# Integrated System for Gamification of Type 2 Diabetes Management with Virtual Avatar Feedback and Health Challenge Engagement

## *BACKGROUND OF THE INVENTION*

**[1]** The prevalence and impact of Type 2 diabetes have increased globally, presenting significant health challenges and socioeconomic costs. Lifestyle factors play a critical role in the management of Type 2 diabetes, particularly diet, exercise, and weight control. However, achieving and maintaining the necessary behavioral changes for effective management often requires continuous motivation, education, and support.

**[2]** Traditional approaches to Type 2 diabetes management have included face-to-face consultations, educational resources, and self-management tools. However, these methods can sometimes be insufficient for providing the individualized support and engagement needed to sustain long-term behavioral changes. With the proliferation of technology and increasing digitization of health services, there is a recognized need for innovative solutions that can offer more personalized, engaging, and effective management of Type 2 diabetes risk factors.

**[3]** Gamification, the application of game-design elements in non-game contexts, has shown promise in enhancing motivation and engagement in various health domains. The use of virtual avatars, representing users in digital environments, can foster a sense of presence and personal connection to the health management process, potentially leading to greater adherence to management programs.

## *SUMMARY OF THE INVENTION*

**[4]** An aspect of the method involves presenting a user interface to enter health data pertinent to type 2 diabetes risk factors. The method includes collecting user data on diet, exercise, and biometrics through this interface, then computing a diabetes risk score from this data. A virtual avatar, reflecting the user's risk score, alters in appearance based on changes to this score and is shown to the user. Additionally, the method involves offering health challenges to users and rewarding points for their completion. These points influence the avatar's appearance and the user's risk score, which are both updated and displayed to the user, integrating the process of diabetic health management with gamification elements.

**[5]** The advantages of the interactive virtual avatar system for gamified management of Type 2 diabetes risk factors are multifaceted, as it seeks to intertwine technology with healthcare to facilitate better self-management outcomes. These advantages may include, but are not limited to the following:

**[6]** Increased Motivation and Engagement: By incorporating gamification techniques into diabetes management, the system can enhance user motivation and engagement, leading to more consistent use and adherence to health-related behaviors. The gamified elements, such as earning points and avatar changes, provide immediate rewards and feedback, which can encourage users to continue their efforts.

**[7]** Personalization of Care: The virtual avatar serves as a personalized representation of the user's health status, allowing for a more tailored approach to diabetes management. Personalization can make users feel more connected to their health journey and thus, more invested in maintaining or improving their outcomes.

**[8]** Enhanced Self-Awareness: Visual feedback on the user's health status, presented through changes in the virtual avatar, can raise awareness about the impact of lifestyle choices on diabetes risk factors.

This real-time feedback can educate users about the consequences of their actions, assisting them in making more informed health decisions.

**[9]** Accessibility and Convenience: The system can be accessed through various devices such as smartphones, tablets, or computers, providing users with the opportunity to engage with their health management at any time and location. This can overcome barriers associated with traditional face-to-face healthcare services, offering convenience to users.

**[10]** Improved Health Outcomes: By fostering sustained engagement and adherence to lifestyle changes, the system has the potential to lead to improved biometric measures (like glucose and cholesterol levels), weight control, and overall better management of Type 2 diabetes, thus reducing the risk of complications associated with the disease.

**[11]** Social Interaction and Support: The system may feature social elements that allow users to connect with others, share achievements, and offer support. This can create a sense of community and further motivate users through social encouragement and competition.

**[12]** Data-driven Insights: The collection and analysis of user data can provide insights into the effectiveness of different management strategies, allowing for continuous improvement of the system based on user engagement and outcomes.

**[13]** Reduced Healthcare Costs: By potentially decreasing the need for frequent healthcare consultations and reducing the risk of diabetes-related complications, the system could lead to lower health care costs for both users and healthcare systems.

**[14]** Empowerment of Users: By placing the management tools directly in the hands of users, the system empowers them to take control of their own health. The system can encourage users to be proactive rather than reactive in their management of Type 2 diabetes.

**[15]** Research and Clinical Applications: Data collected through the system can be useful for healthcare providers and researchers to track population health trends, refine risk scores, and develop more effective Type 2 diabetes management programs.

**[16]** The integration of these advantages represents an innovative step in addressing the challenges of chronic disease management, particularly for conditions like Type 2 diabetes that benefit significantly from lifestyle modifications.

