

Advanced Techniques for Human Motion Capture Data Classification

Harshad Kadu & C.-C. Jay Kuo
Electrical Engineering/SIPI

Problem

Synthesis tools require annotated datasets

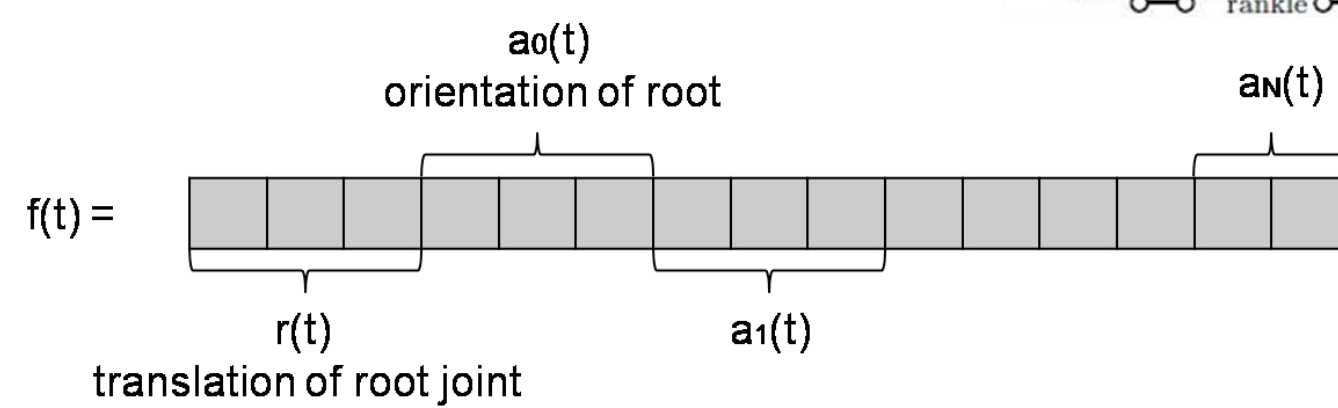
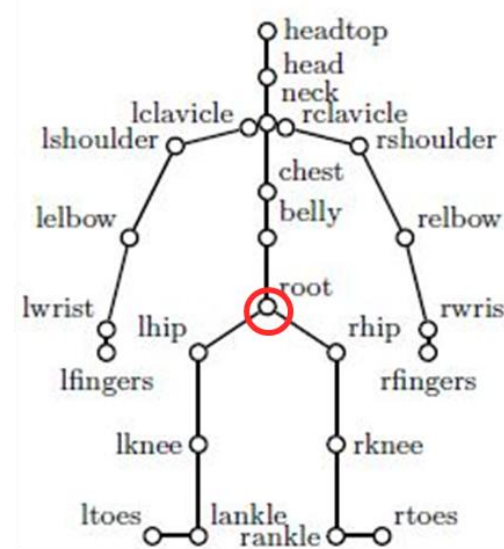
Classification is a precursor

