent words from spoken train information service dialogues)
- ▶ 4 signers (4 women, 2 deaf)
- ▶ 5 repetitions of each sign
- ▶ laboratory lighting and clothing conditions
- ▶ two different perspectives capturing whole body, allowing 3D tracking
- ▶ third camera captures the head only

Recording

- ▶ synchronization of 3 cameras with clapperboard (max 10 ms time shift between 2 videos)
- ▶ shutter speed 1/500 second to avoid blurring
- ▶ dark clothing of signers
- ▶ static, uniform illumination
- ▶ 3D calibration for each recording session

Data

- ▶ resolution 720x576 px, 50 fps
- ▶ 4 signers x 378 signs x 5 repetitions x 3 views
- ▶ 21853 AVI files (11.1 hours)
- ▶ 18 GB (Xvid compression)
- ▶ additional data available for each AVI file: signer ID, sign name, sign group, calibration data, segmented regions (head, hands based on skin color detection)



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Preprocessing

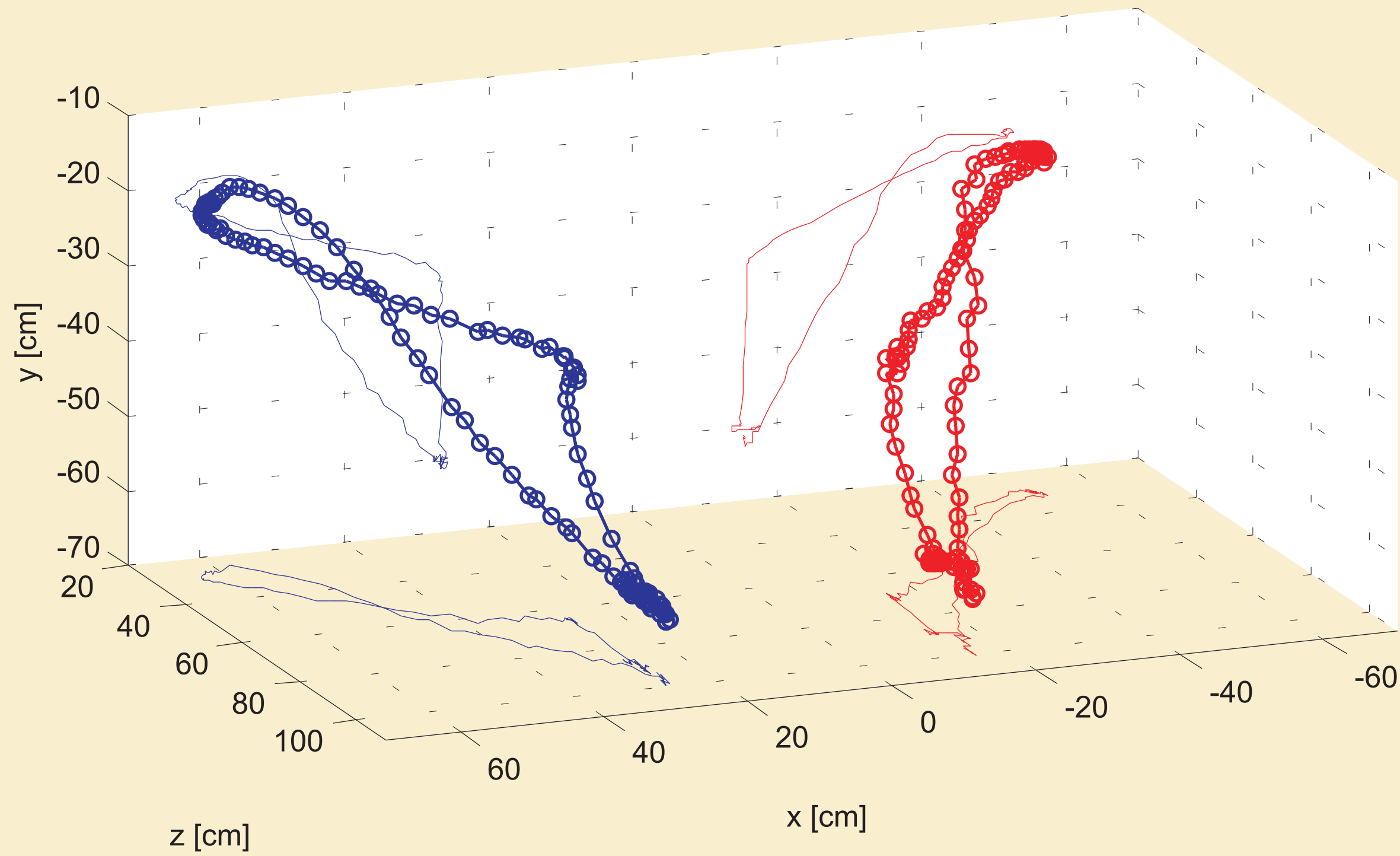
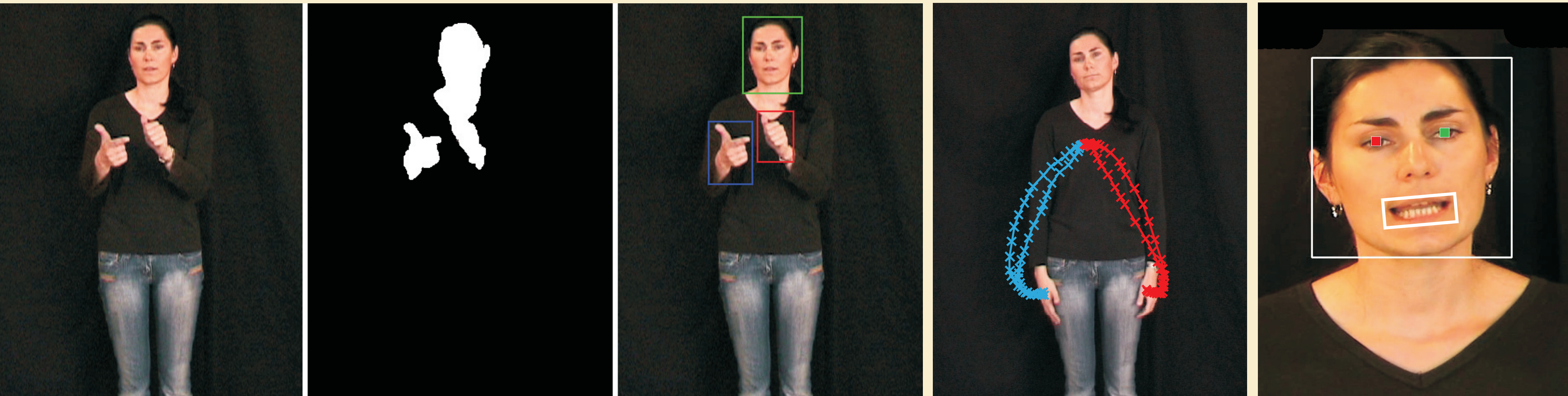
From recording to ready for use UWB-07-SLR-P corpus

