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# IOT based Healthcare Monitoring System

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**Abstract:** *This paper describes the working of a wireless heartbeat and temperature monitoring system based on NodeMCU-Wi-Fi model for implementing IOT concept with a microcontroller. Online mode is mostly used in today's world but our system is designed such that a patient can be monitored remotely in online mode in real time. The proposed system, we use sensors which measures heartbeat and body temperature of a patient which is controlled by the microcontroller. The measured data collected from the remote location is transmitted through the wireless system. The heartbeat sensor checks the value of the human body counts the heartbeat and the temperature sensor measures the temperature of the human and surrounding and both the data are sent to the microcontroller for transmission to receiving end and send a value to the server. Here we design the three modules, doctor module to check the overall patient record, the patient module is to check the all health record, a relative module is used to the emergency situation. If an emergency occurs to the patient then automatically server sends the notification to the doctor and parent to the help.*

**Keywords:** *Controller, sensors, data analysis, Health record, patient record.*

## I. INTRODUCTION

Heartbeat and body temperature are the major signs that are routinely measured by physicians after the arrival of a patient. The heart rate of a normal human being is 72 bpm (beat per min). Heart rate varies for different age groups. The patient is addressed having efficient heart rate which is functioning of the heart. The heartbeat rates of the babies have a much higher rate than adults. It is around 120 bpm and older children have a heart rate of around 90 bpm. Bradycardia is a condition where heart rate is lower than normal. Another condition is tachycardia where higher than usual. Like a heartbeat, the body temperature also varies. The normal body temperature varies from person to person and it changes throughout the day.

The body temperature is minimum in the early morning and high in the early evening. The normal body temperature is about 37° C or 98.6° F. However, it can be as low as 36.1° C (97° F) in the early morning and as high as 37.2° C (99° F) and still be considered normal. Thus, the normal range for body temperature is 97 to 100 degrees Fahrenheit or 36.1 to 37.8 degrees Celsius. Now day's various sensors are available in the market to measure the body temperature. These sensors come in different forms such as thermocouples, thermistors, resistance temperature detectors (RTD), an integrated circuit (IC) sensor.

## II. LITERATURE SURVEY

[2] This paper aims to investigate and compare the accuracy of different data mining classification schemes and their combinations through Ensemble Machine Learning Techniques for predicting heart disease. The dataset for heart diseases, containing 303 instances, has been used in this study.

[3] The proposed system uses sensors, the data acquisition unit, microcontroller and software. Alert alarm messages about the patient's critical health data are send by text messages or by email reports by this system. Using this information the healthcare professional can provide necessary medical advising. Thus the proposed system removes some drawbacks of existing system and provides a reliable health monitoring system which will monitor health parameters such as ECG, RR, HR, BP and BG.

[5] This paper addresses various algorithms and techniques of Mobile Healthcare System. The purpose of this paper is to discuss these algorithms. After analyzing these algorithms and identifying their advantages and limitations, we conclude with several promising directions for future research.

[6] Algorithm using for heart attacks predictions are Data mining algorithms such as J48, Naïve Bayes, reptree, cart, and Bayes Net are applied in this research for predicting heart attacks.

[9] This paper explores the present status of Mobile based Health Care systems in different countries, shortfalls in Primary Health Care Management in rural India, and the potential solution to fill it with the enabling of Mobile Web technologies for Primary Health Care management.

[10] This paper attempts to comprehensively review the current research and development on wearable biosensor systems for health monitoring solutions.

### III.EXISTING SYSTEM

The majority of the patients in the hospital are ambulatory and they are well suited to be monitored using wearable sensors for the purpose of predictive care. The goal of such system is to provide early warning of physiological corrupt Such that preventative clinical action may be taken to improve patients outcome Health is one of the global challenges for humanity. World health organization (WHO) has mentioned that for an individual proper health is the fundamental right. The people who are healthy secure their income as they don't need to spend money for medicines and in hospitals. They reduce burden on over populated clinics, hospitals and reduce workload of medical professionals. So to keep people fit and healthy proper healthcare services should be provided. Despite wearable patient's monitors now being manufacture allowing the collection of physiologically data from ambulatory patients the resulting quantity of data acquired each day is large the data deluge effect occurs. The workload of clinicians and healthcare workers prevents then inspecting long time series of multivariate patients physiological data to high degree accuracy and the predictive accept to patients monitoring is lost. Intelligent online processing of this large datasets is required for predictive monitoring the results of which should then focus the limited resources of human experts to these to those subsets of patients who are deemed to be most at risk of being physiologically unstable and who are in need of expert review.