## *BRIEF DESCRIPTION OF DRAWINGS*

**[17]** Fig. 1 shows flowchart outlining steps for gamification of type 2 diabetes management using a virtual avatar and health-related challenges

## *DETAILED DESCRIPTION OF THE INVENTION*

**[18]** Figure 1 is a flowchart that outlines the steps for gamifying type 2 diabetes management using a virtual avatar and health-related challenges. Starting with providing a user interface for inputting health data related to diabetes risk factors, the process receives user input about dietary habits, physical activity, and biometric measurements. It then calculates a diabetes risk score based on this input and generates a corresponding virtual avatar whose appearance changes according to the risk score. The avatar is presented to the user, and a set of health-related challenges is provided. Users are awarded points for completing these challenges, and both the diabetes risk score and the avatar's appearance are updated based on the awarded points and any new health data input. Finally, the updated virtual avatar and diabetes risk score are displayed to the user.

**[19]** An aspect of the present invention provides a method (S100) involving the provision of a user interface specifically designed for the input of health data pertinent to risk factors associated with type 2 diabetes. This interface facilitates users in recording detailed information regarding their dietary habits, physical activity levels, and biometric measurements, thereby enabling comprehensive data accumulation. This initial step serves as the foundation for further processes, wherein the collected user inputs are essential for subsequent analysis and risk score calculation.

**[20]** The method involves receiving, via the user interface, user input comprising at least one of dietary habits, physical activity levels, and biometric measurements (S102). This step entails the collection of pertinent health data from the user, encompassing their dietary patterns, exercise routines, and specific biometric metrics such as weight, blood pressure, and glucose levels. The user interface facilitates the input of this diverse set of data, ensuring that comprehensive and accurate information is gathered to evaluate the individual's risk factors for type 2 diabetes. This data serves as the foundation for subsequent

steps in calculating a diabetes risk score and customizing a virtual avatar (S100), ultimately integrating these inputs to enhance user engagement and effective management of diabetes risk.

**[21]** The method includes calculating a diabetes risk score based on the received user input (S104). This step involves utilizing the user-provided health data, which includes dietary habits, physical activity levels, and biometric measurements, to compute a risk score indicative of the user's susceptibility to type 2 diabetes. The calculation process integrates this multi-faceted data to derive a quantifiable risk metric. This risk score reflects the user's likelihood of developing diabetes, providing a critical measure for subsequent steps in the diabetes management system.

**[22]** The step of generating a virtual avatar whose appearance changes based on the calculated diabetes risk score (S106) involves creating a digital representation of the user, which visually reflects the user's health status as determined by their diabetes risk score. This score takes into account various health-related data inputs, such as dietary habits, physical activity levels, and biometric measurements received via the user interface. As the risk score changes due to variations in these health inputs or successful completion of health challenges, the avatar’s appearance dynamically updates to visually represent this new health status. This adaptive visual feedback mechanism is designed to provide users with an engaging, intuitive reflection of their progression in managing type 2 diabetes risk factors.

**[23]** An aspect of the method involves presenting a user interface (S100) to enter health data related to type 2 diabetes risk factors. The method includes receiving user input through this interface, which encompasses dietary habits, physical activity levels, and biometric measurements (S102). The collected user data is then utilized to calculate a diabetes risk score (S104). A virtual avatar, which reflects the user's calculated diabetes risk score, is generated with an appearance that dynamically changes based on this score (S106). This virtual avatar is subsequently presented to the user via the user interface (S108). The system further provides a set of health-related challenges through the user interface (S110) and awards

points to the user upon the completion of these challenges (S112). The diabetes risk score and the virtual avatar's appearance are updated based on the awarded points and any new health data input by the user (S114). Finally, the updated virtual avatar and diabetes risk score are displayed to the user (S116).

**[24]** The advantages of the interactive virtual avatar system for gamified management of type 2 diabetes risk factors include enhanced user motivation and engagement. By integrating gamification elements, such as earning points and observing changes in the virtual avatar, users receive immediate rewards and feedback which encourage sustained adherence to health-related behaviors.

