

Sparse Representations and Low Rank Approximations for Action Recognition

Sushma Bomma¹

Dr. Neil Robertson¹

Prof. Paolo Favaro²

Problem

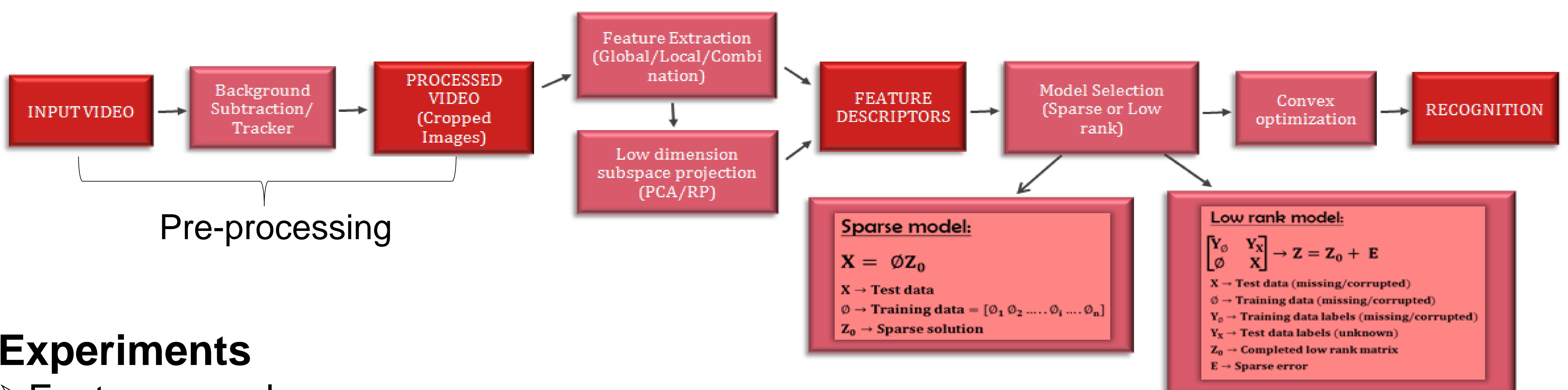
Recognizing ongoing activities from an unknown video is quite challenging due to unavoidable occlusions, background clutter, variation in view-point of cameras and so on. Type of features and classification strategy contribute most to the performance of an activity recognition system.

Objective

➤ Our goal is to develop an activity recognition system based on sparse approximation and low rank approximation models and solve the recognition problem using convex optimization tools.

➤ Choice of features

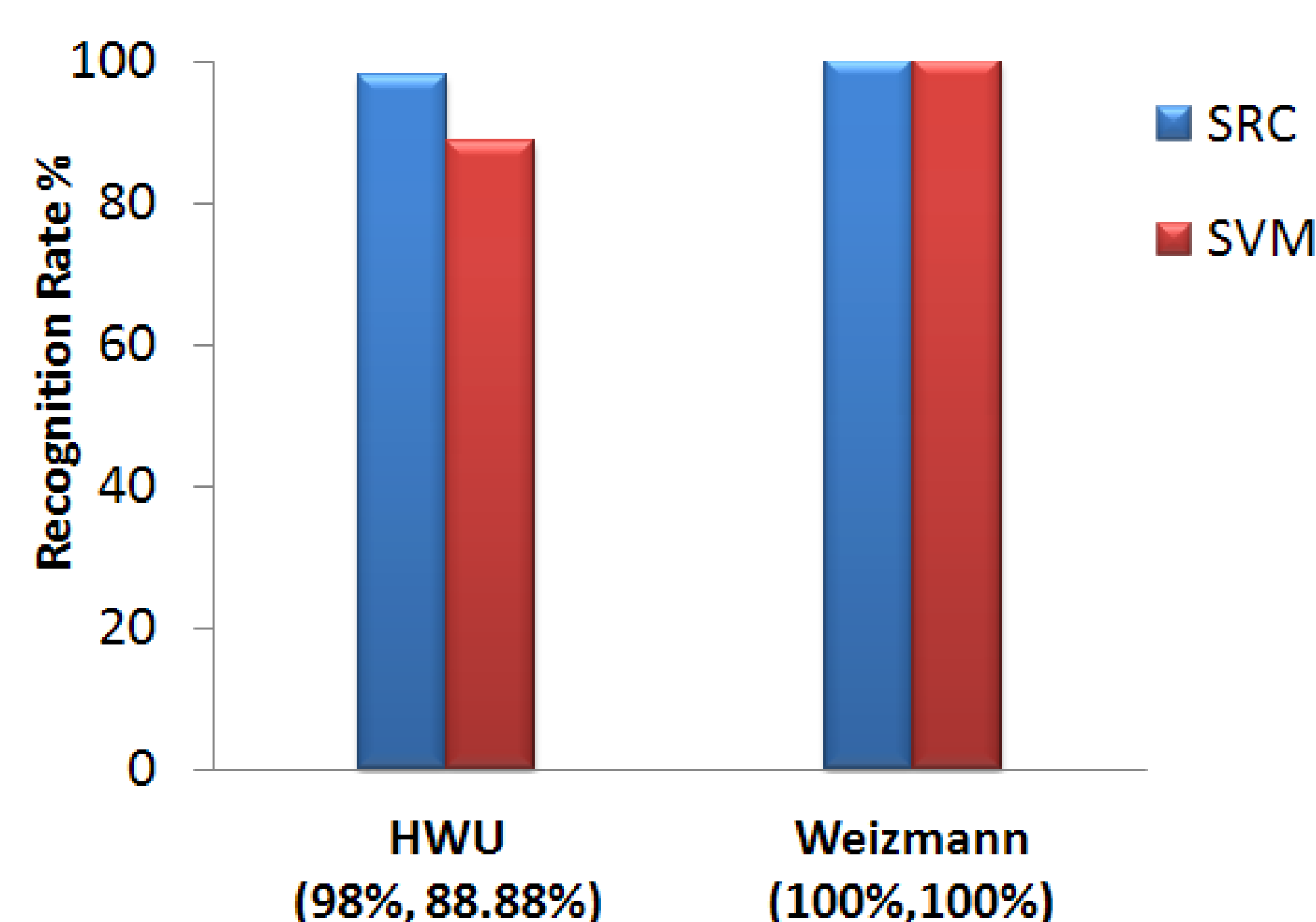
Our Approach



Experiments

- Features used
 - Random projected Gait Energy Images [1]
 - Random projected Motion descriptors [2]
- Model
 - Sparse model
- Datasets
 - Weizmann dataset of Actions
 - HWU dataset of Gestures

Results



Future Work

- Low rank approximation of the data
- Working with incomplete data
- Matrix completion algorithms

References

- *[1] J. Han and B. Bhanu, "Individual recognition using gait energy image," PAMI, IEEE Transactions, 2006.
- * [2] A.A. Efros, A.C. Berg, G. Mori, and J. Malik, "Recognizing action at a distance," in Proceedings of Ninth IEEE International Conference on Computer Vision, IEEE, 2003
- * [3] C. Liu et al. Human action recognition using sparse representation. In Intelligent Computing and Intelligent Systems, 2009. ICIS 2009. IEEE International Conference on, volume 4, pages 184-188. IEEE, 2009
- * [4] T. Guha and R.K. Ward, "Learning sparse representations for human action recognition," Pattern Analysis and Machine Intelligence, IEEE Transactions on, vol. 34, no. 8, pp. 1576-1588, 2012

1. School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh
 2. Institute of Applied Mathematics, University of Bern, Switzerland

