The discipline of pattern recognition is traditionally divided into the statistical and the structural approach. Statistical pattern recognition is characterized by representing objects by means of feature vectors, while the structural approach uses symbolic data structures, such as strings, trees, and graphs. This talk will focus on graphs for object representation. When comparing graphs with feature vectors, one notices an increased flexibility and representational power provided by graphs. On the other hand, the domain of graphs lacks mathematical operations needed to build pattern recognition and machine learning algorithms. Consequently, there is a shortage of suitable tools for graph classification, clustering, and related tasks.

In the first part of the talk we briefly review advances in the field of graph-based pattern recognition that aim at making algorithmic tools originally developed in statistical pattern recognition available for graphs. We will focus on graph embedding and graph kernels. The second part of the talk will give some concrete application examples, demonstrating the usefulness of graph embedding and graph kernels in the fields of handwriting recognition, human action recognition, brain state decoding, and network monitoring.

Horst Bunke received his Master, PhD, and Habilitation (Venia docendi) degrees from the University of Erlangen, Germany. In 1984, he joined the University of Bern, Switzerland, where he currently is a Professor Emeritus. Horst Bunke served as 1st Vice-President and Acting President of the International Association for Pattern Recognition (IAPR). He also is a former Editor-in-Charge of the International Journal of Pattern Recognition and Artificial Intelligence, a former Editor-in-Chief of the Electronic Letters on Computer Vision and Image Analysis, and a former member of the editorial board of various journals.

Horst Bunke is the recipient of the 2010 KS Fu Prize, awarded by the IAPR. Moreover, he received the IAPR/ICDAR Outstanding Achievements Award in 2009 and an honorary doctor degree from the University of Szeged, Hungary, in 2007. He held visiting position at many institutions all over the world. His list of publications includes about 700 entries, with over 40 authored, co-authored, edited or co-edited books and special editions of journals.

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