**[25]** The method involves providing a set of health-related challenges through the user interface (S110). These challenges are designed to promote healthy behaviors pertinent to the management of type 2 diabetes and may include activities related to diet, exercise, and adherence to recommended medical guidelines. Completion of these challenges is incentivized by awarding points, which can influence the user's diabetes risk score and the appearance of a virtual avatar. This gamification strategy aims to enhance user engagement and motivation through interactive and rewarding tasks that facilitate continuous health monitoring and improvement.

**[26]** The method includes the step of awarding points to the user for completing health-related challenges (S112). This involves the user participating in predefined tasks or activities aimed at improving their health, which could include exercise regimens, dietary adjustments, or other health-positive behavior modifications. Upon successful completion of these challenges, the system allocates points to the user. These points serve a dual purpose: they act as immediate feedback, enhancing user motivation and engagement through a gamified reward structure, and they subsequently influence the user's diabetes risk score. This integration of reward points directly ties the user's achievements to tangible improvements in their overall health metrics, which are then reflected in the alterations of the virtual avatar's appearance and the updated risk score.

**[27]** According to step S114, the method includes updating both the diabetes risk score and the virtual avatar's appearance based on the points awarded to the user for completing health-related challenges, along with any new health data input provided by the user. This updating mechanism ensures that the user's progress and health status are continuously monitored and visually represented, thereby providing real-time feedback and motivational cues to encourage the user to maintain or improve their health-related behaviors.

**[28]** An aspect of the method involves displaying the updated virtual avatar and diabetes risk score to the user (S116). This process follows the steps wherein the user's health data is inputted (S100) and received (S102) through a user interface, a diabetes risk score is calculated (S104), and a virtual avatar is generated that reflects this score (S106). Subsequently, the user interface presents the virtual avatar (S108), offers health challenges (S110), and awards points for their completion (S112). Based on these points and any new health data, the diabetes risk score and the avatar's appearance are updated (S114). Finally, the updated virtual avatar and risk score are displayed to the user, providing them with a visual and quantitative representation of their health progress, reinforcing user engagement and motivation in managing type 2 diabetes.

**[29]** Initially, users are presented with the user interface that allows them to input health data related to their dietary habits, physical activity levels, and biometric measurements, such as blood glucose levels, weight, and blood pressure. The user interface is designed to be user-friendly and can be accessed through various devices, including smartphones, tablets, computers, or wearable technology.

**[30]** Upon inputting their health data, the system receives this user input and processes it to calculate a diabetes risk score. This score is determined by analyzing the data in relation to known risk factors for Type 2 diabetes and using algorithms or scoring systems developed based on clinical guidelines and research studies.

**[31]** Following the calculation of the diabetes risk score, the method involves generating a virtual avatar. This avatar is a visual representation of the user and is designed such that its appearance changes based on the user's calculated diabetes risk score. For instance, a higher risk score may result in the avatar appearing less healthy, while a lower risk score could make the avatar appear more vibrant and healthy.

**[32]** Additionally, the system provides a set of health-related challenges that are presented through the user interface. These challenges are designed to encourage users to engage in behaviors that can lower their risk of diabetes. Challenges may include meeting daily exercise goals, adhering to a healthy meal plan, or achieving specified biometric targets.

**[33]** Points are awarded to the user for completing these health-related challenges. The accumulation of points serves to incentivize users by giving them tangible goals to work towards, and it can also be used to unlock rewards or further engage with the application.

**[34]** Throughout this method, user engagement is maintained through the gamification elements which are intended to make the management of Type 2 diabetes more approachable and less daunting, by using positive reinforcement and visual cues that allow users to see the impact of their actions in an engaging and educational manner.

**[35]** The present one implementation provides an enhanced interactive platform that allows users to come together to form teams. These teams are designed to engage in competitions against each other, fostering a sense of community and camaraderie among the users. To facilitate this team-based competitive structure, one implementation includes a system for assembling teams and managing their participation in diverse challenges or contests.

**[36]** The platform integrates a user-friendly interface through which individuals can join existing teams or create new ones. Upon formation of a team, members can invite other users to join, building their

squad up to a desired number of participants. The robust design of the interface ensures that team management, including the addition and removal of members, is both intuitive and efficient.

**[37]** Once the teams are set up, the system proceeds to calculate team scores by aggregating the points and risk scores of individual team members. These points and risk scores may be earned or derived from the users' performance in specific activities or tasks set out by the platform. The aggregation methodology ensures that each team member's contribution is reflected in the overall team score, providing a fair representation of collective performance.

