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In automated shape recognition, and in other settings, one is faced with the task of recognizing a geometric shape from a set of points randomly sampled from that shape, possibly in the presence of some noise. In this talk on preliminary work, building on work of Edelsbrunner, Letscher, Zomorodian, Carlsson and many others, we indicate how one can try to apply ideas from classical differential geometry, such as tangent bundles and curvature, to the analysis of such point cloud data. (Received February 22, 2005)