DECLARATION BY THE CANDIDATE(s)

We the undersigned solemnly declare that the report of the project work entitled **Hi Health** is based on our own work carried out during the course of our study under the supervision of Dr. Anupam Agrawal.

We assert that the statements made and conclusions drawn are an outcome of the project work. We further declare that to the best of our knowledge and belief that the report does not contain any part of any work which has been submitted for the award of any other degree/diploma/certificate in this University/ any other University of India or any other country.

Signature				
Students names	Mohit Singh Lodhi	Vedika Agrawal	Vishwaraj Chandrakar	Rifah Farhat
Roll no.	300113323064	300113323053	300113323054	300113323056
Enroll no.	CD8542	CD8890	CD8859	CD8924

APPROVAL CERTIFICATE

This is to Certify that the report of the project submitted is an outcome of the project work entitled High Health carried out by **Mohit Singh Lodhi** bearing **Roll No. 300113323064, Enrollment No. CD8542; Vishwraj Chandrakar** bearing **Roll No, 300113323054, Enrollment No. CD8859; Vedika Agrawal** bearing **Roll No. 300113323053, Enrollment No. CD8890 , and Rifah farhat bearing Roll No. 300113323056, Enrollment No. CD8924**

Under my guidance and supervision in partial fulfillment of Bachelor of Technology in Electonics & Computer Science from Bhilai Institute of Technology, Durg, an autonomous institute affiliated to Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G).

To the best of my knowledge and belief the project

i) Embodies the work of the candidate himself / herself,

ii) Has duly been completed,

iii) Fulfills the requirement of the Ordinance relating to the B. Tech. degree of the University,

iv) Is up to the desired standard for the purpose of which is submitted.

(Signature)

Dr. Anupam Agrawal
Assistant Professor

The Project work as mentioned above is hereby being recommended and forwarded for examination and evaluation.

Dr. (Mrs.) Surekha Bhusnur
Head of the Department
Electronic & Computer Science Engineering

CERTIFICATE BY THE EXAMINERS

This is to Certify that the project the entitled

Hi Health

Submitted by

Mohit Singh Lodhi bearing **Roll No. 300113323064, Enrollment No. CD8542; Vishwraj Chandrakar** bearing **Roll No, 300113323054, Enrollment No. CD8859;Vedika Agrawal** bearing **Roll No. 300113323053, Enrollment No. CD8890;and Rifah Farhat bearing Roll No. 300113323056,Enrollment No. CD8924** has been examined by the undersigned as a part of the examination for the award of Bachelor of Technology degree in Electonics & Computer Science Engineering from Bhilai Institute of Technology, Durg, an autonomous institute affiliated to Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G)

(Internal Examiner)	**(External Examiner)**
Name:	**Name:**
Date:	**Date :**

ACKNOWLEDGEMENT

We have great pleasure in the submission of this project report entitled **HI HEALTH** in partial fulfillment the degree of Bachelor of Engineering (ECS). While submitting this project report, we take this opportunity to thank those directly or indirectly related to project work.

We would like to thank our guide **Dr. Anupam Agrawal** who has provided the opportunity and organizing project for us. Without his active co-operation and guidance, it would have become very difficult to complete task in time.

We would like to express sincere thanks and gratitude to **Dr. Arun Arora**, **Principal of the Institution**, Dr. Surekha Bhusnur, **Head of the Department ,** Electronics & Computer Science Engineering for their encouragement and cordial support.

While Submission of the project, we would also like to thank all the staff of department of Electronics & Computer Science Engineering, **Bhilai Institute of Technology, Durg** for their continuous help and guidance throughout the course of project Acknowledgement is due to our parents, family members, friends and all those persons who have helped us directly or indirectly in the successful completion of the project work.

MOHIT SINGH LODHI	**CD8542**	**300113323064**
VISHWRAJ CHANDRAKAR	**CD8859**	**300113323054**
VEDIKA AGRAWAL	**CD8890**	**300113323053**
RIFAH FARHAT	**CD8924**	**300113323056**

