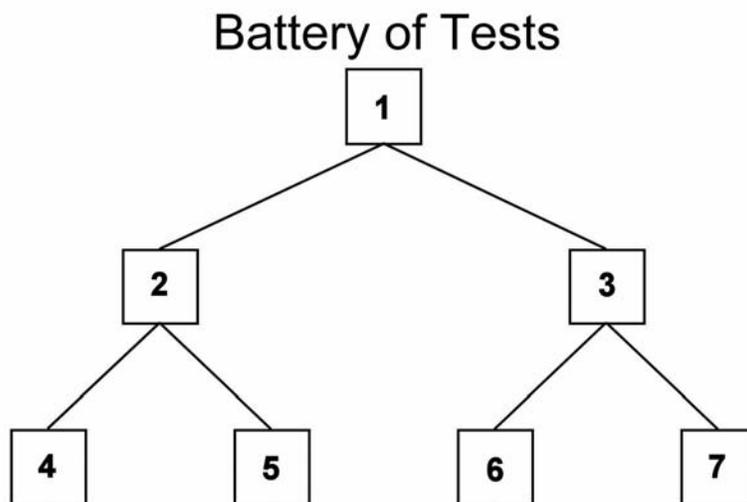


“Panel of Markers” versus a “Battery of Tests”

Brian T. Luke (lukeb@ncifcrf.gov)

In Ransohoff’s discussion of the term “validation set”, he emphasized that it was very important to construct a consistent meaning of terms used in the construction and application of classifiers [Ran-04]. Similar discussions should occur for a term such as “panel of markers” [Bro-05, Con-04, Orn-04, Pet-05, Sri-06, Sto-05]. This term relates to using a multitude of markers in a single [fingerprint-based classifier](#) to determine whether or not an individual has a specific disease, and this usage is incorrect. Given that a 10-feature [MCA classifier](#) generates on the order of 10^{10} cells, it would be possible to create such a classifier that distinguishes a single individual from everyone else on the planet, but it would give no indication of whether or not this individual has a particular disease. Therefore, the concept of a “panel of markers” should be replaced with the accepted notion of a “battery of tests”. Such a battery can be represented by one or more decision trees like the one shown below. If Test 1 fails then Test 2 is applied; otherwise Test 3 is applied. Each of these tests represents either a biomarker-based classifier or the presence of absence of one or more genetic or environmental markers. An example of this is an elevated blood concentration of complement C3a anaphylatoxin which is associated with colorectal cancer or polyps [Hab-06, War-06], prostate cancer or benign prostate hyperplasia [Ada-02, Luk-07], Type 2 diabetes [Sun-06], or possibly some other disease. If an elevated level is observed then one or more independent tests would have to be performed to determine which disease an individual has; otherwise they have none of these diseases. The fact that two individuals have sufficiently similar proteomic fingerprints should never be used to conclude that they have the same disease. Though it is possible that a single disease category may be composed of multiple sub-groups, the identification of a particular sub-group, or disease State, should not depend upon a profile of an individual in that State. Instead it should depend upon the unique biochemical process underlying this particular State; associating all individuals with this biochemical process to this particular State.



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