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Unsupervised classification of children's bodies using currents. (English) Zbl 1414.62431
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Summary: Object classification according to their shape and size is of key importance in many scientific fields. This work focuses on the case where the size and shape of an object is characterized by a *current*. A *current* is a mathematical object which has been proved relevant to the modeling of geometrical data, like submanifolds, through integration of vector fields along them. As a consequence of the choice of a vector-valued reproducing kernel Hilbert space (RKHS) as a test space for integrating manifolds, it is possible to consider that shapes are embedded in this Hilbert Space. A vector-valued RKHS is a Hilbert space of vector fields; therefore, it is possible to compute a mean of shapes, or to calculate a distance between two manifolds. This embedding enables us to consider size-and-shape clustering algorithms. These algorithms are applied to a 3D database obtained from an anthropometric survey of the Spanish child population with a potential application to online sales of children's wear.

MSC:

62P10 Applications of statistics to biology and medical sciences; meta analysis
62H30 Classification and discrimination; cluster analysis (statistical aspects)
68T10 Pattern recognition, speech recognition

Cited in **3** Documents

Keywords:

currents; statistical shape analysis; reproducing kernel Hilbert space; children's body shapes; *k*-means

Software:

Matlab; clusfind

Full Text: [DOI](#) [arXiv](#)

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