

CLAIMS

What is claimed is:

1. A method of analyzing human behavior within an organization, the method comprising:

providing a plurality of wearable electronic badges to be worn by a plurality of persons, each wearable electronic badge in the plurality of wearable electronic badges comprising: (a) a unique identification code, (b) a processor, a memory unit, a battery, and (c) a plurality of sensors to capture sensor data, the plurality of sensors ~~effectively~~ including: an infrared sensor, a wireless communication module, a camera, an accelerometer, a compass, and a plurality of microphones, ~~an electronic data transfer module, and an inductive battery charger;~~

transmitting from the wearable electronic badges being worn the sensor data to a server via a base station or directly via the wireless communication module;

aggregating a plurality of sensor data in the server and processing the plurality of sensor data to create a set of human behavior data;

analyzing the set of human behavior data to calculate a plurality of metrics, said analyzing being implemented by one or more processors; and

creating and displaying on a computer screen a visualization of the plurality of metrics according to at least one user specification;

wherein the compass measures an orientation, said measured orientation being used in combination with the captured data from the plurality of sensors to determine when two or more persons are having a conversation.

2. The method of Claim 1, wherein for a given badge, the sensor data includes data about the person wearing the given badge, including at least one of: proximity to another person, ~~direct face-to-face interaction, location, individual speech patterns, conversational turn-taking patterns, orientation, body movement patterns, and posture patterns.~~
3. The method of Claim 2, wherein the sensor data further includes information regarding interactions with ~~the~~ another person.

4. The method of Claim 3, wherein the another person is not wearing one of the plurality of wearable electronic badges and the camera of the given badge is used to detect the another person's face, said detection of the another person's face being used in combination with the captured data from the plurality of sensors to determine when two or more persons are having a conversation.
5. The method of Claim ~~3~~ 2, ~~wherein the proximity of~~ further including determining an interaction between the person ~~to~~ and the another person is measured by utilizing a combination of at least two of the following: the infrared sensor, the wireless communication module, the compass, and the camera.
6. The method of Claim ~~12~~, wherein for a given badge, the sensor data includes data about the person wearing the given badge, including ~~wherein the conversational turn-taking patterns of the person, said conversational turn-taking patterns being~~ are measured by a combination of at least two of the following: the infrared sensor, the wireless communication module, the compass, the camera, and the plurality of microphones.
7. The method of Claim 1, wherein the plurality of wearable electronic badges are implemented into an existing personnel identification network, and
for a given badge, the unique identification is a number assigned by the existing personnel identification network and communicated to the given badge through the electromagnetic data transfer module, or manually assigned.
8. The method of Claim 1, wherein the plurality of metrics are at least one of: a plurality of social network metrics, a plurality of conversational turn-taking metrics, or a plurality of social signaling metrics.

9. The method of Claim 18, wherein the plurality of metrics include a plurality of social network metrics, said plurality of social network metrics including~~include~~ at least one of: betweenness centrality, degree centrality, cohesion, integration, and exploration.
10. The method of Claim 18, wherein the plurality of metrics include a plurality of conversational turn-taking metrics, said plurality of conversational turn-taking metrics including~~further include~~ at least one of: number of turns taken, number of pauses, number of successful interruptions, number of unsuccessful interruptions, average turn length, average pause length, turn-taking matrix, speaking time, silence time, listening time, overlapping speech time, dominance, interactivity, participation percentage, participation balance, and turn-taking balance.
11. The method of Claim 18, wherein the plurality of metrics include a plurality of social signaling metrics, said plurality of social signaling metrics including~~include~~ at least one of: activity, consistency, mirroring, and influence; and
the plurality of social signaling metrics are calculated by any of: body movement patterns, individual speech patterns, and conversational turn-taking patterns.
12. The method of Claim 1, wherein the visualization of the plurality of metrics illustrate the relationship between any one of the plurality of metrics and a set of performance metrics, the set of performance metrics selected from: productivity, job satisfaction, employee engagement, and drive.
13. The method of Claim 12, wherein the visualization further illustrates correspondence between a change in the performance metrics and a change in the sensed human behavior.
14. The method of Claim 1, wherein the visualization of the plurality of metrics further includes a visualization of the plurality of metrics according to location.
15. The method of Claim 1, wherein the plurality of sensors of each wearable electronic badge further include an electromagnetic data transfer module~~includes the~~
electromagnetic data transfer module being at least one of: a near field communication (NFC) module and a radio frequency identification (RFID) module.