**[38]** To encourage balanced and fair competition, teams are matched against one another based on their aggregate scores. This ensures that teams with similar capabilities are pitted against each other, eliminating any undue advantage and preserving the competitive spirit of the contests.

**[39]** Moreover, one implementation may also include features to track the history of competitions, display leaderboards, and award prizes or accolades based on team performance. These elements are designed to maintain user engagement and motivate continued participation in the team-based competitions.

**[40]** In accordance with the features of one implementation, users who partake in team formation and competitions are likely to benefit from the social interactions and friendly rivalry that such a system promotes. This novel approach to team-based competition on a digital platform enhances user engagement and fosters a vibrant community of participants who can enjoy the combined aspects of social networking, skill development, and competitive rivalry within a collaborative environment.

**[41]** The present one implementation is designed to address various health-related challenges that individuals face in their daily lives. Among these challenges, one implementation provides novel solutions

for managing and improving health outcomes through a multifaceted approach, covering nutritional intake, physical activity, blood glucose monitoring, and educational support for disease management.

**[42]** An aspect of one implementation is a system and method that aids users in logging their daily food intake. This feature allows individuals to track what they eat each day, including the type, amount, and nutritional content of the food. The system can be configured to analyze the logged information to give feedback on the user's dietary patterns, suggesting improvements or adjustments as needed to meet their nutritional goals. The data collected by the food logging feature could be used to create a personalized nutrition plan that aligns with the user's health objectives, dietary restrictions, or preferences.

**[43]** Another aspect of one implementation pertains to the encouragement and tracking of physical activity, specifically by focusing on achieving a target number of steps per day. The system can include a motion-detecting sensor, such as an accelerometer, within a wearable device to track the number of steps a user takes. The invention may set daily, weekly, or personalized step goals to motivate users to increase their physical activity. Real-time feedback can be provided on the device or an associated application to inform the user of their progress towards the day's step goal.

**[44]** The regulation of blood glucose levels is a significant concern, particularly for individuals with diabetes. The present one implementation features a component for maintaining blood glucose levels within a specified range. This can be done through integration with blood glucose monitoring devices that capture blood glucose readings at regular intervals or on-demand. The system is capable of storing historical glucose data, recognizing patterns, and providing alerts or recommendations when glucose levels fall outside of the predetermined safe range. This is crucial for preventing the acute and chronic complications associated with uncontrolled blood glucose levels.

**[45]** To further support individuals with diabetes, one implementation includes a module for completing diabetes education. These education modules serve to inform and guide users about the nature of

diabetes, its management, and the implications of proper care. The modules can be interactive and tailored to the individual's stage of disease, literacy level, and learning preference. They are designed to cover a wide range of topics, including but not limited to, the importance of diet, exercise, medication adherence, blood glucose monitoring, and recognizing signs of hypo- or hyperglycemia.

**[46]** The combined features of the present one implementation create a comprehensive system that not only assists users in managing their health-related challenges but also educates and empowers them to take control of their health. The interconnectivity between the system's components allows for a seamless user experience where data from one aspect can inform recommendations and adjustments in others, thereby promoting a holistic approach to health management. The invention thus serves as an invaluable tool for individuals seeking to attain and maintain optimal health through daily food intake tracking, physical activity, glucose monitoring, and continued education on diabetes management.

**[47]** The system encompasses an algorithm or module designed to analyze a user's input data and challenge completion history to generate personalized recommendations aimed at improving the user's diabetes risk score. This process involves a detailed examination of various types of input data, which may include, but is not limited to, demographic information, health metrics, lifestyle choices, and genetic predispositions.

**[48]** The system uses a combination of the user's unique data profile and their performance or adherence to previous challenges to create an individualized plan. This approach ensures that the recommendations are not generic but rather tailored specifically to each user. For example, if the input data suggests that the user has a sedentary lifestyle, and the challenge history indicates a willingness to engage in physical activities, the system may recommend more frequent and varied forms of exercise that fit the user's preferences and capabilities.

**[49]** The engine driving personalized recommendations integrates evidence-based practices known to affect diabetes risk, such as nutrition science, physical activity guidelines, behavior change theories, and diabetes prevention research. By leveraging this knowledge, the system can prioritize recommendations that are most likely to have a beneficial impact on the user's diabetes risk score.