Extension to indexing and retrieval problems

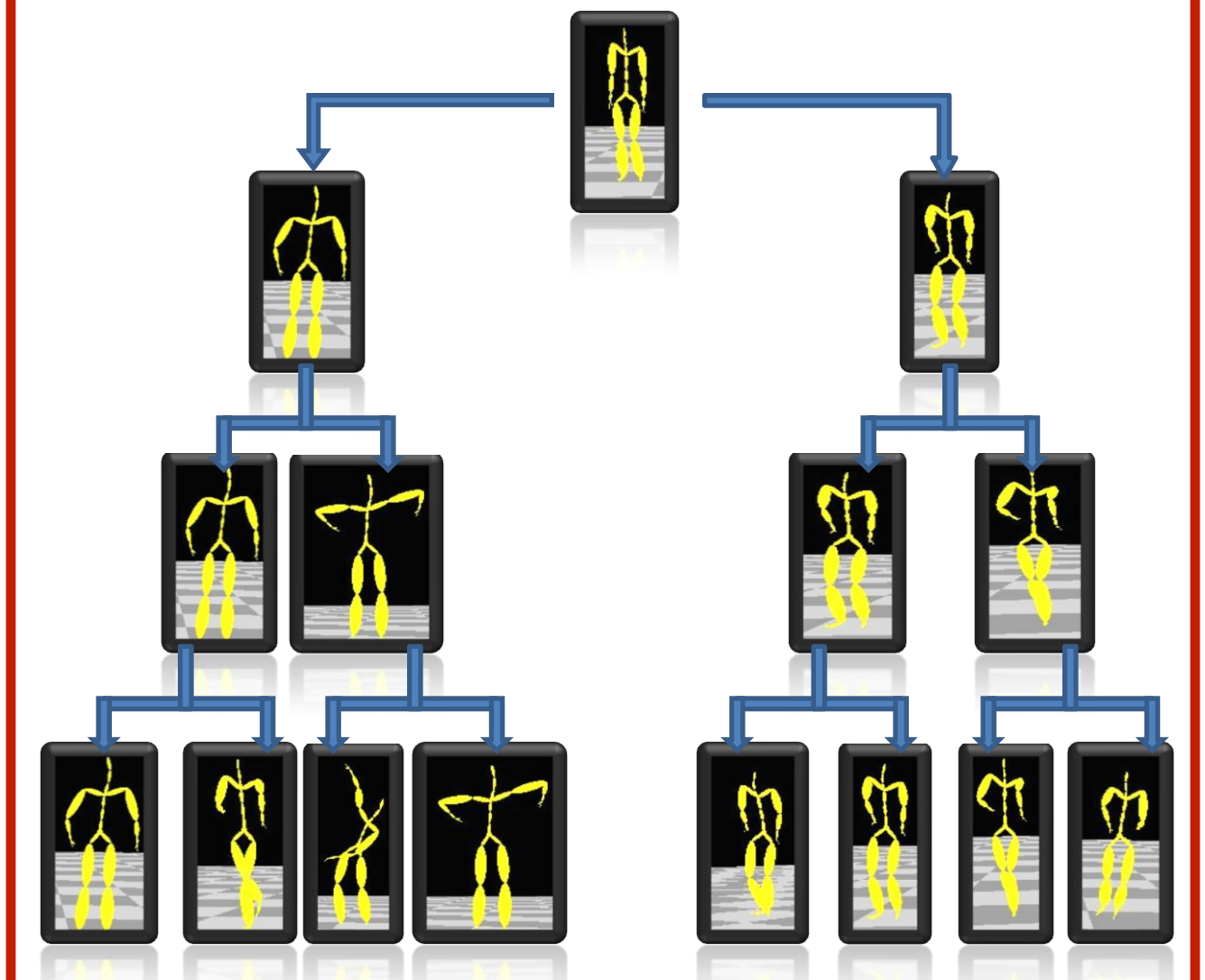
Motion Capture Data

$$f(t) = \{r(t), a_0(t), a_1(t), \dots, a_N(t)\}$$