#### A. Drawbacks Of Existing System

- 1) Existing systems mostly focus on storing patients data which is used for analysing patients health.
- 2) This data is either stored on medical database system and hence is useful during treatment sessions.
- 3) Other systems available are used by patients that provides suggestions to patients using previous data.
- 4) But these systems aren't useful considering pervasive system model.

### IV.PROPOSED SYSTEM

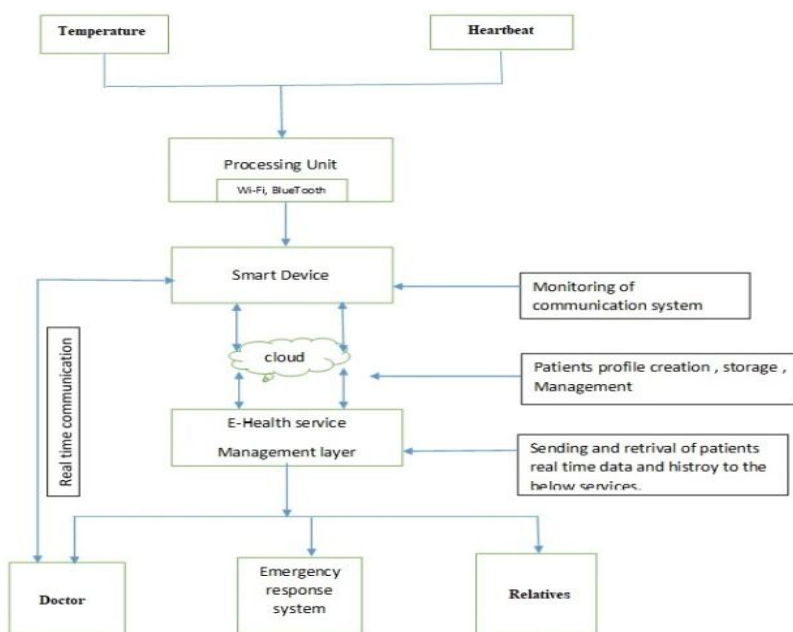


Fig 1. System architecture

### V. ALGORITHM

- 1) Input: Sensor data.
- 2) Output: Emergency response.
  - a) Step1: If any abnormal change in patient.
  - b) Step 2: Capture the body temperature and heartbeat of patient using sensors .
  - c) Step 3: Send the data to the relative or doctor in case of emergency.
  - d) Step 4: if not emergency send the data to the database for record.