ABSTRACT

Life expectancy across the globe has increased due to better health services and medicine as well as due to an increasing awareness about personal and environmental sanitation. Moreover, there has also been a growing focus on family planning in the last few decades, which led to a drop in fertility rates globally. The World Health Organization (WHO) states that elderly populations (those aged over 65 years) will, by 2017, constitute a higher percentage than that of pre-school age children (aged less than 5 years). Although this huge segment of aged population will lead to drastic changes in the socio-economic structure of the society with reference to social care and medical services requirements .This paper presents the design and prototype of a wireless health monitoring system using mobile phone accessories. We focus on measuring real-time electrocardiogram (ECG) and heart rate monitoring using a smartphone case. Health monitoring systems have rapidly evolved during the past two decades and have the potential to change the way health care is currently delivered .Health monitoring systems (HMS) in smart environment have evolved rapidly to become a viable alternative to traditional healthcare solutions. IF WE Compare traditional medical services provided within hospitals, health monitoring system (HMS) or cloud health monitoring system .Traditional medical system face more challenges in personalised health data processing. To achieve personalised and high-quality health monitoring means of new technologies ,such as mobile network and cloud computing, in this paper, a framework of an m-Health monitoring system based on a cloud computing platform (Cloud-MHMS) is designed to implement pervasive health monitoring. Furthermore, the modules of the framework, which are Cloud Storage and Multiple Tenants Access Control Layer, Healthcare Data Annotation Layer, and Healthcare Data Analysis Layer, are discussed .Although smart health monitoring systems automate patient monitoring tasks and, thereby improve the patient workflow management, their efficiency in clinical settings is still debatable. This paper presents a review of smart health monitoring systems and an overview of their design and modeling. The aim of HMS is to not only reduce costs but to also provide timely e-health services to individuals wishing to maintain their independence. In this way, elderly people can avoid, for as long as possible, any interaction with healthcare institutions (e.g. nursing homes and hospitals), which in turn reduces pressure on the health system.

TABLE OF CONTENT

CHAPTER-1

INTRODUCTION

Health monitoring systems are innovative solutions designed to track and analyze an individual's vital signs and health metrics in real-time. These systems utilize advanced technologies, such as wearable devices, IoT sensors, and mobile applications, to collect data on parameters like heart rate, blood pressure, oxygen saturation, and body temperature. By integrating these systems with cloud computing and artificial intelligence, health data can be processed, stored, and analyzed efficiently, enabling early detection of abnormalities and personalized health recommendations.

Advancements in technology have enabled the integration of automated systems that collect and analyze health data, aiding in early detection of diseases and personalized healthcare management. Non-invasive monitoring devices, such as blood glucose meters and digital thermometers, have enhanced patient comfort and convenience.

Health monitoring systems play a critical role in chronic disease management, postoperative care, and preventive healthcare. By empowering individuals and healthcare providers with actionable insights, these systems contribute to improved health outcomes and reduced healthcare cost

1.1 Background

Population aging is happening faster than ever before. According the United Nations Population Fund (UNFPA) (UNFPA, 2012), the global number of people aged 60 or older will rise to 2 billion by 2050. Added to this, a report issued by the World Health Organization (WHO) stated that there was a shortage of about 7.2 million healthcare workers in 2013, and this is estimated to reach 12.9 million by 2035 (Global Health Workforce Alliance and World Health Organization, 2013).It is predicated that the cost of hospitalization and patient care will rise worldwide. In the US, the mortality rate is over 770,000 per year .This includes patients who suffer sentinel events associated with; incorrect medication, dosage inaccuracies, contraindications or critical delays in interventions resulting in hospitalization. The aggregated costs of these events across the US is between $1.5 billion and $5 billion annually[2] Currently, a significant proportion of the elderly population suffers from an age-related health issue such as Alzheimer's disease, dementia, diabetes, cardiovascular disease, osteoarthritis or other chronic diseases.

1.2 Scope of the Health Monitoring System Project

The health monitoring system project aims to develop a reliable framework for tracking vital health parameters, enabling early detection of medical conditions and promoting preventive healthcare. It covers the integration of various medical sensors and devices to measure parameters such as heart rate, blood pressure, and temperature. The project focuses on ensuring user-friendly interfaces, accurate data collection, and efficient data analysis for better health management. It can be applied in clinical settings, home care, and fitness environments. The system is particularly beneficial for chronic disease

management, elderly care, and improving overall healthcare accessibility and efficiency.

1.3 Significance

A health monitoring system plays a vital role in enhancing healthcare quality by enabling continuous tracking of vital parameters like heart rate, blood pressure, and temperature. It allows early detection of abnormalities, ensuring timely medical intervention and reducing the risk of severe health complications. By improving diagnostic accuracy and reducing the need for frequent hospital visits, they enhance the quality of life and lower healthcare costs. Additionally, health monitoring systems contribute to preventive care, encouraging healthier lifestyles and reducing the burden on healthcare facilities.

CHAPTER-2

LITERATURE SURVEY

Ananda Mohan Ghosh has proposed a health monitoring system for managing the hospital to allow family members and consultant doctors to remotely monitoring the patient's health condition through the internet with E-health sensor shield kit interface kit. But it does not send any notification such as email and SMS alert to the respective family members and doctors.

P Kumar has proposed a patient monitoring healthcare system which is controlled by a raspberry pi such as the heartbeat rate, respiration level, and temperature and body movement of the patient is monitored and data is collected by using sensors and displayed it on the screen using the putty software. However, it does not provide the alarm notification for insisting the family members or doctors give the prescribed drugs to the patient which is included in our proposed solution.

