

CLAIMS

What is claimed is:

1. A computer-implemented method for managing glucose states of a user, the method comprising:
 - receiving the user's glucose levels using a continuous glucose monitoring (CGM) device;
 - determining a time in range (TIR) value of the user's glucose level, wherein the TIR value is based on an amount of time the user's glucose level is within a threshold band over a base time period;
 - determining a TIR state based on the TIR value;
 - receiving a glucose variability (GV) value based at least on the user's glucose level, wherein the GV value is one of a standard deviation or a coefficient of variance (CV), wherein a CV indicates a variability of the user's glucose level in view of a standard deviation of the glucose level over the base time period;
 - determining a GV state based on the GV value;
 - determining a starting state based on the TIR state and the GV state;
 - determining that the starting state corresponds to a non-ideal state;
 - generating an optimized pathway to reach an ideal state based on one or more user vectors and the starting state, the optimized pathway comprising one or more adjustments to the one or more user vectors; and
 - providing the optimized pathway to the user.
2. The method of claim 1, wherein the threshold band is between approximately 70 mg/dL and 180 mg/dL.
3. The method of claim 1, wherein the base time period is 24 hours.
4. The method of claim 1, wherein the CV value is determined by dividing the standard deviation of the glucose level by a mean of the glucose level over the base time period.
5. The method of claim 1, wherein the TIR state is a binary state selected from one of a good TIR state or a bad TIR state.

6. The method of claim 5, wherein the good TIR state corresponds to a TIR value of greater than a TIR cutoff.
7. The method of claim 1, wherein the GV state is a binary state selected from one of a good GV state or a bad GV state.
8. The method of claim 7, wherein the good GV state corresponds to a GV value of greater than a GV cutoff.
9. The method of claim 1, wherein the user vectors comprise one or more of medications, food consumption, exercise value, psycho-social parameters, or social-determinant parameters.
10. The method of claim 1, further comprising:
 - classifying one or more CGM events based on the user's glucose levels, wherein the classifying is based at least on a severity score associated with each of the one or more CGM events; and
 - generating the optimized pathway further based on the classifying one or more CGM events.
11. The method of claim 1, wherein the optimized pathway is further based on a user attribute, the user attribute selected from one or more of a social attribute, medical attribute, user preference, metabolic attribute, or user demographic.
12. The method of claim 1, wherein the optimized pathway comprises an increase in one or more state improving habits and/or a decrease in one or more state worsening habits.
13. A computer-implemented method for managing glucose states of a user, the method comprising:
 - receiving a plurality of optimization profiles for reaching an ideal state from a non-ideal state, the ideal state corresponding to a good time in range (TIR) state and good a glucose variability (GV) state and the non-ideal state comprising at least one of a bad TIR state or a bad GV state;
 - determining a current TIR state based on a TIR value of the user's glucose level, wherein the TIR value is based on an amount of time the user's glucose level is within a threshold band over a base

time period and the current TIR state is one of a good TIR state or a bad TIR state;

determining a current GV state being based on a GV value associated with the user's glucose level, wherein the GV value indicates a standard deviation (SD) of glucose levels or a coefficient of variance (CV), wherein the CV is variability of the user's glucose level in view of a standard deviation of the glucose level over the base time period;

receiving one or more user vectors for the user;

identifying one of the optimization profiles based on the one or more user vectors and one or more user attributes;

identifying an optimized pathway based on the identified optimization profile, the TIR state, and the GV state, the optimized pathway comprising one or more adjustments to the one or more user vectors; and

providing the optimized pathway to the user.

14. The method of claim 13, wherein each of the plurality of optimization profiles comprise a different combination of a plurality of user vectors and a plurality of user attributes.
15. The method of claim 14, wherein the plurality of optimization profiles are each associated with a plurality of optimized pathways, each of the plurality of optimized pathways being identified based on one or more of a potential TIR state or a potential GV state.
16. The method of claim 13, wherein a machine learning model receives, as input, the optimization profile, the TIR state, and the GV state to output the optimized pathway.
17. The method of claim 13, further comprising receiving one or more user attribute and identifying one of the optimization profiles further based on the one or more user attributes.
18. The method of claim 13, wherein the CV value is determined by dividing the standard deviation of the glucose level by a mean of the glucose level over the base time period.

19. A system for managing glucose levels of a user, the system comprising:

- a memory having processor-readable instructions stored therein; and
- a processor configured to access the memory and execute the processor-readable instructions, which, when executed by the processor configures the processor to perform a method, the method comprising:
 - electronically receiving the user's glucose levels using a continuous glucose monitoring (CGM) device configured to obtain glucose values using a component that penetrates a skin of the user;
 - determining a time in range (TIR) value of the user's glucose level, wherein the TIR value is based on an amount of time the user's glucose level is within a threshold band over a base time period wherein the threshold band is between approximately 70 mg/dL and 180 mg/dL and the base time period is 24 hours;
 - determining a TIR state based on the TIR value, wherein the TIR state is selected from a good TIR state or a bad TIR state;
 - receiving a glucose variability (GV) value based at least on the user's glucose level, wherein the GV value is one of a standard deviation or a coefficient of variance (CV), wherein a CV indicates a variability of the user's glucose level in view of a standard deviation of the glucose level over the base time period;
 - determining a GV state based on the GV value, wherein the GV state is one of a good GV state or a bad GV state;
 - determining a starting state based on the TIR state and the GV state;
 - determining that the starting state corresponds to a non-ideal state;
 - detecting a CGM event based on the user's glucose levels;
 - characterizing the CGM event based on one or more of a multi-parameter CGM classification or a severity and CGM event trace shape characterization, wherein the multi-parameter CGM classification comprises a glucose level at a beginning of the CGM event, a severity, and a glucose at an end of the CGM event;
 - generating an optimized pathway to reach an ideal state based on one or more account vectors and the characterizing the CGM event, the optimized

pathway comprising one or more adjustments to the one or more account vectors; and

providing the optimized pathway to the user.

20. The system of claim 19, wherein providing the optimized pathway to the user comprises providing context based instructions to the user based on the optimized pathway.