## VI. ADVANTAGES

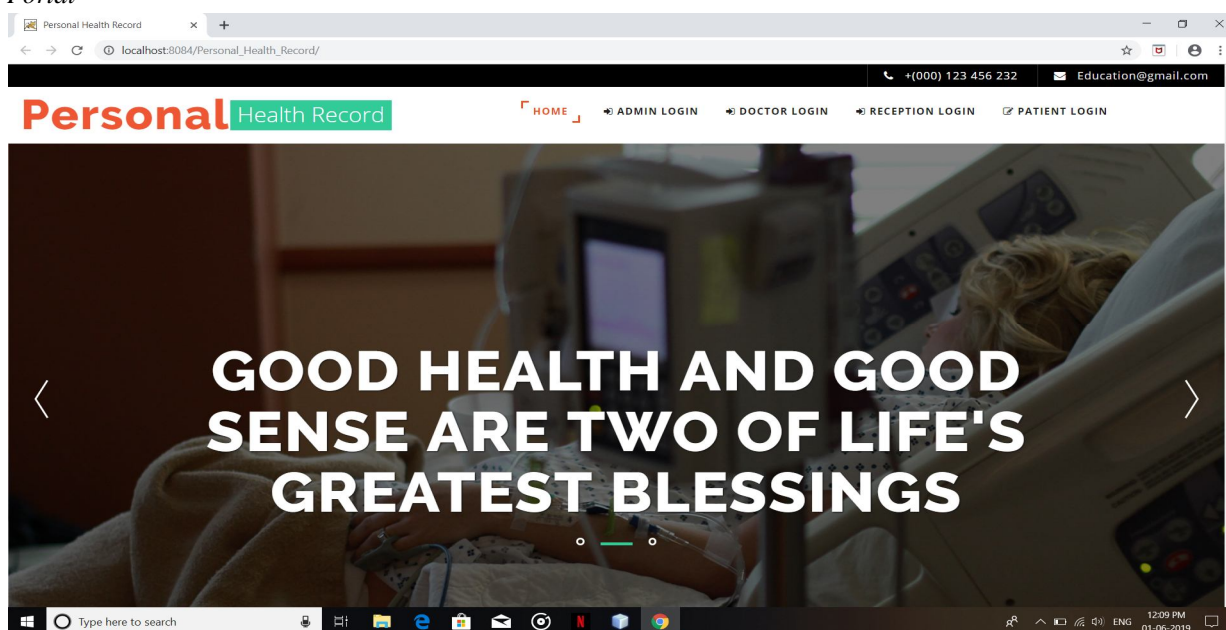
- A. Time effective process.
- B. Accuracy in patient's data management.
- C. Remote monitoring
- D. Easy to use

## VII. METHODOLOGY

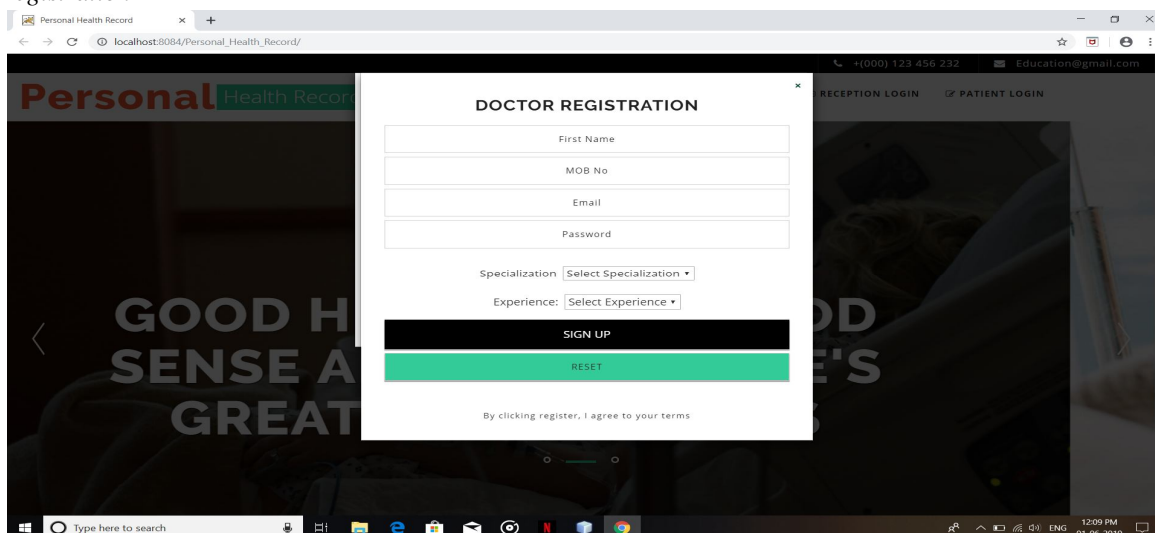
- 1) *Microcontroller*: It is used for developing the wearable kit which is useful for remote monitoring.
- 2) *Arduino*: It is the most suitable for this application.
- 3) *Sensors*: for sensing the data of patient.
- 4) *Temperature Sensor*: It is used for sensing temperature in case of high fever.
- 5) *Heartbeat Sensor*: It is used for monitoring the pulse rate of patient.