Sarfraz Fayaz Khan has demonstrated a useful patient's healthcare monitoring system with the help of IoT and RFID tags. But, it does not contain preventive measures concerning the patient health condition by controlling the appliances and providing the prescribed drugs to the patient which is included in our paper.

Freddy Jimenez have considered only on monitoring the patient's health condition and sending the necessary information and notification to doctors, family members. Moreover, it does not contain the appliance control, which is included in our project; it only focused on Monitoring and provides notification to the respective people on time.

S. Siva has demonstrated to monitor a patient's health condition by using the smart hospital system. The health condition of the patients can be monitored by using the spark kit. It gathers information about the temperature and heartbeat rate of the patient and sent an alert notification if any of the obtained parameters crosses the predefined threshold value.

CHAPTER-3

PROBLEM SOLVING & OBJECTIVE

3.1 Problem Identification

Health monitoring systems address the limitations of traditional healthcare, where health parameters are only checked during occasional visits to medical facilities. This approach often delays the detection of critical conditions, leading to complications. Additionally, the growing prevalence of chronic diseases, limited access to healthcare in remote areas, and the need for personalized monitoring highlight the gap in current systems. Manual recording of health data can also be prone to errors and inefficiencies.

3.2 Objective

The primary objective of a health monitoring system is to provide an efficient and reliable method for tracking vital health parameters. This includes:

1. Ensuring accurate measurement and recording of health data.

2. Facilitating early detection of abnormalities or health risks.

3. Promoting preventive care and timely medical intervention.

4. Reducing dependency on frequent hospital visits and improving healthcare accessibility.

5. Enhancing patient outcomes through better health management and monitoring solutions.

CHAPTER-4

METHODOLOGY

4.1 System Design of a Health Monitoring System

The system design of a health monitoring system involves a structured framework that integrates hardware, software, and communication modules to measure, process, and analyze health parameters. Below is a general overview of the design:

1. Input Layer

This layer consists of sensors and devices used to measure vital health parameters. Examples include:

- *Heart Rate Sensor*: Measures heartbeat.

- *Blood Pressure Monitor*: Tracks systolic and diastolic pressure.

- *Temperature Sensor*: Measures body temperature.

- *Pulse Oximeter*: Tracks oxygen saturation.

2. Storage Layer

- *Local Storage*: Data is temporarily stored in local memory, such as SD cards or device memory.

- *Cloud Storage*: Data is uploaded to secure servers for long-term storage, analysis, and remote access.

3. Communication Layer

This layer enables the transfer of data between devices and servers:

- *Wireless Communication*: Bluetooth, Wi-Fi, ZigBee, or GSM for data transmission.

- *Wired Communication*: USB or serial interfaces for direct device connectivity.

4. User Interface Layer

- *Display Units*: LCD or LED screens to show real-time data locally.- *Mobile/PC Applications*: Provide visualization, historical data access, and insights into health trend

5. Output Layer

- *Alerts/Notifications*: Generates alerts for abnormal readings (e.g., low oxygen levels or high blood pressure).

- *Reporting*: Creates health reports for patients and healthcare providers.

6. Power Management

- *Power Supply*: Battery-operated or plugged-in devices.

- *Energy Efficiency*: Focus on optimizing power consumption for portable devices.

7. Security and Privacy

- *Encryption*: Ensures secure data transfer.

- *Access Control*: Limits access to authorized users only.

- *Data Anonymization*: Protects patient identity during data sharing.

4.2 Block Diagram Overview

1. *Sensors* → Data Collection

2. *Processor* → Data Processing

3. *Storage* → Local/Cloud Storage

4. *Communication* → Data Transfer

5. *User Interface* → Data Visualization

6. *Output* → Alerts & Reports

This design ensures accurate, efficient, and user-friendly health monitoring for various use cases. Let me know if you'd like detailed technical schematics or specific components!

4.3 Programming

The programming of the Health Monitor System was done using the Arduino IDE. The code integrates the sensors, alert mechanisms, servo motors, and the LCD display, ensuring seamless operation of the fire detection and response system.

Sensor Integration:

The Arduino was programmed to continuously read data from the MQ-series gas sensor and TMP36 temperature sensor. The sensors output analog values, which are converted to meaningful data by the Arduino. Specific threshold values were set for both gas

concentration and temperature, allowing the system to detect hazardous conditions in a timely manner. For example, if the gas sensor detects a concentration exceeding 700 parts per million (ppm), or if the temperature rises above 37°C, the system will trigger an alert.