**[50]** Additionally, the system may optionally include a feedback mechanism wherein the user provides responses or updates on their progress with respect to the personalized recommendations. This feedback is then processed to refine further recommendation strategies, ensuring a dynamic and responsive system that evolves with the user's changing needs and circumstances.

**[51]** Furthermore, the system can incorporate a prediction model that estimates the potential impact of following the personalized recommendations on the user's diabetes risk score. The model takes into account both the short-term and long-term effects of lifestyle modifications and provides the user with an estimated projection of how their risk score might change over time, thus offering an additional motivational tool for the user to engage with the recommended interventions.

**[52]** In summary, the system represents a comprehensive approach to diabetes risk management by not only identifying individual risk factors but also providing a supportive framework for lifestyle interventions tailored to each user, with the ultimate goal of reducing the prevalence and impact of diabetes on the population.

**[53]** The claimed one implementation provides a comprehensive solution to enhance user engagement and motivation in managing type 2 diabetes through a virtual avatar whose appearance dynamically changes in response to the user's health improvements or declines associated with type 2 diabetes risk factors. In one embodiment, the virtual avatar serves as a visual proxy for the user's health status, representing a powerful tool for visual feedback and education.

**[54]** As the system processes this health data, corresponding visual changes are reflected in the virtual avatar. For instance, if a user regularly monitors their blood glucose levels and maintains them within a healthy range, the avatar might exhibit a more vibrant complexion or a more energized posture. Conversely, if the user's blood glucose levels are consistently high, the avatar could demonstrate signs of fatigue or a less vibrant complexion, subtly signaling the need for better glycemic control.

**[55]** Furthermore, changes in the avatar can include accessories or attributes that symbolize the user's compliance with medication. Perfect adherence to medication schedules may be represented by clear, bright eyes or an aura surrounding the avatar, whereas non-adherence may result in the avatar looking notably less vibrant or even appearing with visual cues like a dull aura or cloud above its head, indicating the potential risks of poor medication management.

**[56]** The disclosed technology herein pertains to an advanced system for monitoring and managing an individual's health status. In an embodiment, the system includes a novel feature that expands upon its capabilities by integrating data acquired from various wearable fitness devices or blood glucose monitors. This integration allows for the automatic updating of a user's health data and corresponding risk score within the system's framework.

**[57]** Wearable fitness devices have become increasingly prevalent in the modern health-conscious society. These devices can track a multitude of parameters, including but not limited to, step count, heart rate, sleep quality, and exercise intensity. By harnessing the data collected from these devices, the system can provide a more comprehensive view of the user's daily activity levels and overall fitness.

**[58]** Similarly, blood glucose monitors are utilized by individuals who need to keep a close watch on their blood sugar levels. These are particularly vital for diabetics who must regularly monitor and manage their glucose to prevent adverse health consequences. By incorporating data from these monitors, the

system can offer real-time insights into a user's glycemic control, which is an essential component of diabetes management.

**[59]** The seamless integration of data from both the wearable fitness devices and blood glucose monitors is accomplished through wireless communication technologies. These may include, but are not limited to, Bluetooth, Wi-Fi, Near Field Communication (NFC), or other suitable wireless data transmission methods. The collected data is then transmitted to the system, where it is processed and analyzed.

**[60]** Upon receipt of the new data from the connected devices, the system is configured to automatically update the health data associated with the user's profile. This update process may involve sophisticated algorithms and data processing techniques that ensure the accuracy and relevance of the new data. The system issues an updated risk score that reflects any changes in the user's health status based on the newly acquired data.

**[61]** The risk score is an algorithmically generated number or category that represents the probability of the user experiencing a health event, such as a disease or injury, within a certain period. The factors that may influence a user's risk score include but are not limited to, their activity levels, heart rate patterns, sleep quality, and blood glucose levels.

**[62]** To maintain user privacy and data security, the system includes robust encryption and authentication protocols to safeguard the transmission and storage of health data. Only authorized users and systems can access the sensitive health information, ensuring that user privacy is maintained in compliance with relevant health data protection regulations.

**[63]** The integration of data from wearable fitness devices and blood glucose monitors provides several benefits. It enables the system to more accurately predict health risks and offer personalized recommendations for lifestyle modifications, fitness activities, or medical interventions that may improve

the user's health outcomes. Additionally, the automatic data updating feature removes the need for manual input of health metrics, thereby increasing the convenience for users and reducing the potential for human error.