## VIII. RESULTS

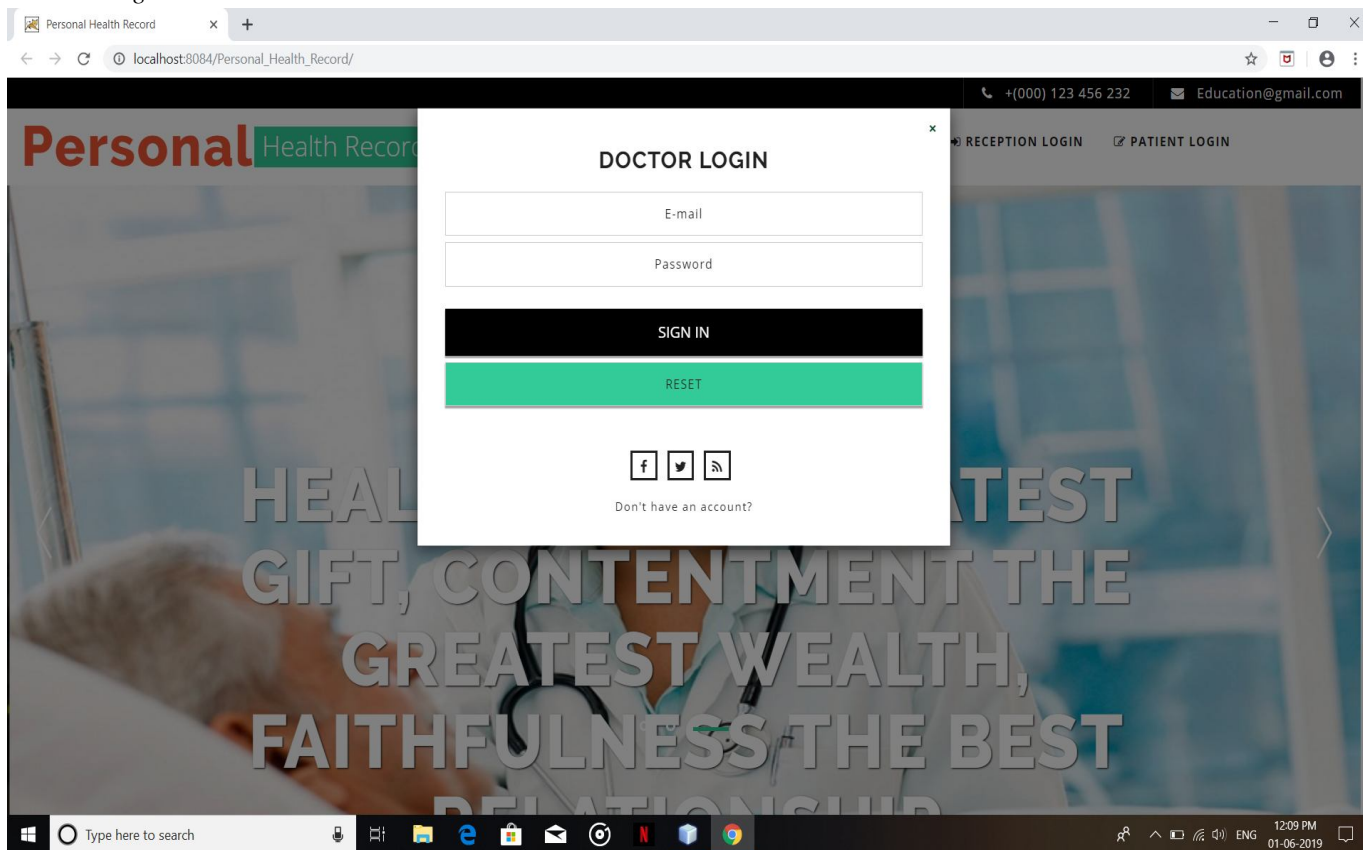
### A. Web Portal



### B. Doctor Registration



### C. Doctoe Login



Personal Health Record

localhost:8084/Personal\_Health\_Record/

