CLAIMS

1. A data-input device
for using to enter data-inputs into an electronic or computing client device (CD), wherein the data-input device is configured to be worn by a user on a hand;

wherein the data-inputs result from reading and interpreting user-inputted gestures;

wherein the user-inputted gestures consist of positions and movements between digits (D1, D2, D3, D4, D5), other portions of the hand and components of the data-input device worn on the hand, <u>wherein the positions and movements are</u> relative to each other;

wherein reading and interpreting the user-inputted gestures is achieved via an electromagnetic sensing;

wherein the electromagnetic sensing is performed by sensing units configured to be placed at/by specific spots or regions of the hand, the sensing units configured to be placed at/by fingertips are called fingertip sensing units (FU1, FU2, FU3, etc.) and the sensing units configured to be placed not at/by fingertips are called not fingertip sensing units;

wherein the data-input device comprises:

- at least one energy unit to provide energy used by the data-input device,
- at least one fingertip sensing unit (FU1) worn on a thumb (D1) of the hand,
- at least one not-fingertip sensing unit worn on an interdigit (I1, I2, I3, I4) or on a digit that is not the thumb (D2, D3, D4, D5),
- at least one processing unit to process information from an electromagnetic coupling sensed by the sensing units and to generate the data-inputs to be sent to the electronic or computing client device (CD),
- at least one energy connection unit (EC) to transmit wirelessly or via cable power from the at least one energy unit to other components of the data-input device,
- at least one signals/data connection unit (SC, SC2, SC3, SC4) to connect wirelessly or via cable the sensing units with the at least one processing unit,

- at least one data-inputs connection unit (IC) to connect wirelessly or via cable the at least one processing unit with the electronic or computing client device (CD);

wherein the at least one fingertip sensing unit (FU1) further comprises:
- at least one outwards-oriented conductive terminal configured not to be in direct contact with a human body tissue;
- insulating and/or electromagnetic shielding means (IN);
- fixation means to fix and support the at least one fingertip sensing unit and to assure removable attachment of whole or part of the at least one fingertip sensing unit;

wherein when the data-input device comprises two or more fingertip sensing units (FU1, FU2, FU3, etc.), electromagnetic signals by the two or more fingertip sensing units are generated at different frequencies and/or with different ~~wavelengths, wave amplitudes or other~~ characteristics in order to enable unique identification of each individual fingertip sensing unit of the two or more fingertip sensing units when participating in the user-inputted gestures and to facilitate a simultaneous multi-channeled electromagnetic coupling between the two or more fingertip sensing units and other sensing units; and

wherein at least one not-fingertip sensing unit is a body-contact sensing unit (BU, BU1, BU2) and the body-contact sensing unit comprises a conductive terminal in touch with the human body tissue of the hand and is configured to sense the electromagnetic coupling, wherein the human body tissue acts as dielectric.

2. The data-input device according to claim 1,
wherein the data-input device further comprises one or more of the not-fingertip sensing units, wherein the one or more of the not-fingertip sensing units are worn on interdigits (I1, I2, I3, I4) of the hand or on digits that are not the thumb (D2, D3, D4, D5);

wherein the one or more of the not-fingertip sensing units are:
- body-contact sensing units (BU, BU1, BU2, etc.), and/or
- conductor-contact sensing units (CU, CU1, CU2, etc.) with outwards-oriented conductive terminals not in touch with the human body tissue and configured

to sense the electromagnetic coupling, wherein nil or variable amount of air acts as dielectric;

wherein when the one or more of the not-fingertip sensing units are worn on a same digit, the one or more of the not-fingertip sensing units are integrated into a first set of elements with a common support, wherein the first set of elements is called a digit set (DS, DS2, DS3, DS4, DS5); and/or

wherein when the one or more of the not-fingertip sensing units are worn on a same interdigit, the one or more of the not-fingertip sensing units are integrated into a second set of elements with a common support, wherein the second set of elements is called an interdigit set (IS2, IS4).

3. The data-input device according to claim 2,
wherein the outwards-oriented conductive terminals of the conductor-contact sensing units are configured to be placed by a volar and/or radial side of proximal segments of the digits.

4. The data-input device according to any of claims 1, 2 and 3, wherein each body-contact sensing unit (BU, BU1, BU2, etc.) comprises:

- at least one ~~first~~ conductive terminal configured to be in touch with the human body tissue,
- ~~first~~ insulating and/or electromagnetic shielding means,
- ~~first~~ fixation means to fix and support the each body-contact sensing unit and to assure removable-attachment of whole or part of the each body-contact sensing unit; and

wherein each conductor-contact sensing unit (CU, CU1, CU2, etc.) comprises:

- at least one ~~second~~ conductive terminal configured not to be in touch with the human body tissue,
- ~~second~~ insulating and/or electromagnetic shielding means,
- ~~second~~ fixation means to fix and support the each conductor-contact sensing unit and to assure removable-attachment of whole or part of the each conductor-contact sensing unit.

