Team name	Samgest
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Rest of team members	Baptiste Angles Christophe Mollaret
Team website URL (if any)	Our lab Website: http://www.irit.fr/

Title of the contribution	HMM-based gesture recognizer
General method description	We modeled each of the 20 gestures by left-to-right hidden Markov models (HMM). Each HMM has three states and we allow to skip one state. We added a 21st model with a single state that models a rest position. This last label is not outputted in the predicted final labels. It allowed to decrease the number of false positives of other gestures.
References	Our HMM approach is similar to the one in: F. Bevilacqua , F. Baschet, S. Lemouton. The augmented string quartet: experiments and gesture following, Journal of New Music Research 41(1), pp. 103-119, 2012 Our hand feature extraction is based on: Konovalov, Vitaliy, Albert Clapés, and Sergio Escalera. Automatic Hand Detection in RGB-Depth Data Sequences, In Proc. CCIA 2013, Vic

Describe data preprocessing techniques applied (if any)	We perform a normalization on the skeleton coordinates: a resampling to 32 feature vectors for each sliding window, a rotation, a translation, a symmetry to merge left- and right-handed gestures, and a final rescaling to a 100x100x100 cube
Describe features used or data representation model (if any)	- Joints used: elbow, wrist, hand (x,y,z) - Blob areas, barycenter coordinates, spatial moments on the hands
Data modalities used, i.e. depth, rgb, skeleton... (if any)	Skeleton, depth, RBG, user map
Fusion strategy applied (if any)	The best score of several sliding windows is chosen at each frame
Dimensionality reduction technique applied (if any)	

Temporal clustering approach (if any)

Temporal segmentation approach (if any)	We parse the test files with sliding windows of several lengths (from 5 to 40 frames)
Gesture representation approach (if any)	
Classifier used (if any)	HMM. Decoding based on the forward algorithm (in log domain) We also tested MLPs as included in the code, but our submission uses HMMs
Large scale strategy (if any)	Use of threads to decode several files simultaneously

Transfer learning strategy (if any)

Temporal coherence and/or tracking approach considered (if any)

Other technique/strategy used not included in previous items (if any)

Method complexity analysis

Qualitative advantages of the proposed solution	Light in terms of computation resources Generative approach so that interpretation of results is easy
Results of the comparison to other approaches (if any)	Similar performance obtained with a Multi-layer Perceptron feeded with context-dependent frames (we tested 1 and 2 neighboring frames)
Novelty degree of the solution and if is has been previously published	The novelty of our approach is limited

Language and implementation details (including platform, memory, parallelization requirements)	The main program is in Java. The hand feature extraction written in C++ requires openCV 2.8
Human effort required for implementation, training and validation?	The HMM classifier implementation required about 1 person/month. The implementation of the hand feature extraction took about one week. We spent about three weeks testing on the validation subset.
Training/testing expended time?	Training lasts about 5 minutes. Decoding the all validation subset takes about 2 hours (about 1 minute per file in average)
General comments and impressions of the challenge	We had fun participating!