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Presifit- An App Which Connects Personal Health Influencers Through Social Media

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1 Abstract

This innovative application unveils a revolutionary API for the Interactive Health and Lifestyle (IHL) platform, focusing on fostering user engagement. The API empowers individuals to establish health challenges within their social circles, providing a gamified experience with incentives and badges strategically placed to drive sustained participation and goal accomplishment. The application underscores the API's versatility, facilitating dynamic challenges across various health-related activities. Implemented in React Native, the platform ensures seamless navigation, allowing users to participate effortlessly in challenges related to fitness goals, habits, and health vitals.

2 Key Words

Gamification, Rewards, React, MongoDB, Expressjs, nodejs, Accelerometer, API's

3 Introduction

We are presenting a novel application that redefines health and well-being by skilfully fusing cutting-edge technology with social dynamics. The app, which was painstakingly created with React Native, is a dynamic, cross-platform masterpiece that will rev- olutionize how users approach their fitness objectives. Intentional coding choices gamify the experience in a user-friendly way, incorporating rewards for increased interaction. Users immerse themselves in a guiding light towards a healthier life, going beyond simply following instructions.

The secret is gamification; elements like leader-boards, prizes, and badges foster an engaging and inspiring environment. The main focus is on tracking footsteps, with gamified features like personalized consultations to enhance the experience. It distinguishes itself technically by utilizing state-of-the-art technologies, particularly React Native, to guarantee a smooth and adaptable platform.The thoughtful coding decisions set it apart from conventional health apps by emphasizing not just functionality but also a snappy and eye-catching design.

More than just an app, becomes a vibrant social network that promotes holistic health and wellness, profoundly altering how people interact with and accomplish their health objectives.

4 Literature survey

The literature survey focused on systematically reviewing studies related to Presifit, aiming to gain insights into its role in promoting health and well-being. The survey aimed to identify patterns, challenges, and potential applications, providing a comprehensive overview of impact in the healthcare landscape.

1. "Gamification in Health Care Management: Systematic Review of the Literature and Research Agenda".Gamification, which is understood as the application of game elements in non-playful

environments, is a tool in continuous growth and expansion that can be very useful for these purposes.In this paper they have identified the gap between the research and development in this area where gamification plays a important role in healthcare management mainly focused certain set of individuals in between the certain age gap and working professionals. They conducted a systematic review which carried on in Three phase process.[SMZLSBM23]

2. "A Comprehensive Review of Gamification in Healthcare: Incentives in Mobile Healthcare App" - Gamification employs game features and methods to enhance engagement in non-game processes, utilizing motivational techniques with mechanics and dynam-ics to encourage users in completing challenging tasks. This work conducts a literature evaluation on gamification in healthcare, focusing on descriptive statistics of game aspects.[AKS+23]

3. "Health at hand: A systematic review of smart watch uses for health and wellness"-Smart watches offer multifaceted potential in health support, from self-monitoring and activity feedback to in-site surveys and communication with healthcare providers. Since 2014, consumer-grade smart watches have rapidly gained prominence in health research. To fully harness their capabilities, rigorous field studies are imperative, substantiating the technical reliability and efficacy of smart watches in real-world scenarios with participants living with targeted health conditions. This step is crucial for unlocking the true trans-formative impact of smart watches in the healthcare landscape.[RD16]

4. "Mobile Applications for Health and Wellness: A Systematic Review" - This paper systematically investigates 70m health apps, revealing journals as the most common category, with strategies like self-monitoring and reminders being highly employed, showcasing a positive correlation between app ranks and behavior change potential.[AOO+22]

5. "The Role of Steps and Game Elements in Gamified Fitness Tracker Apps: A Systematic Review": The article conducts a comprehensive review of 103 gamified fitness tracker apps, analyzing their game elements and mechanics, particularly those incorporating step count data. It employs network clustering and visualizations to explore relationships between game elements, providing a taxonomy of step-based rewards and mapping a currency-based taxonomy onto step-based games. The study reveals the prevalence of the triad of Social Influence, Competition, and Challenges in these apps. It identifies gaps in the design space and highlights the common use of Real-Life Incentives. The research addresses the issue of sustained use of fitness trackers and emphasizes the need for a nuanced understanding of game elements for improved motivation and health benefits.[NHFS21]

6. "A Novel Walking Detection and Step Counting Algorithm Using Unconstrained Smartphones":This paper introduces a novel algorithm for walking detection and step counting using smartphones, regardless of their arbitrary and alterable placement. Leverag-ing the gyroscopes' precision in capturing walking motion, the algorithm employs fast Fourier transform (FFT) to extract frequency domain features from three-dimensional angular velocities. Extensive experiments demonstrate a high precision of 93.76% for walking detection and an accuracy of 95.74 % for step counting, outperforming existing methods and commercial products. The proposed approach's robustness to diverse smartphone placements makes it promising for enhancing pedestrian tracking and local-ization applications, offering valuable insights into the potential of gyroscope-based techniques.[KHQ18]

5 Existing Methodology

The React Native prototype of the IHL API not only ensures functional efficiency but also prioritizes a visually appealing and user- friendly interface, allowing users to seamlessly create health challenges and invite friends through familiar platforms like WhatsApp or Facebook. The code emphasizes both functionality and visual appeal, ensuring an enjoyable user experience throughout the challenge creation process.