16. A system for analyzing human behavior within an organization, the system comprising:
- a plurality of wearable electronic badges, each badge in the plurality of wearable electronic badges comprising: (a) a unique identification code, (b) a processor, memory unit, and a battery, and (c) a plurality of sensors to capture a sensor data, the plurality of sensors ~~effectively~~ including: an infrared sensor, a wireless communication module, a camera, an accelerometer, a compass, and a plurality of microphones, ~~an electromagnetic data transfer module, and an inductive battery charger;~~
 - one or more base stations configured to receive the sensor data from the badges;
 - a server configured to: (i) receive the sensor data from the one or more base stations or wearable electronic badges, (ii) process said plurality of sensor data to create a set of human behavior data, and (iii) analyze the set of human behavior data to calculate a plurality of metrics; and
 - a user terminal having a processor and a display monitor, the user terminal providing a visualization of the plurality of metrics by rendering the visualization on the display monitor according to at least one user specification;
 - wherein the compass measures an orientation, said measured orientation being used in combination with the captured data from the plurality of sensors to determine when two or more persons are having a conversation.
17. The system of Claim 16, wherein for a given badge, the sensor data includes data about the person wearing the given badge, including at least one of: proximity to another person, ~~direct face-to-face interaction, location, individual speech patterns, conversational turn-taking patterns, orientation, body movement patterns, and posture patterns.~~
18. The system of Claim 17, wherein the sensor data further includes information regarding interactions ~~with the~~ another person.
19. The system of Claim 18, wherein the another person is not wearing one of the plurality of wearable electronic badges and the camera of the given badge is used to detect the another person's face, said detection of the another person's face being used in

combination with the captured data from the plurality of sensors to determine when two or more persons are having a conversation.

20. The system of Claim 1817, wherein the server is further configured to determine an interaction between the proximity of the person to and the another person is measured by utilizing a combination of at least two of the following: the infrared sensor, the wireless communication module, the compass, and the camera.
21. The system of Claim 1617, wherein for a given badge, the sensor data includes data about the person wearing the given badge, including wherein the conversational turn-taking patterns of the person, said conversational turn-taking patterns being are measured by a combination of at least two of the following: the infrared sensor, the wireless communication module, the compass, the camera, and the plurality of microphones.
22. The system of Claim 16, wherein the plurality of wearable electronic badges are implemented into an existing personnel identification network, and
for a given badge, the unique identification is a number assigned by the existing personnel identification network and communicated to the given badge through the electromagnetic data transfer module, or manually assigned.
23. The system of Claim 16, wherein the plurality of metrics are at least one of: a plurality of social network metrics, a plurality of conversational turn-taking metrics, or a plurality of social signaling metrics.
24. The system of Claim 1623, wherein the plurality of metrics include a plurality of social network metrics, said plurality of social network metrics including include at least one of: betweenness centrality, degree centrality, cohesion, integration, and exploration.
25. The system of Claim 1623, wherein the plurality of metrics include a plurality of conversational turn-taking metrics, said plurality of conversational turn-taking metrics

~~including further include~~ at least one of: number of turns taken, number of pauses, number of successful interruptions, number of unsuccessful interruptions, average turn length, average pause length, turn-taking matrix, speaking time, silence time, listening time, overlapping speech time, dominance, interactivity, participation percentage, participation balance, and turn-taking balance.

26. The system of Claim ~~16~~²³, wherein the plurality of metrics include a plurality of social signaling metrics, said plurality of social signaling metrics including ~~include~~ at least one of: activity, consistency, mirroring, and influence; and the plurality of social signaling metrics are calculated from any of: body movement patterns, individual speech patterns, and conversational turn-taking patterns.
27. The system of Claim 16, wherein the visualization of the plurality of metrics illustrate the relationship between any one of the plurality of metrics and a set of performance metrics, the set of performance metrics selected from: productivity, job satisfaction, employee engagement, and drive.
28. The system of Claim 27, wherein the visualization further illustrates correspondence between a change in the performance metrics and a change in the sensed human behavior.
29. The system of Claim 16, wherein the visualization of the plurality of metrics further includes a visualization of the plurality of metrics according to location.
30. The system of Claim 17, wherein the plurality of sensors of each wearable electronic badge further include an electromagnetic data transfer module, ~~includes the~~ electromagnetic data transfer module being at least one of: a near field communication (NFC) module and a radio frequency identification (RFID) module.
31. A method of analyzing human behavior within an organization, the method comprising:
providing a plurality of wearable electronic badges to be worn by a plurality of persons, each wearable electronic badge in the plurality of wearable electronic badges comprising: (a) a unique identification code, (b) a processor, a memory unit, a battery,

and (c) a plurality of sensors to capture sensor data, the plurality of sensors including: an infrared sensor, a wireless communication module, a camera, an accelerometer, a compass, and a plurality of microphones, ~~an electromagnetic data transfer module, and an inductive battery charger~~;

transmitting from the wearable electronic badges being worn the sensor data to a server via a base station;

aggregating a plurality of sensor data in the server and processing the plurality of sensor data to create a set of human behavior data;

analyzing the set of human behavior data to calculate a plurality of metrics, said analyzing being implemented by one or more processors; and

creating and displaying on a computer screen a visualization of the plurality of metrics according to at least one user specification;

wherein the wireless communication module measures a radio signal strength and the compass measures an orientation, said measured radio signal strength being used in combination with said measured orientation ~~the captured sensor data from the plurality of sensors~~ to determine when two or more persons are having a conversation.

32. The method of Claim 1, wherein the plurality of metrics are calculated for respective locations of different conversations between persons wearing the wearable electronic badges, wherein the respective locations of the different conversations are determined from the sensor data, or from the wearable badges proximity to one or more base stations, each base station having a known location.

33. The system of Claim 16, wherein the plurality of metrics are calculated for respective locations of different conversations between persons wearing the wearable electronic badges, wherein the respective locations of the different conversations are determined from the sensor data, or from the wearable badges proximity to one or more base stations, each base station having a known location.