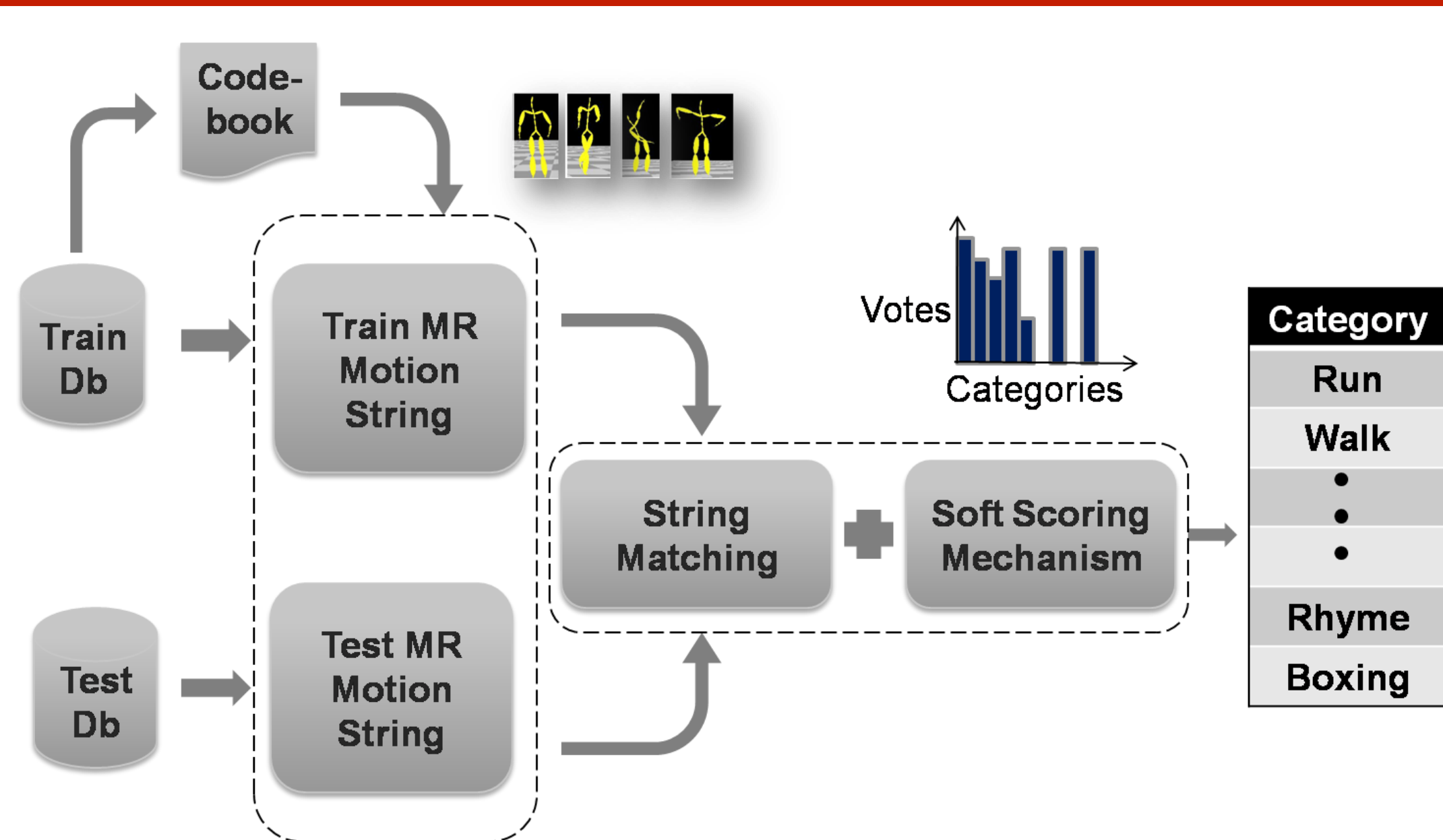
where: $t = 1, 2, \dots, m$



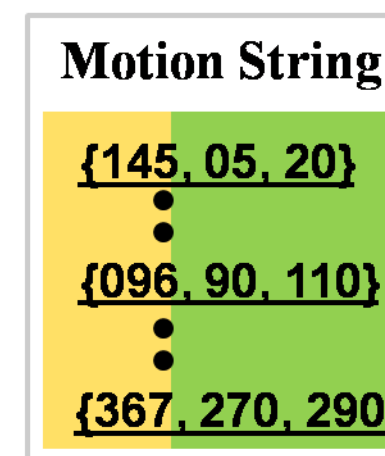
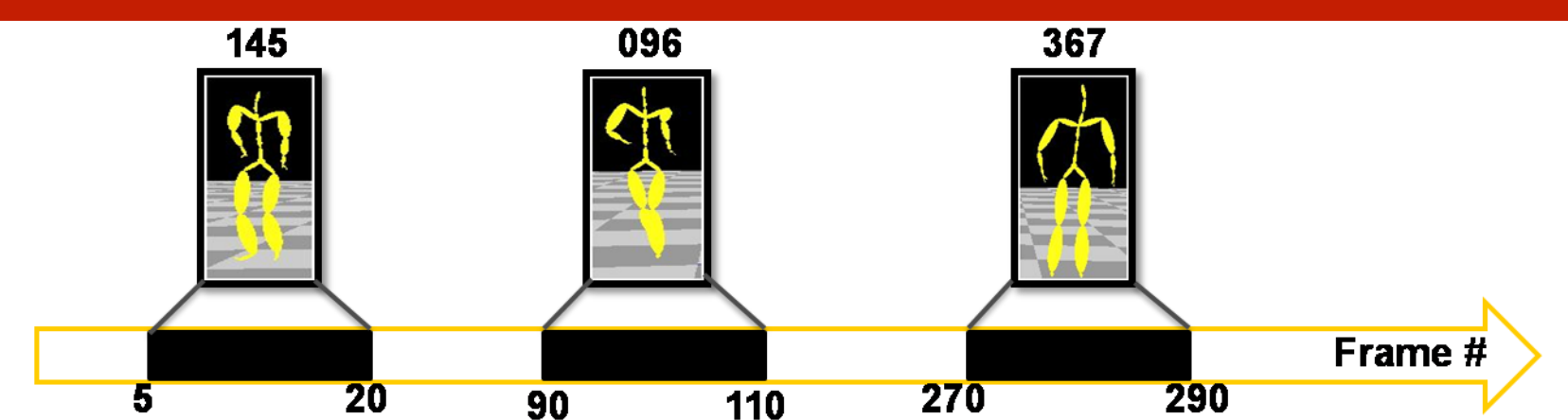
TSVQ Codebook