Alert Mechanisms:

The system is equipped with both visual and auditory alert mechanisms. When the gas or temperature sensors detect dangerous levels, the buzzer is activated to provide a high-pitched alert sound, drawing immediate attention to the hazard. In addition, the RGB LED changes from green to red, providing a clear visual cue of the dangerous situation. These alert mechanisms help ensure that occupants are notified of the emergency as quickly as possible.

Servo Motor Control:

The servo motors are responsible for opening emergency exits when hazardous conditions are detected. The Arduino is programmed to control the angle of the servos, and during normal conditions, the doors remain closed (at 90 degrees). Upon detecting an emergency, the motors rotate the doors to 0 degrees, ensuring that the exits are open and accessible for evacuation.

LCD Display:

The LCD is programmed to display real-time data, including the current temperature and gas concentration levels. During normal operation, it shows safe conditions (e.g., "Temperature: 25°C, Gas: 300 ppm"). In the event of an emergency, the LCD displays warning messages such as "DANGER!! VACATE Building!" alongside the sensor data. This visual feedback keeps users informed of the system's status and conditions inside the building

4.4 Source Code

```
parameters:
  # Default values
  packageArtifacts: true

steps:
- task: UseDotNet@2
  displayName: 'Use .NET Core sdk 6.0.x'
  inputs:
    version: 6.0.x
    selectOrConfig: configs
    nugetConfigPath: nuget.config

- script: dotnet build --configuration $(buildConfiguration) --version-
suffix $(build.buildNumber) -p:AssemblyVersion="$(assemblySemVer)" -
p:FileVersion="$(assemblySemFileVer)" /warnaserror
  displayName: 'dotnet build $(buildConfiguration)'

- task: DotNetCoreCLI@2
```

```
  displayName: 'dotnet test UnitTests'
  inputs:
    command: test
    projects: '**/*UnitTests/*.csproj'
    arguments: '--configuration $(buildConfiguration)'

- ${{ if eq(parameters.packageArtifacts, 'true') }}:
  - template: package.yml
```

```
# DESCRIPTION:
# Builds, tests and packages the solution for all PR requests.

# name: pr$(system.pullRequest.pullRequestNumber)-
$(Date:yyyyMMdd)$(Rev:-r)
variables:
  buildConfiguration: 'Release'

stages:
- stage: UpdateVersion
  displayName: 'Determine Semver'
  dependsOn: []
  jobs:
  - job: Semver
    pool:
      vmImage: 'ubuntu-20.04'
    variables:
      skipComponentGovernanceDetection: true
    steps:
    - template: update-semver.yml
- stage: BuildTestDeployPackages
  displayName: 'Build, run unit tests and deploy nuget packages'
  dependsOn:
  - UpdateVersion
  variables:
    assemblySemVer:
$[stageDependencies.UpdateVersion.Semver.outputs['IomtVersion.GitVersio
n.AssemblySemVer']]
    assemblySemFileVer:
$[stageDependencies.UpdateVersion.Semver.outputs['IomtVersion.GitVersio
n.AssemblySemFileVer']]
    informationalVersion:
$[stageDependencies.UpdateVersion.Semver.outputs['IomtVersion.GitVersio
n.InformationalVersion']]
    majorMinorPatch:
$[stageDependencies.UpdateVersion.Semver.outputs['IomtVersion.GitVersio
n.MajorMinorPatch']]
```

```
    nuGetVersion:
$[stageDependencies.UpdateVersion.Semver.outputs['IomtVersion.GitVersio
n.SemVer']]
  jobs:
  - job: Windows
    pool:
      vmImage: 'windows-2019'
    steps:
    - template: build.yml

  - job: Linux
    pool:
      vmImage: 'ubuntu-20.04'
    steps:
    - template: build.yml
      parameters:
        packageArtifacts: false
```

CHAPTER-5

CONCLUSION &FUTURE SCOPE OF WORK

5.1 Conclusions

In conclusion, Hi Health is a vital tool in advancing healthcare delivery by enabling real-time tracking of patient health metrics. By integrating cutting-edge technologies such as IoT, cloud computing, and data analytics, this system enhances accuracy, accessibility, and efficiency in monitoring and diagnosing health conditions. It empowers healthcare providers with actionable insights and supports patients in managing their well-being more proactively.

The implementation of a health monitoring system not only reduces the burden on healthcare facilities but also fosters preventive care, improving overall patient outcomes. However, addressing challenges such as data security, system scalability, and user training is essential to ensure its successful deployment and adoption.

Overall, the health monitoring system represents a significant step forward in modernizing healthcare infrastructure and meeting the demands of an increasingly connected and health-conscious society.

5.2 FUTURE SCOPE OF WORK

Future insights/plannings : To introduce or, implement a system which sends out a panic alarm to the user and the nearest health station whenever a critical health condition is detected. And to introduce real-time health monitoring using live data.

To build/introduce a health monitoring system using less resources and cheaper version of the system. Less and cheaper resources

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