The algorithmic foundation of the API is designed with a focus on efficient user search functionality and dynamic data filtering based on search queries. This ensures optimal data retrieval from the friend list, promoting prompt and relevant information access. State-of-the-art state management techniques, evident in the code, further enhance the overall performance of the API.

Moreover, the code seamlessly integrates with external social platforms, leveraging their APIs for streamlined communication and invitation processes. This integration enhances the platform's connectivity and user engagement by tapping into existing social networks.

In the implementation of gamification for non-game contexts, key game mechanics are identified and

incorporated to anchor user engagement through cognitive skill development. Challenges and targets are thoughtfully designed to evoke emotional responses, while competitive elements are seamlessly integrated to provide motivation. The continuous evaluation of user performance allows for the adaptive tailoring of gamification strategies, ensuring ongoing effectiveness based on user feedback and observed behavioral changes.[SPV20]

In a saturated landscape of health applications, the IHL API stands out for its unique integration of social elements into group challenges. Unlike counterparts that primarily focus on individual health tracking, this platform merges social media connections with health-related activities, creating an exclusive space for collective well-being initiatives. The emphasis on forming challenge groups with friends, as seen in the code, aligns with contemporary trends where social connectivity amplifies the impact of health- related activities.

Additionally, the React Native prototype allows users to effortlessly select friends from their social connections, inviting them to participate in health challenges. The use of familiar platforms such as WhatsApp or Facebook enhances accessibility and user engagement, contributing to the success of the collective well-being initiatives facilitated by the IHL API. This approach not only fosters a sense of community but also leverages existing social dynamics to encourage healthier lifestyles.

Overall, the React Native prototype and underlying algorithms of the IHL API not only demonstrate technical prowess but alsoreflect a thoughtful approach to user experience and social integration, making it a standout solution in the realm of health and lifestyle applications.

6 Proposed Methodology

The IHL API not only sets itself apart through its integration of social elements but also redefines the conventional approach to health and wellness. By pioneering the amalgamation of social media connections with health-related activities, it transforms the app into a vibrant community hub rather than a mere tracking tool.[YC22] This innovative approach capitalizes on the power of social dynamics, fostering a sense of collective responsibility and motivation within challenge groups. The code's emphasis on this collaborative framework aligns seamlessly with the current shift towards holistic well-being, emphasizing that health is not just anindividual pursuit but a shared journey among friends. Furthermore, the platform's unique selling point lies in its ability to turn health goals into shared experiences, making the pursuit of well-being not only effective but also enjoyable and socially enriching. The code, by facilitating the creation and management of challenge groups, becomes a catalyst for a positive shift in the way users engage with their health objectives.

The React Native prototype serves as a tangible manifestation of the IHL API's capabilities. Beyond functional efficiency, the code prioritizes an aesthetically pleasing and user-friendly interface. Users can effortlessly select friends from their social connections, inviting them to participate in health challenges through familiar platforms like WhatsApp or Facebook. The code ensures a seamless and enjoyable user experience throughout the challenge creation process, emphasizing both functionality and visual appeal.

The peak detection algorithm employs dynamic time windows and a Start Vector to identify potential peaks based on consecutive increases in magnitude values.[DGG23] Upon detecting a potential peak, it checks if the magnitude surpasses a predefined step threshold, storing values above the threshold in a Peak Vector. The maximum value in the Peak Vector represents the real peak, and subsequent tracking with an End Vector determines the end point, facilitating dynamic step length calculation for robustness in varying walking styles. The approach mitigates errors from fake peaks and adapts to user-specific gait patterns.[AAHAAS23]

7 Implementation

In the comprehensive implementation of Presifit, various technologies and frameworks synergize to deliver a sophisticated and user-centric health and fitness application.

Frontend Development with React Native: Presifit's user interface is developed using React Native, a popular cross-platform framework. This choice allows for the creation of a single code base that runs seamlessly on both iOS and Android devices, optimizing development efficiency. The front-end design follows modern UI/UX principles, ensuring an intuitive and visually appealing experience for users. React Native's component-based structure facilitates the creation of interactive and responsive elements, enhancing the overall usability of the application.

Back-end Infrastructure with Express and Node.js: The back-end of Presifit is powered by Express, a fast and minimalist web application framework for Node.js. Node.js, known for its event-driven and non-

blocking architecture, enables the server to handle concurrent connections efficiently. The Express framework simplifies routing, middle ware integration, and request handling. Together, they form a robust back end infrastructure that manages data processing, user authentication, and communication with thedatabase.