2D

- ▶ 245 GB of raw material
- ▶ 18 GB of compressed (Xvid), annotated videosequences
- ▶ deinterlacing
- ▶ hands and head detection using skin color model
- ▶ partially resolved occlusions
- ▶ face tracking, mouth tracking

3D trajectories

- ▶ signer is recorded from 2 views
- ▶ it allows 3D reconstruction of hand trajectories
- ▶ projective and fundamental matrices are available
- ▶ epipolar lines are used as a constraint for stereo correspondence
- ▶ from two 2D trajectories one 3D trajectory is computed

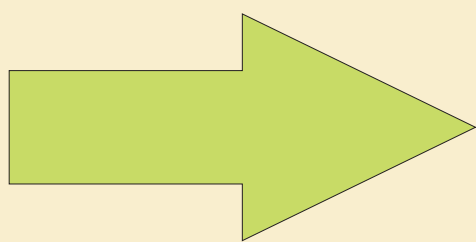


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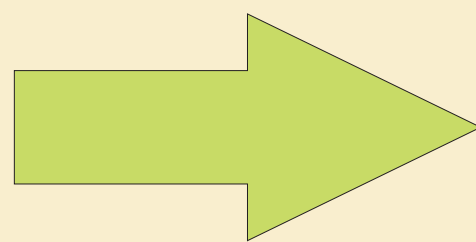
Use and experiments

Possible experiments on the UWB-07-SLR-P corpus

- ▶ head and hand detection
- ▶ resolving occlusions
- ▶ manual features extraction (hand and head trajectories, hand shape)
- ▶ non-manual features extraction (face expression, articulation)



- ▶ sign clustering
- ▶ sign recognition
- ▶ automatic sign annotation



- ▶ sign language recognition and translation
- ▶ sign language tutoring tools
- ▶ information kiosks for the Deaf (railway and bus stations...)