**[64]** Overall, with the incorporation of real-time data from personal health monitoring devices, the system stands as a dynamic and interactive platform that can adapt to the changing health profiles of users, thereby providing a tailored and responsive approach to personal health management.

**[65]** The present one implementation includes a reward system that incentivizes user participation and engagement. Within this system, users accumulate points through various activities related to the functionality of the system. These activities can be predefined and may include, but are not limited to, completing certain tasks, reaching health milestones, consistently using the system over a period of time, or engaging in health-promoting behaviors encouraged by the system.

**[66]** Once users have accumulated a certain number of points, these points can be redeemed for virtual or real-world health-related incentives. Virtual incentives may include digital items such as badges, avatars, or access to premium content within the system. Real-world incentives can be tangible goods or services, such as discounts on health products, free merchandise, gym memberships, health insurance discounts, or coupons for healthy foods.

**[67]** The point system is designed to be flexible and customizable. The system operator can set the parameters for how points are earned and how many points are needed to redeem specific incentives. These parameters can be adjusted based on feedback from users or analysis of their engagement with the system. Additionally, partnerships with health-related businesses and service providers may be established to offer a diverse and appealing selection of incentives.

**[68]** To ensure the integrity of the reward system, security features may be implemented to prevent fraudulent accumulation or redemption of points. This could include verification processes or limits on how quickly points can be earned.

**[69]** Integrating this reward system into the broader context of one implementation supports the primary goal of improving user health outcomes. By providing a mechanism to reward users for positive behaviors, the system can increase motivation levels, leading to higher user engagement and better adherence to health recommendations. The reward system also adds an element of gamification to one implementation, potentially making the experience more enjoyable and interactive, which could help to retain users over the long term.

**[70]** The present one implementation encompasses the provision of a user interface that is both versatile and universally accessible. Specifically, the user interface is incorporated within a mobile application as well as a web platform, ensuring that users can access the interface from a plethora of devices, including but not limited to smartphones, tablets, laptops, and desktop computers. This universality in access is a cornerstone of the present one implementation, as it allows users to engage with the user interface in a variety of contexts, environments, and situations.

**[71]** The mobile application component of the user interface ensures that users can interact with the system on-the-go, utilizing the inherent capabilities of mobile devices such as touch inputs, GPS functionality, cameras, and microphones. The design of the mobile application is such that it ensures ease of use, with a layout that is intuitive and navigation that is straightforward, facilitating users to perform desired tasks efficiently and without unnecessary complexity.

**[72]** In addition to the mobile application, the user interface is also accessible through a web platform. This platform is designed to be responsive, such that it adapts seamlessly to the screen size and resolution of various devices. This ensures that whether a user is accessing the web platform from a small handheld

device or a large screen desktop, the experience remains consistent and functional. The responsiveness of the web platform negates the need for multiple versions of the website, thus simplifying maintenance and content management.

**[73]** The user interface is developed to be device-agnostic, meaning that it is not confined to a specific operating system or manufacturer's ecosystem. Whether the user's device is powered by Android, iOS, Windows, or any other operating system, the interface retains full functionality, ensuring that the user experience is not compromised by the device in use.

**[74]** Connectivity to the interface through either the mobile application or web platform is achieved through standard internet protocols, allowing for real-time interaction and data exchange with the underlying systems and services. The system behind the user interface ensures that data presented is current and that any actions or commands issued by the user are executed promptly.

**[75]** Key functionalities provided through this interface include but are not limited to user account management, data input and retrieval, transaction processing, and live communication features. Security measures are integrated into the interface to safeguard sensitive data and user privacy, utilizing advanced encryption and authentication methods to prevent unauthorized access and ensure that user data remains confidential.

**[76]** Overall, the integration of the user interface within both a mobile application and a web platform leads to a cohesive and flexible user experience, where convenience, accessibility, and functionality are at the forefront. The design and implementation of this interface take into account the diverse needs and preferences of users in today's digital age, aiming to provide a seamless digital interaction regardless of the device used for access.

**[77]** The invention in its embodiment encompasses a comprehensive system for monitoring and enhancing user health and wellness through an interactive platform that integrates various health-related data. The system is designed to assess, track, and improve the health of individuals by analyzing their activities, habits, and physiological parameters.

