CLAIMS

WHAT IS CLAIMED IS:

1. A method for managing safety and risk in a remote workplace comprising:
   (a) collecting, via a network local to the workplace, data stream from one or more sensors and a user device;
   (b) transmitting, via the network, the data stream to an edge computing device located within the workplace, wherein the data stream is stored in a database local to the workplace;
   (c) processing, using one or more models running on the edge computing device, the data stream to predict (i) a hazardous condition associated with a work zone within the workplace and (ii) a health condition of a user associated with the user device, wherein the one or more models are trained and developed using machine learning algorithm at an entity remote from the workplace; and
   (d) automatically generating a dynamic geofencing area in the remote workplace base at least in part on the predicted hazardous condition, the work zone and the predicted health condition.

2. The method of claim 1, wherein the one or more sensors comprise at least one sensor located onboard the user device and at least one sensor deployed in the remote workplace.

3. The method of claim 2, wherein the user device is a wearable device and the data stream collected from the at least one sensor located onboard the user device includes a heart rate of the user.

4. The method of claim 3, wherein the data stream collected from the at least one sensor located onboard the user device further comprises an activity level of the user.

5. The method of claim 4, further comprising calculating a work and rest hour of the user based on the data stream.

6. The method of claim 3, wherein the data stream collected from the at least one sensor located onboard the user device includes a temperature and humidity of an environment surrounding the user.

7. The method of claim 6, further comprising determining a heat stress level of the user based on the data stream.

8. The method of claim 1, wherein the hazardous condition includes a predicted impeding hazardous event that occurs within a timespan of the prediction of the hazardous condition.

9. The method of claim 1, wherein the hazardous condition is identified based at least in part on workflow data inputted by a user via the user device.

10. The method of claim 1, wherein the health condition of the user comprises a fatigue level or a heat stress level.

11. The method of claim 1, wherein a duration of the dynamic geofencing area is determined based at least in part on the hazardous condition or an operation performed within the geofencing area.

12. The method of claim 1, wherein a permission to enter the dynamic geofencing area is determined based at least in part on the health condition of the user.

13. The method of claim 1, wherein a permission to enter the dynamic geofencing area is determined by a supervisory user and the dynamic geofencing area is automatically terminated upon detection of an operation completed within the geofencing area.

14. The method of claim 1, further comprising transmitting, via a gateway device that provides Internet connection, a report comprising the predicted hazardous condition and the predicted health condition to the entity remote from the workplace for further analysis.

15. A system for managing safety and risk in a remote workplace comprising:

a local network deployed in the remote workplace;

an edge computing device local to the remote workplace and configured to:

receive data stream from one or more sensors and a user device via the local network, wherein the data stream is stored in a database located within the remote workplace;

process, using one or more models running on the edge computing device, the data stream to predict (i) a hazardous condition associated with a work zone within the workplace and (ii) a health condition of a user associated with the user device, wherein the one or more models are trained and developed using machine learning algorithm at an entity remote from the workplace; and

automatically generate a dynamic geofencing area in the remote workplace base at least in part on the predicted hazardous condition, the work zone and the predicted health condition.

16. The system of claim 15, wherein the one or more sensors comprise at least one sensor located onboard the user device and at least one sensor deployed in the remote workplace.

17. The system of claim 16, wherein the user device is a wearable device and the data stream collected from the at least one sensor located onboard the user device includes a heart rate of the user.

18. The system of claim 17, wherein the data stream collected from the at least one sensor located onboard the user device further comprises an activity level of the user.

19. The system of claim 18, wherein the edge computing device is further configured to calculate a work and rest hour of the user based on the data stream.

20. The system of claim 16, wherein the data stream collected from the at least one sensor located onboard the user device includes a temperature and humidity of an environment surrounding the user.

21. The system of claim 20, wherein the edge computing device is further configured to determine a heat stress level of the user based on the data stream.

22. The system of claim 15, wherein the hazardous condition includes a predicted impeding hazardous event that occurs within a timespan of the prediction of the hazardous condition.

23. The system of claim 15, wherein the hazardous condition is identified based at least in part on workflow data inputted by a user via the user device.

24. The system of claim 15, wherein the health condition of the user comprises a fatigue level or a heat stress level.

25. The system of claim 15, wherein a duration of the dynamic geofencing area is determined based at least in part on the hazardous condition or an operation performed within the geofencing area.

26. The system of claim 15, wherein a permission to enter the dynamic geofencing area is determined based at least in part on the health condition of the user.

27. The system of claim 15, wherein a permission to enter the dynamic geofencing area is determined by a supervisory user and the dynamic geofencing area is automatically terminated upon detection of an operation completed within the geofencing area.

28. The system of claim 15, wherein the edge computing device is configured to further transmit, via a gateway device that provides Internet connection, a report comprising the predicted hazardous condition and the predicted health condition to the entity remote from the workplace for further analysis.