5. The data-input device according to any of claims 1, 2, 3 and 4, wherein when one or more of the fingertip sensing units (FU1, FU2, FU3, etc.) are worn on a same digit, the one or more of the fingertip sensing units are integrated into a set of elements with a common support, wherein the set of elements is called a fingertip set (FS1); and/or

wherein a common support of the fingertip set (FSS) presents any of the following configurations:

- a hood-like element configured to be worn on the digit of the hand fully or partially covering or wrapping a fingertip of the digit and/or other parts of a skin surface of the digit;
- a ring-like element (RE), wherein the ring-like element is fully or partially circled and configured to be worn on the digit of the hand partially covering or occluding the skin surface of the digit, comprising an attached hood-like element, wherein the attached hood-like element is attached to the ring-like element and is configured to be worn on or over the digit fully or partially covering or wrapping the fingertip of the digit;
- an attachment mechanism configured to allow engagement/disengagement with/from a small auxiliary component (AUX), wherein the small auxiliary component is fixedly attached to a fingernail of the hand of the user;
- an artificial nail complementing, extending or replacing the fingernail of the user and integrating the at least one fingertip sensing unit (FU1);
- a partial implant of the at least one fingertip sensing unit (FU1), wherein the at least one fingertip sensing unit is located inside the human body tissue of the fingertip of the user leaving the at least one outwards-oriented conductive terminal of the at least one fingertip sensing unit facing to an outside and sticking out of ~~a~~ skin of the fingertip; and any of the following combinations:
- the ring-like element (RE) combined with the hood-like element;
- the ring-like element (RE) combined with the attachment mechanism or the like;
- the ring-like element (RE) combined with the artificial nail;
- the ring-like element (RE) combined with the partial implant.

6. The data-input device according to claim 2, wherein the common support of the digit set (DS, DS2, DS3, DS4) presents a shape of a fully or partially circled ring-like element configured to be worn on proximal segments of the digits.

7. The data-input device according to claim 6,
wherein the common support of the digit set (DS, DS2, DS3, DS4) presents adjustment components or adaptations (LRA, TRA) to allow rotational and/or translational adjusting of supported not-fingertip sensing units into specific wearing/operating positions of the supported not-fingertip sensing units.

8. The data-input device according to claim 2,
wherein the common support of the interdigit set (IS2, IS4) presents a shape comprising a combination of a hook-like shape, wherein the hook-like shape is configured to be worn on the interdigit (I1, I2, I3, I4), and two partially circled ring-like shapes, wherein the two partially circled ring-like shapes are configured to be worn on proximal segments of digits adjacent to the interdigit.

9. The data-input device according to claim 8,
wherein the common support of the interdigit set (IS2, IS4) comprises a movable joint (MJ2, MJ4) to allow an articulated connection between two parts of the common support of the interdigit set, wherein the movable joint is configured to induce a separation and/or avoid an approximation of the two parts of the common support of the interdigit set from each other whilst keeping the two parts of the common support of the interdigit set connected via the movable joint.

10. The data-input device according to any of claims 2, 6, 7, 8 and 9,
wherein the digit or the interdigit set comprises a not-fingertip-set contact detector (NND) detecting touching contacts (N-N) with an intervention of the digit set or the interdigit set and without an intervention of the fingertip sensing units.

11. The data-input device according to any of claims 2, 6, 7, 8, 9 and 10,
wherein adjacent digit sets or adjacent interdigit sets are joined to each other by flexible bridging elements (B2, B3, B4).

12. The data-input device according to any of the prior claims,
further comprising a bracelet-type component worn on a wrist of the hand, wherein the bracelet-type component is configured to facilitate a temporary hosting of all or part of the components of the data-input device.

13. The data-input device according to any of the prior claims, wherein the body-contact sensing units are at least two in number and worn on different digits, and wherein the at least one processing unit is configured to enable using delimited surfaces of a skin of the hand as touchpads, wherein, on the touchpads, dynamic gestures, consisting of positioning and/or sliding a fingertip set (FS1) acting as a pointer, are converted into dynamic variations of the data-inputs for the electronic or computing client device (CD).

14. The data-input device according to any of the prior claims, wherein the data-input device further comprises:

- one or more of the fingertip-sensing units worn on digits that are not the thumb (D2, D3, D4, D5), and/or
- one or more of the not-fingertip sensing units worn on the thumb (D1).

15. The data-input device according to any of the prior claims, wherein when one or more of the body-contact sensing units (BU1, BU2, BU3, etc.) are worn on a same digit of the hand, the one or more of the body-contact sensing units are supported and attached to the digit by a non-removable support configured as a full implant of the one or more of the body-contact sensing units inside the human body tissue of the digit of the user leaving the one or more of the body-contact sensing units completely under a skin and in contact with the human body tissue.