Database Management with MongoDB and Mongoose: Presifit relies on MongoDB, a No SQL database, for efficient and scalable data storage. The Mongoose library acts as an ODM (Object-Document Mapper) for MongoDB in the Node.js environment, providing a straightforward way to model application data and interact with the database. This combination ensures flexibility in handling diverse data types and facilitates seamless integration between the application and the database.

Security Measures with CO-RS and JWT Authentication: Cross-Origin Resource Sharing (CO-RS) is integrated into the appli- cation to enhance security by defining which domains are permitted to access resources. This prevents unauthorized domains from making requests, mitigating potential security vulnerabilities. JSON Web Token (JWT) authentication is implemented to secure user interactions and ensure that only authenticated and authorized users can access specific features and data within the application. This adds an extra layer of protection to user accounts and sensitive information.

Email Verification with Node mailer: Presifit employs Node-mailer to manage email verification processes. This essential feature verifies the legitimacy of user-provided email addresses during the registration process, ensuring a valid and secure user base. Node mailer's capabilities contribute to the overall security and reliability of the application.

In summary, the implementation of Presifit showcases a well-rounded tech stack that prioritizes user experience, security, and efficient data management. The combination of front-end and back end technologies creates a powerful and scalable platform for users to engage in health challenges and holistic well-being.

8 Algorithm

```
useEffect(() = >
    let lastStepTime = new
    Date().getTime();const
    handleSensorData = (data) = >
    const  x, y, z  = data;
    const acceleration = Math.sqrt(x * x + y * y
    + z * z);if (acceleration > THRESHOLD)
    const currentTime = new Date().getTime();
    if (currentTime - lastStepTime > STEP
    DELAY)setStepCount((prevCount) = >
    prevCount + 1); lastStepTime =
    currentTime;
    ;
    const startAccelerometer = async ()
    = >  await
    Accelerometer.setUpdateInterval(100
    );
    Accelerometer.addListener(handleSensorData);
    ;
    startAccelerometer();
    return () = >
    Accelerometer.removeAllListeners();
    ;
    , []);
```

9 Algorithm Components

1.Thresholding

An essential first step in step counting algorithms that use accelerometers is thresholding. This involves setting a specific acceleration threshold that, when crossed, denotes a possible step. Choosing the right threshold is crucial because it must be sensitive enough to detect sluggish walking while remaining resilient enough to reject non-step accelerations. It may be necessary to use calibration and adaptive thresholding techniques to account for individual differences in walking patterns and environmental factors. These steps help the algorithm be more accurate and flexible in a variety of situations.

2. Peak counter

A critical component of signal processing is peak detection, particularly when examining accelerometer data for use in activity recognition and step counting applications. It entails locating local maxima in the signal that represent important occurrences, such walking steps. Accurate peak identification is achieved by a variety of ways, such as statistical approaches, mathematical derivatives, and signal processing techniques. Reliability in step counting algorithms depends on the accurate detection of peaks, which are often connected with the upward and downward movements of each step. Effective filtering is used to handle issues like signal noise, and adaptive thresholding techniques are included to make the system flexible enough to adjust to various walking scenarios. Step counting's overall precision is greatly enhanced by the interaction between peak detection and thresholding.[AAHAAS23]

3. Smoothing Techniques Smoothing techniques, which are essential to step counting algorithms, reduce noise in raw accelerom-eter data by refining it using processes such as low-pass filters. These filters improve algorithm accuracy by selectively admitting lower-frequency elements linked to deliberate actions, such steps, while blocking high-frequency noise. By stabilising the signal, this procedure separates real steps from erratic accelerations.[SVBT18] A meticulous adjustment and calibration of the parameters is essential to choosing the best filter properties. The selection of smoothing techniques is a crucial component of step counting and requires careful thought, striking a balance between noise reduction and the preservation of important signal properties. Ongoing research investigates novel approaches that guarantee accuracy in real-world situations and flexibility to various walking conditions.

10 Conclusion

our works concludes the with the sense of importance of health as in our busy schedules through a application which gamifies and rewards you with coupons and points in order to keep you connected.The API goes beyond traditional health platforms by deliber-ately introducing gamification components into its structure. This allows it to present itself as a dynamic catalyst for encouraging beneficial lifestyle choices in our globalised society. This special fusion of group challenges, social connectedness, and gamified components produces a potent synergy that inspires users to start a shared journey.In summary, the IHL API represents a paradigmshift in health and fitness applications. By merging social connections with communal health challenges, the API pioneers a novelapproach to fostering well-being. The React Native prototype not only demonstrates technical feasibility but also hints at the trans-formative potential of community-driven health initiatives. With gamification elements strategically deployed in the code, the API emerges as a catalyst for instigating healthier lifestyles in our interconnected world.

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