**[78]** As part of the system, there is a feature that extends to the generation of periodic progress reports. These reports serve as a summarization of the user's risk score trends, the completion of various health challenges, and any health improvements that have occurred over time. The risk score is derived from a set of metrics that are indicative of the user's health status. The metrics can include, but are not limited to, biometric data such as blood pressure, glucose levels, heart rate, sleep patterns, physical activity levels, and dietary habits. This risk score is dynamically calculated by the system using algorithms that take into account the latest research in the fields of medicine, fitness, and nutrition.

**[79]** Health improvements are gauged over time by analyzing the changes in the aforementioned metrics in response to user participation in the challenges and adherence to the health guidance provided by the system. Positive trends in these data points are indicative of improved health outcomes such as weight loss, better-managed diabetes, reduced cardiovascular risk, or increased mental wellbeing.

**[80]** The system's periodic progress reports are designed to provide feedback and motivation by demonstrating tangible results of the user's efforts. The frequency and format of these reports can be customized based on user preferences or the recommendation of a healthcare provider who may also have access to the reports, with the appropriate consents.

**[81]** By compiling this data in an accessible format, one implementation encourages users to take a proactive role in managing their wellness. The reports may also use comparative analytics to show how the user's health and fitness parameters have improved relative to their historical data or to normative

data sets. This feature not only provides reinforcement but also empowers users to set more informed health goals and fosters sustained engagement with the system.

**[82]** The feature of generating periodic progress reports is thus a critical aspect of one implementation, providing users with valuable insights into their health journey, helping them visualize their progress, and making the entire experience personalized and rewarding.

**[83]** The disclosed technology encompasses a robust system that includes a feature allowing users to share their achievements and milestones with their peers through various social media and networking platforms. This function is designed to encourage a sense of community and provide motivation for users by leveraging the intrinsic value of social support and recognition.

**[84]** The system employs a user-friendly interface through which individuals can effortlessly broadcast their accomplishments to friends, family, and other members of their social networks. When a user achieves a particular milestone or goal, the system presents an option to share this achievement. This sharing option is seamlessly integrated within the platform to enhance user experience, making the act of sharing both intuitive and immediate.

**[85]** Upon selecting to share their accomplishment, the user can choose from a range of social networking services that they have connected to their account within the system, such as Facebook, Twitter, Instagram, and LinkedIn, among others. The system then generates a customized message or post that highlights the user's success. This message can include various elements such as text, images, badges, or any other suitable media that signifies the achievement. Users have the option to personalize this message, adding their own words or flair before posting it on their chosen platform(s).

**[86]** The social sharing feature also provides users with privacy controls, allowing them to manage who among their network can see their shared content. This ensures that users feel comfortable and secure

when sharing their personal achievements, while also fostering an environment where encouragement and positive reinforcement are readily available from peers.

**[87]** Furthermore, the system may include notification mechanisms that inform other users within the community about the shared achievements of their peers, prompting congratulatory messages, likes, or other forms of positive feedback. This not only bolsters the user's sense of accomplishment but also serves to inspire others within the community to strive for their own goals.

**[88]** To enhance engagement, the system can track the number of times achievements are shared and the responses received from the user's network. This data can be utilized to provide the user with insights into the impact of their shared achievements on their peers, thus adding another layer of motivation. Rewards or additional incentives may be offered by the system for sharing milestones, further encouraging users to connect with their community.

**[89]** Overall, this feature is part of a larger ecosystem aimed at fostering a supportive and active user community. By integrating social sharing capabilities, the system not only celebrates individual accomplishments but also knits users together, encouraging a collaborative environment where everyone's successes contribute to a collective sense of achievement and well-being.

## *Claims*

1. A method for gamifying type 2 diabetes management, comprising:

a) providing a user interface for inputting health data related to type 2 diabetes risk factors;

b) receiving, via the user interface, user input comprising at least one of dietary habits, physical activity levels, and biometric measurements;

c) calculating a diabetes risk score based on the received user input;

d) generating a virtual avatar whose appearance changes based on the calculated diabetes risk score;

e) presenting the virtual avatar to the user via the user interface;

f) providing a set of health-related challenges through the user interface; and

g) awarding points to the user for completing the health-related challenges;

h) updating the diabetes risk score and the virtual avatar's appearance based on the awarded points and any new health data input by the user;

i) displaying the updated virtual avatar and diabetes risk score to the user.

