Analyzing the health of Students using a smartwatch -Health Buddy App

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Abstract: The motivation behind analyzing the health of the students using smartwatches can stem from several factors such as Early Detection of Health Issues, promoting a healthy lifestyle, and Enhancing Academic Performance. The project is driven by the desire to prioritize student well-being and perform physical activities to burn the required amount of calories every day, thus leading to a healthier lifestyle. Students can adjust daily goals as per their potential. In our app, we are measuring the heart rate, BP, Sleep Time, and Oxygen Saturation and analyze health-related issues.

I. INTRODUCTION

The development of health apps is mainly required by students to make sure that their health is going well or not through smartwatches and tablets.

The main aim of this project is to facilitate Students in fitness, Exercising, and improving their knowledge regarding training.

In the meantime, our app provides them with diet plans. We designed the application to facilitate users to be able to lose weight using portable devices such as smartwatches and tablets.

This app facilitates engagement through effective student-focused care, personalized experience, and knowledge sharing between providers and students. Through this the student can access and monitor their health record details at their convenience anywhere and anytime. The main motto of this app is to study the mobile application in health management

In recent years, the use of smartwatches has gained significant popularity due to their ability to provide real-time health monitoring and analysis. These wearable devices, equipped with various sensors, can track vital health parameters and provide valuable insights into an individual's well-being. In this context, a health analysing app utilizing a smartwatch has emerged as a revolutionary tool, empowering users to take control of their health and make informed decisions.

The health analysing app utilizing a smartwatch has transformed the way individuals monitor and manage their health. By providing real-time health insights, personalized recommendations, and comprehensive data analysis, this app empowers users to make proactive choices towards a healthier lifestyle. It promotes self-awareness, facilitates early detection of potential health risks, and encourages users to take an active role in maintaining their well-being. With advancements in technology and continuous innovation, this app has the potential to revolutionize the field of healthcare and contribute to improved health outcomes for individuals worldwide.

II. *Introduction to project topics*

Real-time Health Monitoring: The app continuously monitors vital health metrics such as heart rate, blood pressure, sleep patterns, and activity levels throughout the day. It uses the smartwatch's sensors to gather accurate data and presents it in an easily understandable format.

Personalized Health Insights: Based on the collected data, the app generates personalized health insights and trends. It can identify patterns, highlight areas of concern, and provide actionable recommendations to improve overall health and well-being.

Activity and Fitness Tracking: The app tracks the user's physical activities, including steps taken, distance covered, and calories burned. It sets goals, tracks progress, and provides feedback to encourage a healthy and active lifestyle.

Heart Rate Analysis: By analyzing heart rate variability (HRV), the app can assess the autonomic nervous system's functioning and stress levels. It provides users with an understanding of their stress levels and offers techniques such as guided breathing exercises to promote relaxation.

Sleep Analysis: The app analyzes sleep patterns, including duration, quality, and stages of sleep. It provides personalized recommendations to improve sleep hygiene and helps users achieve better sleep quality and overall restfulness.

Health Trends and Alerts: The app identifies long-term health trends and provides notifications for any significant changes or abnormalities detected. It alerts users to seek medical attention or take necessary actions in case of potential health risks.

Integration with Medical Professionals: The app allows users to securely share their health data with healthcare professionals, facilitating remote monitoring and timely interventions. This feature enables a collaborative approach to healthcare and enhances the accuracy of diagnoses and treatment plans.

III.

2.1 Parameters
1) Heart Rate
Heart rate is a fundamental indicator of cardiovascular health and plays a crucial role in understanding one's overall fitness and stress levels. Monitoring heart rate can provide insights into students' physical activity levels, sleep quality, and emotional well-being. By tracking heart rate patterns over time, the project can help identify irregularities, stressors, or potential health concerns that may require attention and intervention.
We can determine the disease from Heart Rate with help of following table:

Conditions	Heart rate	Disease
60 to 100	90	NORMAL
Greater than 100	120	TACHYCARDIA
Less than 60	58	BRADYCARDIA

2) Bloop Pressure
Blood pressure is a critical indicator of cardiovascular health and an essential measure of overall well-being. Monitoring blood pressure can provide insights into students' cardiovascular fitness, stress levels, and risk of developing hypertension. By tracking blood pressure patterns over time, the project can identify deviations, detect early signs of hypertension, and promote preventive measures to maintain healthy blood pressure levels.
Systolic Blood Pressure (SBP):
Systolic blood pressure is the higher number in a blood pressure reading and represents the pressure exerted on the arterial walls when the heart contracts and pumps blood into the arteries. It is measured in millimetres of mercury (mmHg). SBP reflects the force with which blood is pushed through the arteries during each heartbeat.

