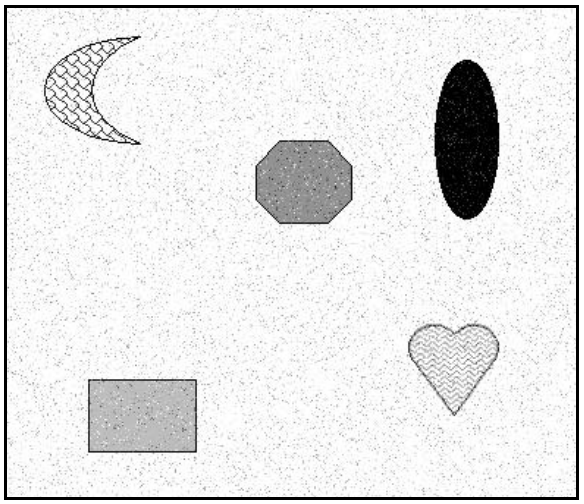


Figure 1.9: *If noise is present in the image, proper noise filtering procedures should be applied before and/or during shape analysis.*

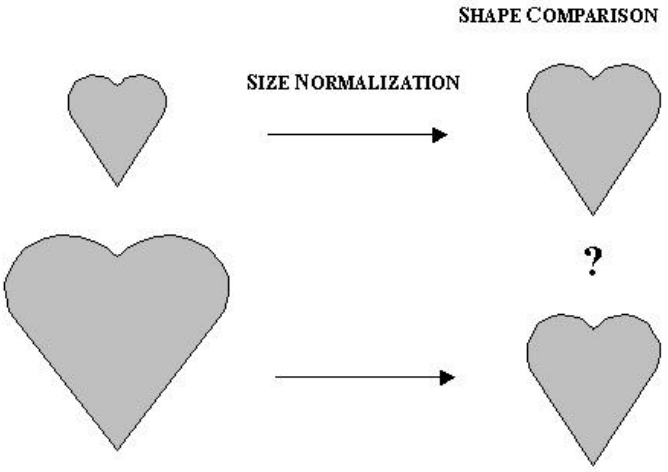
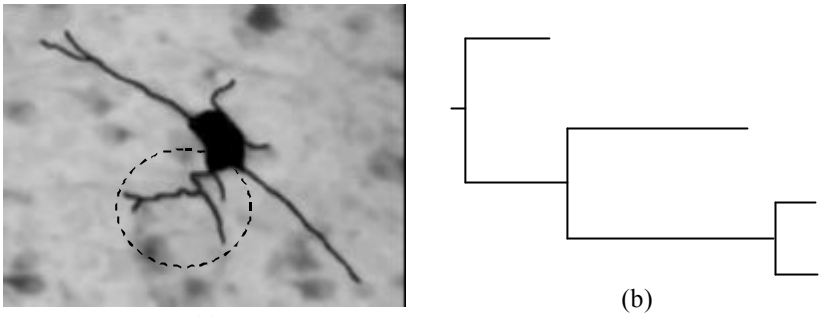


Figure 1.10: *Shape operations can be involved while normalizing some visual properties, e.g., before comparing shapes. It is important to note that, in some applications, the differences in size are actually an important shape parameter, which would make size normalization senseless in such situations. Similar comments apply to other visual properties, such as orientation and translation normalization.*



(a) (b)

Figure 1.17: *A neural cell is presented in (a) while a dendrogram of one of its dendrites (that with terminations and branch points indicated) is shown in (b).*

1.3.2.4 Shape Visualization

Scientific visualization techniques are mainly concerned with the suitable presentation of large amounts of data to humans. As such, this area is particularly important both for supporting the development of shape analysis tools and as an aid for shape inspection by human operators. In the former situation, shape visualization can be used to effectively present the obtained results (e.g., features to be tested, intermediate results, filtered images), which can involve the superposition of such results over the original shapes or relating the several obtained data, in order to provide insights about the assets and shortcomings of the considered techniques. On the other hand, shape visualization is also important to aid human experts to solve specific problems, e.g., to help a physician decide how a broken bone should be treated.

1.3.2.5 Shape Compression

Digital image applications generally involve processing a large amount of data, which can become prohibitive depending on the application, especially when real-time processing is required. Data compression is an issue often present in imaging applications, including shape analysis problems. For instance, applications that depend on large image databases (e.g., fingerprint recognition) usually require storing and computing very large sets of images. Some shape analysis approaches naturally offer good data compression solutions, e.g., contour-based approaches, which represent 2D shapes by 1D structures (Figure 1.18). Very high compression rates can be obtained by further compressing such contours. In fact, there are some approaches for image and video coding (for data compression) which make extensive use of contour shape representations (e.g., [Buhan et al., 1997]).