+ (000) 123 456 232 Education@gmail.com

**DOCTOR LOGIN**

E-mail

Password

**SIGN IN**

**RESET**

f t in

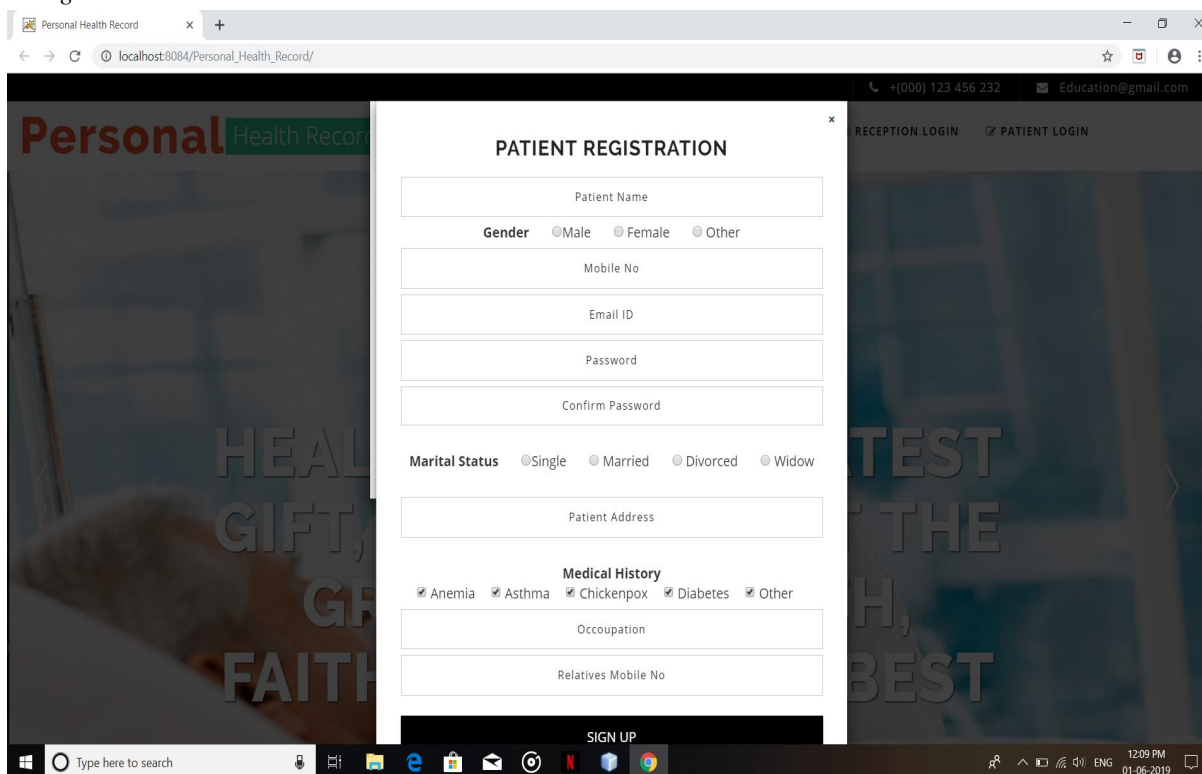
Don't have an account?