A. Motion String Similarity



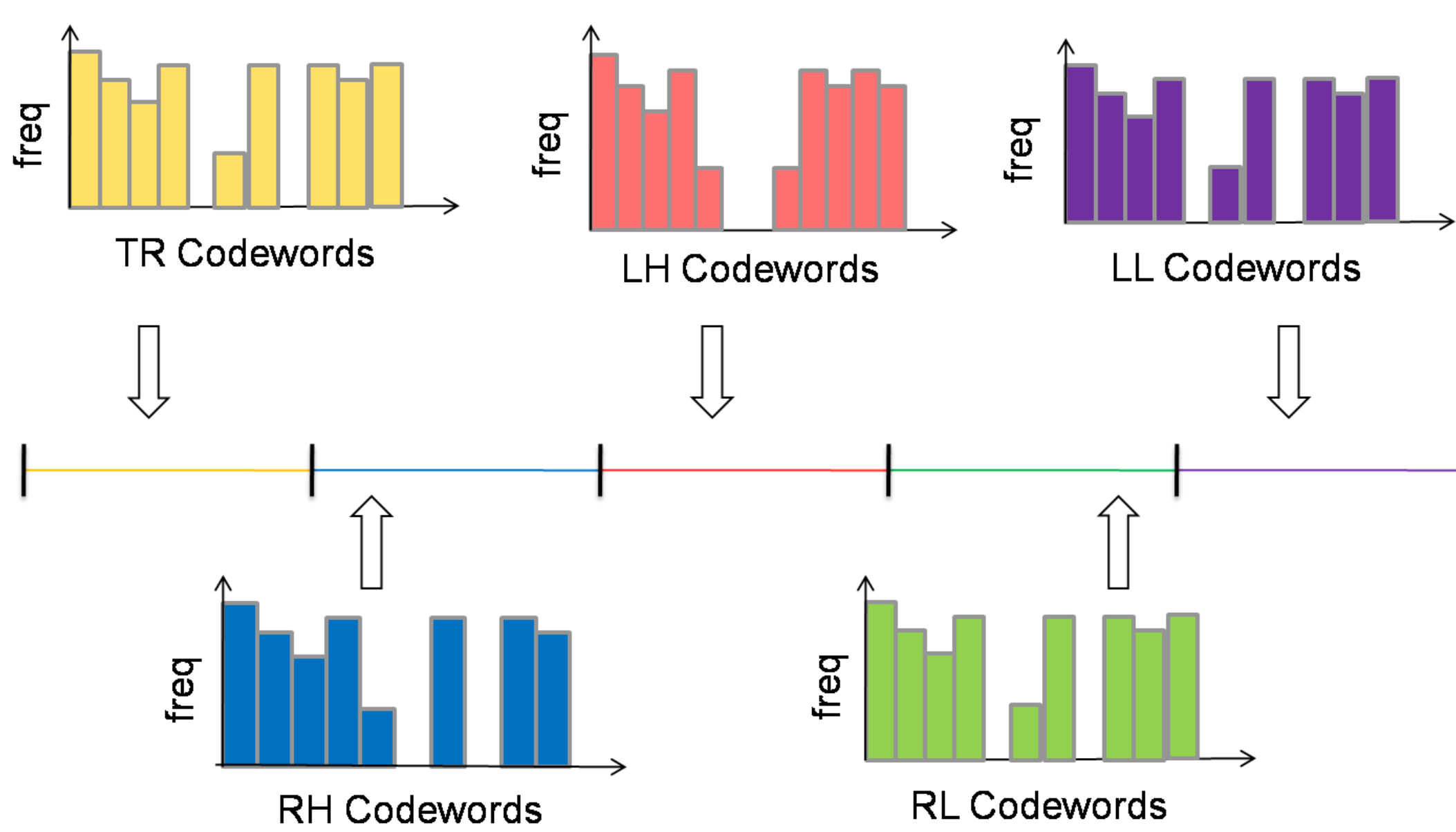
Motion Strings



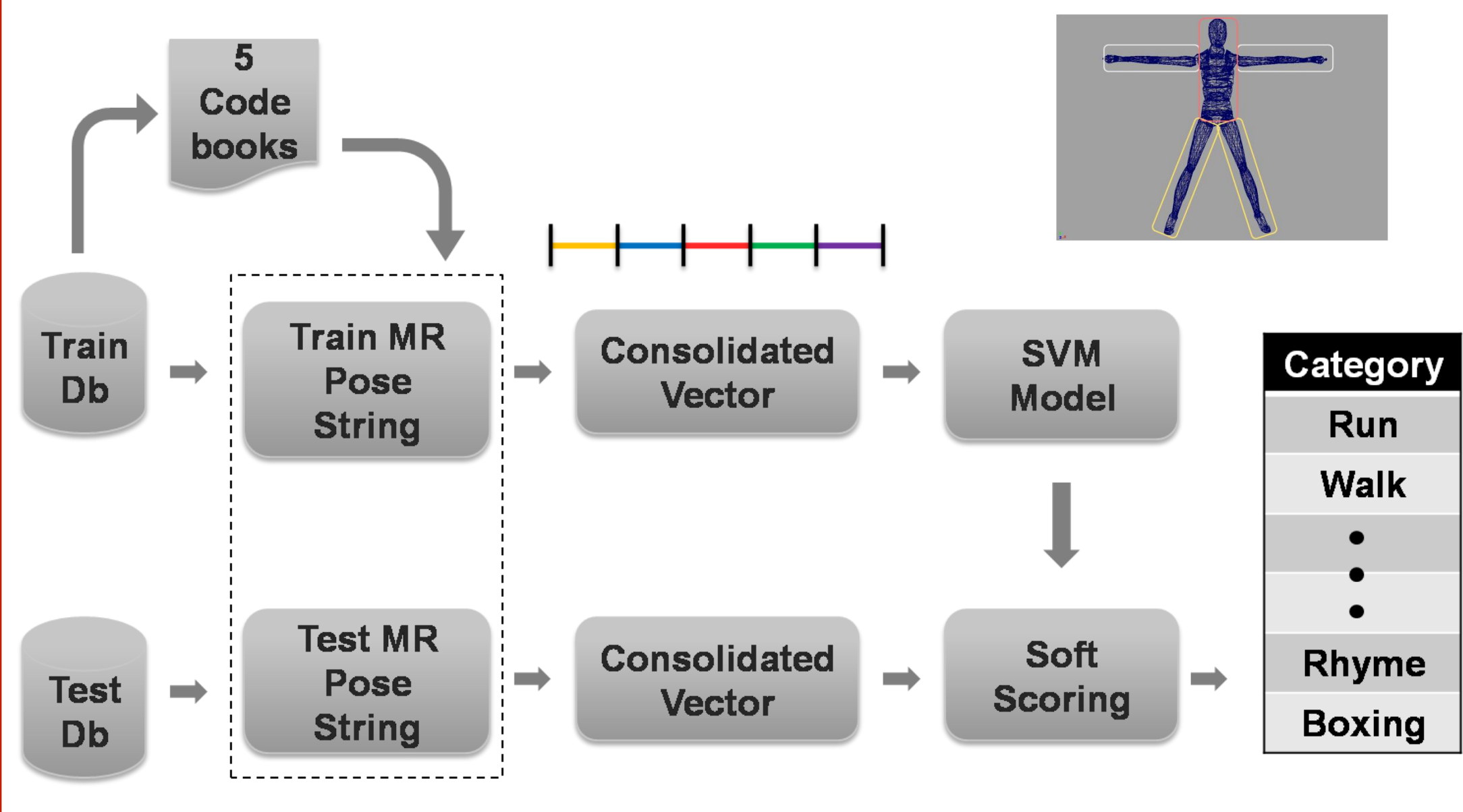
Full-body codeword indices
Frame range

Training Sequence: ... 145, 234, 096, **301, 150, 167, 188, 013**, 367, 055 ...
Test Sequence: ... 102, **301, 150, 167, 188, 013**, 143, 281, 117, 082 ...