Diastolic Blood Pressure (DBP):
Diastolic blood pressure is the lower number in a blood pressure reading and represents the pressure on the arterial walls when the heart is at rest between beats, specifically during the relaxation of the heart's chambers. It is also measured in mmHg. DBP indicates the resistance or pressure in the arteries when the heart is at rest.
We can determine the disease from Blood Pressure with help of following table:

Conditions	Blood Pressure	Disease
(sbp>90 && dbp>60) or (sbp<140 && dbp <90)	Sbp=99 Dbp=80	NORMAL
sbp>140&&dbp>90	Sbp=141 Dbp=99	HYPERTENSION
Sbp<140&&dbp<90	Sbp=139 Dbp=89	HYPOTENSION

3)Oxygen saturation

Oxygen saturation refers to the percentage of oxygen carried by red blood cells in the body. Monitoring oxygen saturation levels can provide insights into a person's respiratory efficiency and the oxygen supply to vital organs. It can help identify conditions such as hypoxemia (low blood oxygen levels) or other respiratory issues that may affect overall health and physical performance.

We can determine the disease from Heart Rate with help of following table:

Conditions	Oxygen saturation	Disease
75 to 100	80	NORMAL
Greater than 100	150	HYPEROXIA
Less than 60	40	HYPOOXIA

4)Sleep

Sleep Cycles: Sleep consists of cycles that repeat throughout the night. Each cycle typically lasts around 90 to 120 minutes and includes several stages, including light sleep, deep sleep, and REM (rapid eye movement) sleep. These stages play different roles in promoting restorative sleep and cognitive function.

Recommended Sleep Duration for student :

School-age children (6-13 years): 9-11 hours per day

Teenagers (14-17 years): 8-10 hours per day

Adults (18-64 years): 7-9 hours per day

We can determine the disease from Heart Rate with help of following table:

Condition	Sleep	Disease
sleep>7 && sleep <9	8	NORMAL
Sleep greater than 9	10	EXTRA SLEEP
Sleep less than 7	6	HYPERSOMNIA

2.2 SCOP OF THIS PROJECT:

1. User :This Smart Health Application invented especially for adult around age 18 until 63 years old.

This application is suitable for those who want preventing chronic disease and 4 management of their good health.

The people can use this application in their smartphone to manage their basic need in health management.

They also can experience to see the virtual object appear in real-world with the 2D animation.

2. Admin:

The admin can make maintenance on the application and update a new version.

Besides that, the admin is able to view the responses to the feedback which comes from the users.

admin also can manage all the information (add new information. updates, delete) about any current change

The project can focus on monitoring various health parameters of students, such as their heart rate variability, sleep quality, and activity levels. The goal is to identify any deviations from normal ranges or potential health issues that may require attention.

Wellness Recommendations: Based on the analyzed data, the project can provide personalized wellness recommendations to students. For example, if a student is not getting enough sleep, the smartwatch can suggest strategies for improving sleep habits.

It's important to note that the scope of the project can be adjusted based on available resources, goals, and constraints. Careful consideration of ethical implications and regulatory requirements should also be a part of the project scope.

2.3 Hardware requirement:

1. Laptop LENOVO

Processor :

Intel Core i5-2450M CPU @ 2.50GHz

Operating System: Windows 10 Pro – 64 bits

Memory: 8GB RAM

Video Card or memory: Nvidia Geforce GT 630M, 2GB RAM

2. Smartwatch:

1.69'' Full Touch screen, 240*280 pixels Resolution.

SpO2 Monitoring. Heart Rate Tracking, Sleep Monitoring. Sedentary and Drink Water   Reminder.

Training Modes: Walking, Running, Cycling, Skipping, Badminton, Basketball, Football, Climbing, Tennis and more.

2.4 Software requirement

1. Android studio:

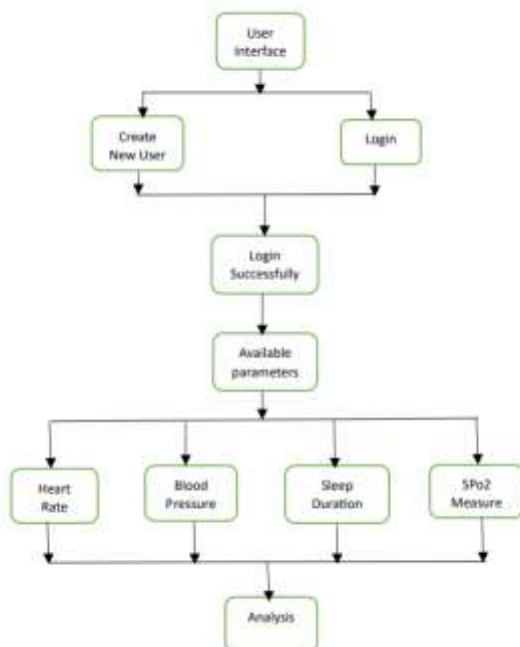It helps to develop our app and coding section.

2. Health Buddy app:

Health Buddy app to connect smartwatch in the app. This app is used to use apps from smartwatches as well.

IV. User Interface:

IV. System Flow Diagram:

Our Health App Framework

Conclusion:

This project discusses a product that uses in smart health applications.

In this age of science and technology, students are getting easier and more convenient ways to solve their everyday problems. Health care is also getting the attention of scientists and researchers, and they are developing a helpful system to save lives and care for life. This app demonstrates a smartwatch application-based healthcare tool that can be a friend-like company for the masses. Using the app they can find many conveniences that can change the way people react in emergency situations

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