HEALTHY LIFESTYLE IS THE GREATEST WEALTH, FAITHFULNESS THE BEST RELATIONSHIP

Type here to search

12:09 PM 01-06-2019

### D. Paitent Registration



Personal Health Record

localhost:8084/Personal\_Health\_Record/

+ (000) 123 456 232 Education@gmail.com

**PATIENT REGISTRATION**

Patient Name

Gender ☐ Male ☐ Female ☐ Other

Mobile No

Email ID

Password

Confirm Password

Marital Status ☐ Single ☐ Married ☐ Divorced ☐ Widow

Patient Address

**Medical History**

☒ Anemia ☒ Asthma ☒ Chickenpox ☒ Diabetes ☒ Other

Occupation

Relatives Mobile No

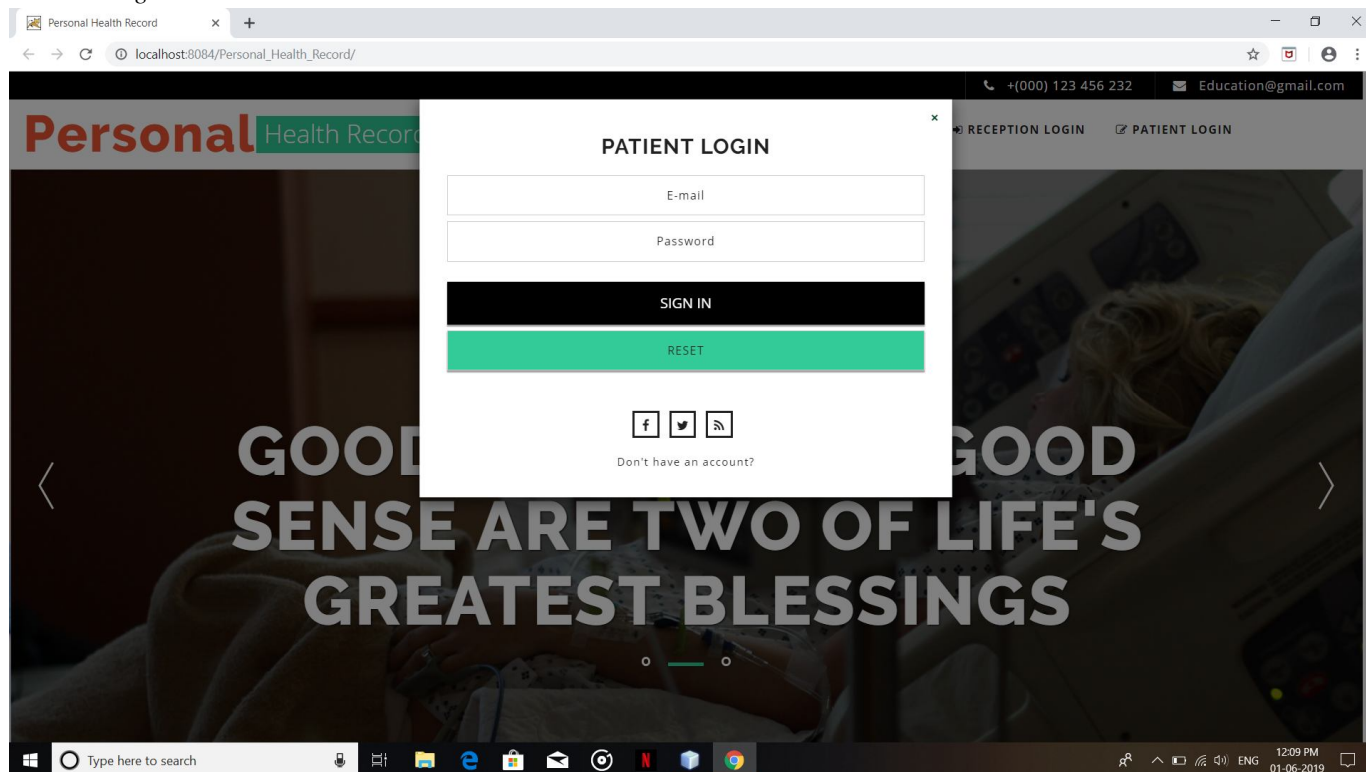
**SIGN UP**

HEALTHY LIFESTYLE IS THE GREATEST WEALTH, FAITHFULNESS THE BEST RELATIONSHIP

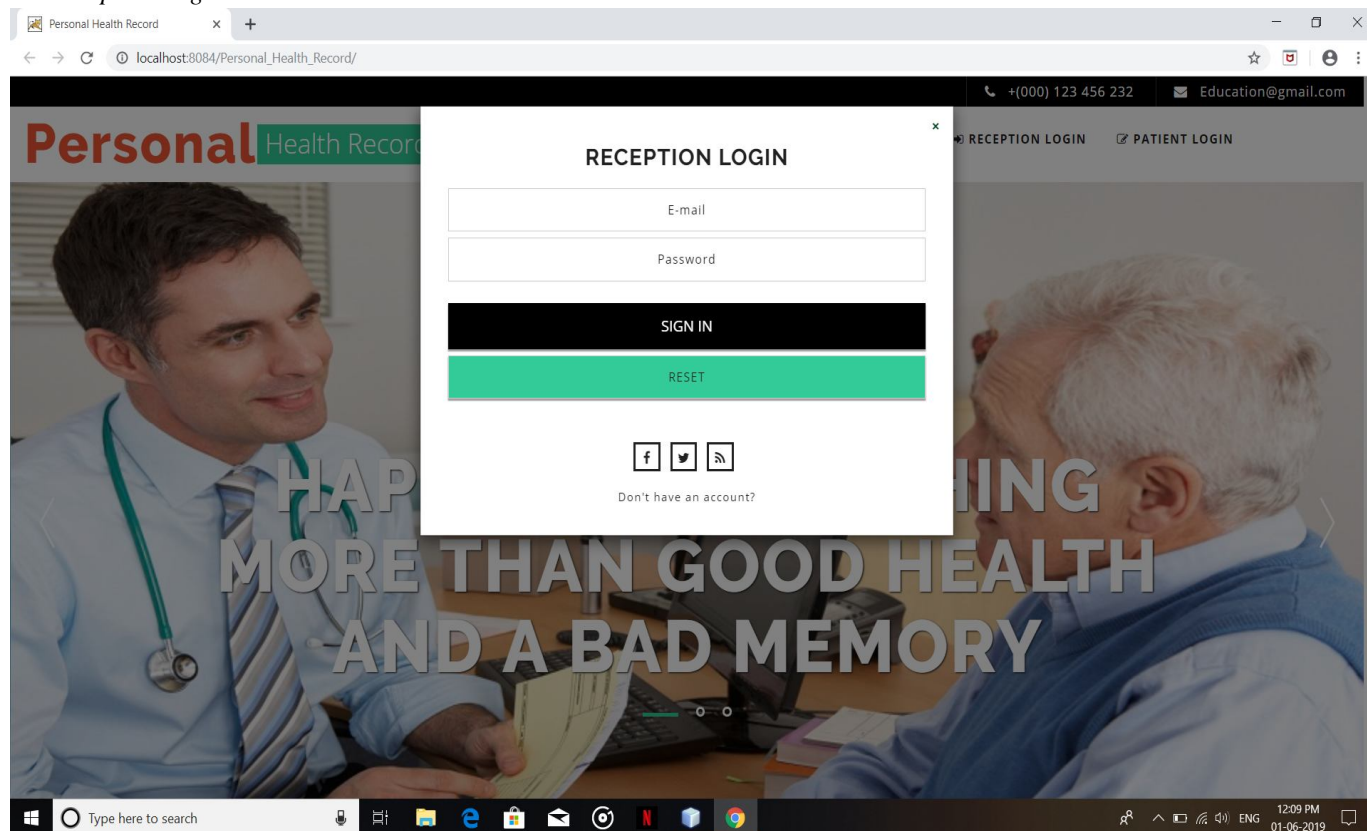