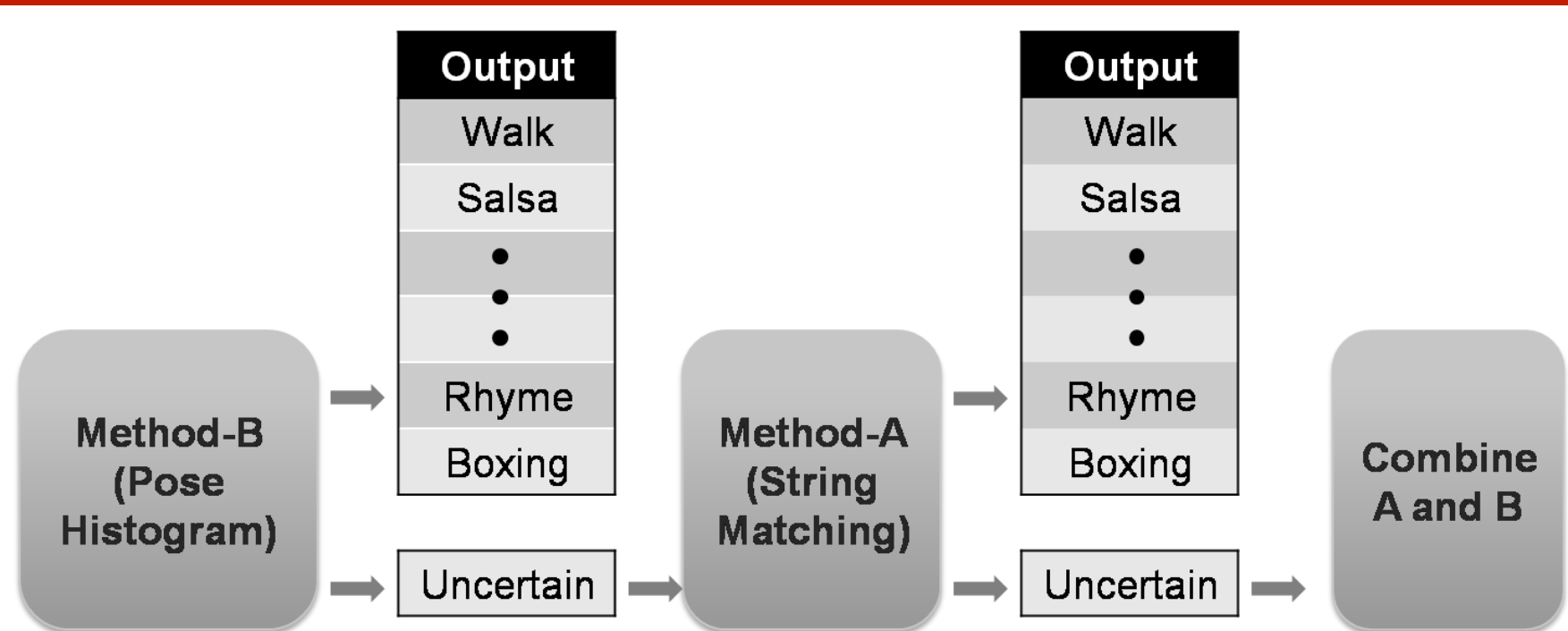
Consolidated Pose Vector



B. Pose Histogram Classifier



C. Cascade Fusion



Results and References

Methods	Categories	Accuracy	Dataset
K-WAS	23	90.3%	Self Generated
Wu et. al	14	97.0%	CMU + Self Generated
Fusion	30	98.8%	CMU Dataset

[1] Harshad Kadu, Maychen Kuo, and C.-C. Jay Kuo. Human motion classification and management based on mocap data analysis. In Proceedings of Joint ACM workshop on Human gesture and behavior understanding. ACM Multimedia, December 2011
[2] Wu Shuangyuan, Zhaoqi Wang, and Shihong Xia. "Indexing and retrieval of human motion data by a hierarchical tree." *Proceedings of the 16th ACM Symposium on Virtual Reality Software and Technology*. ACM, 2009