2. The method of claim 1, further comprising:

j) enabling users to form teams and compete against other teams based on aggregate team scores derived from individual user points and risk scores.

3. The method of claim 1, wherein the health-related challenges include at least one of, comprising:

logging daily food intake;

achieving a target number of steps per day;

maintaining blood glucose levels within a specified range;

completing diabetes education modules.

4. The method of claim 1, further comprising:

k) providing personalized recommendations for improving the user's diabetes risk score based on their input data and challenge completion history.

5. The method of claim 1, wherein the virtual avatar's appearance changes, include visual representations of health improvements or declines associated with type 2 diabetes risk factors.

6. The method of claim 1, further comprising:

l) integrating data from wearable fitness devices or blood glucose monitors to automatically update the user's health data and risk score.

7. The method of claim 1, further comprising:

m) implementing a reward system where users can redeem points for virtual or real-world health-related incentives.

8. The method of claim 1, wherein the user interface is provided through a mobile application or web platform accessible on various devices.

9. The method of claim 1, further comprising:

n) generating periodic progress reports summarizing the user's risk score trends, challenge completions, and health improvements over time.

10. The method of claim 1, further comprising:

o) facilitating social sharing of achievements and milestones to encourage peer support and motivation within the user community.

## *Abstract*

We present a gamified approach for improving the management of type 2 diabetes, that incorporates a user-friendly interface allowing users to input health data to calculate a personalized diabetes risk score. A virtual avatar linked to this score visually transforms in response to the user's health behaviors. The platform includes health challenges that, when completed, reward users with points, incentivizing lifestyle improvements critical for diabetes care. The challenges are designed to help users achieve better disease self-management through active participation. Users can enhance their experience by forming teams, engaging in competitions, receiving personalized health tips, and connecting wearable devices for seamless data integration. The system further motivates users with a points redemption program and regular progress reports. Social sharing options are integrated, building community and maintaining motivation through peer support. This innovative method is accessible on multiple digital devices, utilizing both mobile and web technologies to facilitate comprehensive support for diabetes management.

## *Drawings*

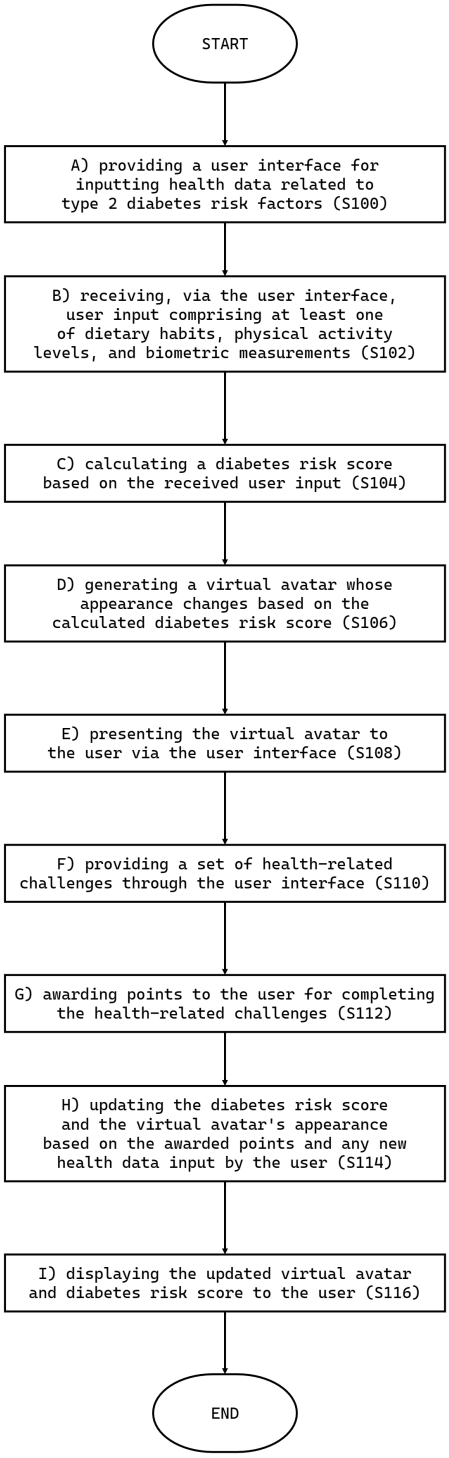


**FIGURE 1**