assigned to the thumb attractor point and a thumb factor is above a predetermined thumb threshold; and

shifting the innermost finger contact to a fingertip attractor point if the innermost finger contact is currently assigned to the thumb attractor point and the thumb factor is below the predetermined thumb threshold.

61. The method of claim 60, wherein the thumb factor is high if the orientation and size of the innermost finger contact are greater than those of other finger contacts.

62. The method of claim 60, wherein the thumb factor is high if the separation, angle, and velocity of the innermost finger contact relative to other finger contacts are in ranges unique to opposable thumb presence or motion.

63. The method of claim 60, wherein the verification step is performed when one of a fingertip or thumb attractor point is left unfilled by the attractor points minimization step.

64. A method for ordering surface contacts and establishing finger, thumb, and palm identities, the method comprising the steps of:

finding a shortest path connecting all of the contacts assumed to be from a given hand;

passing through each contact once to form an ordered loop;

finding an innermost contact in the ordered loop;

determining whether the innermost contact is a thumb, fingertip, or palm contact from contact and inter-contact features of the innermost contact; and

assigning thumb, fingertip, or palm identities to non-innermost contacts based upon the features of the contacts, assignment of the innermost contacts, vertical position relative to assigned contacts, and the loop ordering.

65. An apparatus for distinguishing palm heel contacts from other types of hand contacts in a system for recognizing hand activity on a multi-touch surface and generating input signals to a competing device therefrom, the apparatus comprising:

means for finding the nearest neighbor contact of a given contact in a plane of the surface; and

means for suppressing identification of the given contact as a palm heel contact if a neighbor contact exists and is closer to the given contact than the anatomical separation between inner and outer portions of a palm heel.

66. The apparatus of claim 65, wherein the finding means ignores contacts identified as forepalm hand contacts.

67. An apparatus for distinguishing palm heel contacts from other types of hand contacts in a system for recognizing hand activity on a multi-touch surface and generating input signals to a competing device therefrom, the apparatus comprising:

means for measuring the total proximity, orientation, and eccentricity of all contacts;

means for encouraging identification of a given contact as a palm heel contact if its ratio of total proximity to eccentricity is larger than for a typical fingertip contact; and

means for encouraging identification of a given contact as a palm heel contact as its orientation approaches the expected slant of a palm heel.

68. An apparatus for distinguishing thumb contacts from other types of hand contacts in a system for recognizing hand activity on a multi-touch surface and generating input signals to a competing device therefrom, the apparatus comprising:

means for measuring the size and orientation of all contacts;

means for encouraging identification of a given contact as a thumb contact if its size is larger than a typical fingertip contact;

means for discouraging identification of a given contact as a thumb contact if its size is larger than a typical thumb contact; and

means for encouraging identification of a given contact as a thumb contact as its orientation approaches the expected slant of the thumb.

69. A method for determining which hand causes each surface contact detected on a multi-touch surface so that input signals generated by hand activity on the surface can depend on the identity of the hand performing the activity and so that multiple hands can perform independent activities on the surface simultaneously, the method comprising the steps of:

defining a template of hand part attractor points on the surface, the attractor points for each hand approximately forming a ring;

generating partitions which divide the set of all surface contacts into left hand clusters and right hand clusters;

assigning finger and palm identities to the contacts within each cluster;

computing for each partition an assignment fitness measure which represents the biomechanical consistency of the fit of contact clusters to their assigned attractor rings;

choosing the partition which has the best assignment fitness measure as the partition containing the true contact identities; and

recognizing each hand's configuration from the combination of and features of surface contacts assigned within each attractor ring of the best partition.

70. The method of claim 69, wherein the hand assignments are re-computed only for proximity images in which new hand contacts are stabilizing.

71. The method of claim 69, wherein a reactivated path for a temporarily-removed contact regains its previous identity.

72. The method of claim 69, wherein each attractor point is placed at an expected position of a corresponding hand part.

73. The method of claim 69, wherein the partition generating step comprises the following sub-steps:

constructing approximately vertical contours between each horizontally adjacent contact; and

constructing a partition from each contour by tentatively assigning contacts which are positioned to the left of a