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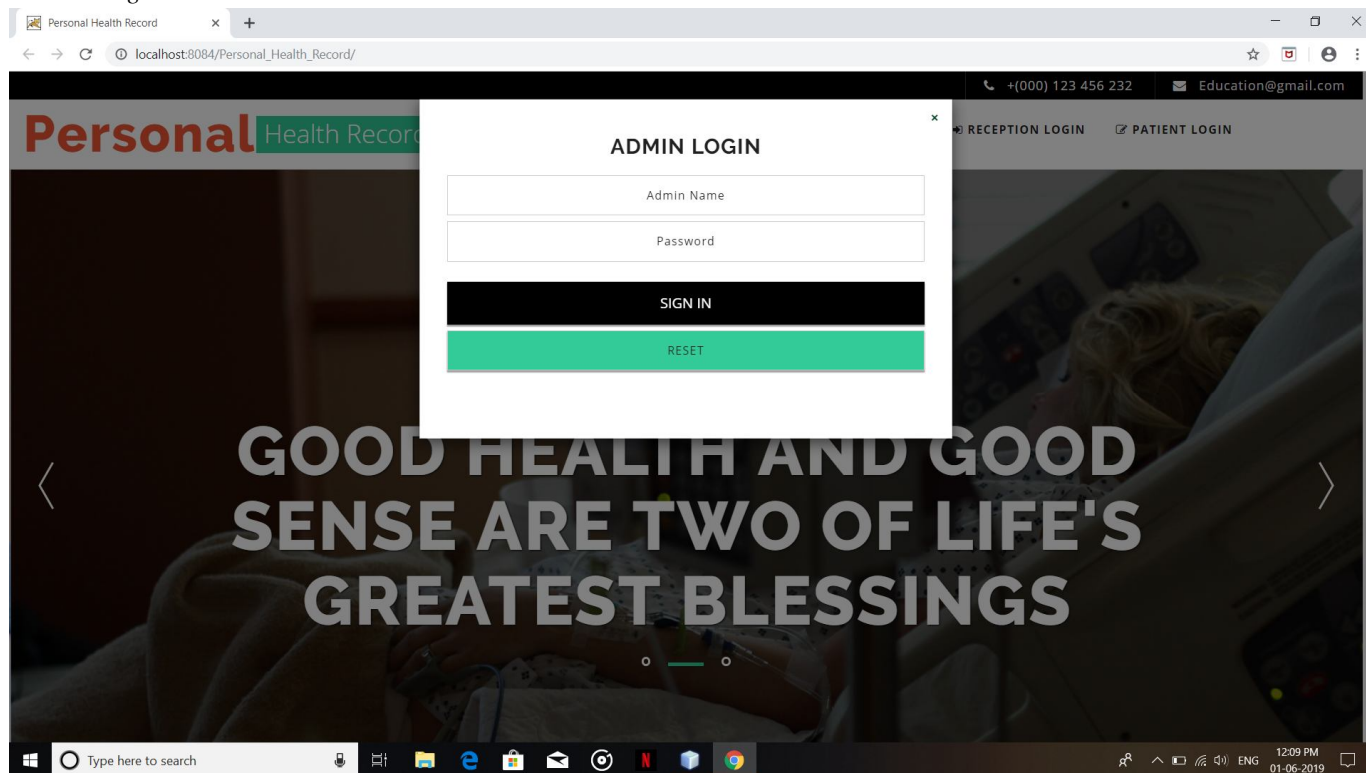
### E. Patient Login



### F. Reception Login



### G. Admin Login



The screenshot displays a web browser window with the URL `localhost:8084/Personal_Health_Record/`. The page title is "Personal Health Record". A modal window titled "ADMIN LOGIN" is centered on the screen. It contains two input fields: "Admin Name" and "Password". Below these fields are two buttons: a black "SIGN IN" button and a green "RESET" button. The background of the page is a dark image with a large, white, semi-transparent text overlay that reads: "GOOD HEALTH AND GOOD SENSE ARE TWO OF LIFE'S GREATEST BLESSINGS". In the top right corner of the page, there are links for "RECEPTION LOGIN" and "PATIENT LOGIN". The browser's address bar shows the local host address, and the Windows taskbar is visible at the bottom.

### IX.CONCLUSION

As health care services are important part of our society, automating these services lessenthe burden on humans and eases the measuring process. The trust of patients is gained by the transparency of the system. When threshold value is reached, the alarm system that consists of SMS alert the doctors and parent he can act more quickly. The objective of developing monitoring systems is to reduce health care costs by reducing physician office visits, hospitalizations, and diagnostic testing procedure.

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