

Development of Graphical System for Patient Monitoring using Cloud Computing

Mr. DILIP R
Assistant Professor
Department of Mechatronics Engineering
Acharya Institute of Technology
Bengaluru, Karnataka India
Email: dilipr@acharya.ac.in

Dr. Ramesh K. B
Associate Professor
Department of Instrumentation Technology
RV College of Engineering
Bengaluru, Karnataka India
Email : rameshkb@rvce.edu.in

Abstract

Speech Recognition Technology has created it attainable for pc to follow the human voice command and perceive the human languages. The objects like physique parameters are often monitored through Human Speech is meant, by combining The Virtual Instrumentation Technology and Speech Recognition Techniques. this may be finished the assistance of LabVIEW Platform. The electro-acoustic transducer is employed to require Voice Commands from Human and do the Signal process Operation for observation and dominant the devices that has been interfaced. This electro-acoustic transducer signals square measure interface with LabVIEW Platform at the side of the devices. The LabVIEW code can generate acceptable management Signal to watch the physique parameters. the whole work done on the LabVIEW platform.

After the Completion of the above process the next will be to upload the given data to the Firebase Cloud Platform using HTTP Client VI's from the LabVIEW. By this we can store the data of the body parameters calculated by the Sensors to the cloud network via our Voice Command and also, we can utilize Android and IOS platforms to view the Result of the work via devices such as Mobile Phone or other devices for other users by verifying and authorizing them the authority to view the data via Firebase Authentication (Sign-In Method) in Firebase Network.

Keywords: LabVIEW, MyRIO, SDK, Firebase, Speech Recognition

I. Introduction

Speech is that the expression of or the flexiblens to specific thoughts and feelings by articulate sounds. Speech recognition means that a computer or program has the ability to recognize and convert words and phrases in spoken conversation to a computer-readable format. Rudimentary speech recognition kit options a restricted vocabulary of terms and phrases, and these should be defined exclusively if they are really spoken clearly. LabVIEW provides a graphical programming approach that allows America to visualize every side of our application, along with configuring hardware, measuring details, and debugging. This visualization makes it simple for any merchant to incorporate measuring equipment, reflects complicated logic on the diagram, develops algorithms for knowledge analysis and styles custom user interfaces. The LabVIEW Cloud Toolkit for AWS provides developers with interfaces from Windows or amount LabVIEW applications to Amazon web Services for info storage, message commercial enterprise, and queueing operations. Applications in wish of additional storage for analytics or post-processing operations can like cloud services to store and retrieve any amount of knowledge programmatically from PC-based applications or hardware targets like MyRIO. Cloud consists of AN outsized pool of merely usable and getable virtualized resources. The users can access these resources supported their desires. Cloud computing has three service models like Software-as-a-Service, Platform-as-a Service, Infrastructure-as-a-Service. Cloud preparation model's area unit Public Cloud, private Cloud, and Hybrid Cloud. The cloud has many edges like Pay-As-We-Use, speedy snap, Multi occupancy, Resource Pooling, reduced maintenance and

capital investments etc. These choices have created cloud computing further profitable. There is a demand to vogue further users based interactive systems for the oldsters inside the important time atmosphere and there was the necessity to work on one issue really innovative and thus set to work on this concept. The user can exclusively use the speech to watch and put together to understand the standing at any given purpose of sometime whereas not overabundant intervention. In this Project, we have got designed the program to browse the commands from the user inside the design of Speech Signals which we've got designed the interface to the laptop computer victimization the MyRIO and conjointly the associated circuits which we've got developed info Storage System inside the important Time atmosphere from the Cloud Server via LabView package.

II. Objective

To design and develop and user interactive system for the user using the speech, such that he can get to know the status of the Patients who are being monitored by External Devices such as Temperature Sensor etc. via Cloud Storage which is interfaced with the LabVIEW Software.

III. Problem with The Existing System

Nowadays, everyone is creating a health monitoring system which can Store the relevant data which is need for the further recovery of the patient and their previous status. But the retrieval of the data from the devices or from the cloud storage is done manual.

IV. Solution for The Problem

Cloud-based devices can share information with each other, and access the Internet at any time and wherever they are unique in addressing and identifying. Remote health management systems that use cloud-based tools will share information with health institutes over the Internet automatically.

In this project we are using Speech Recognition System for the storage of patient data from various systems from Cloud Server using the Secret key (API Key) which is provided by the User. By doing the advancement of the Speech Recognition System and Wireless Patient Monitoring System is possible.

V. Block Diagram

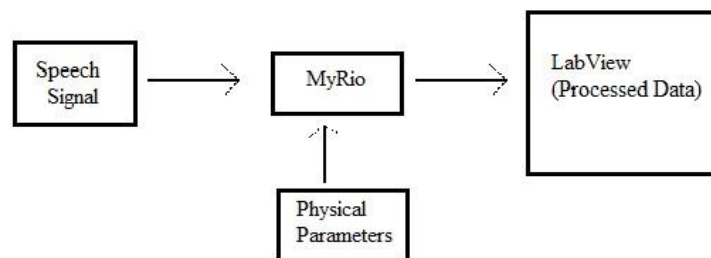


Fig 1. Block Diagram of Speech Recognition System

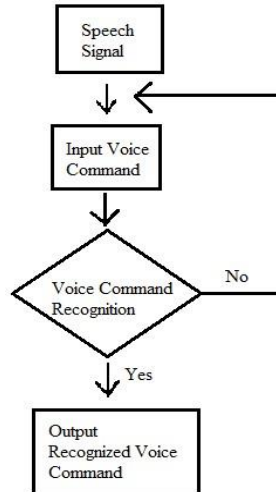


Fig 2 Flowchart of Speech Recognition System

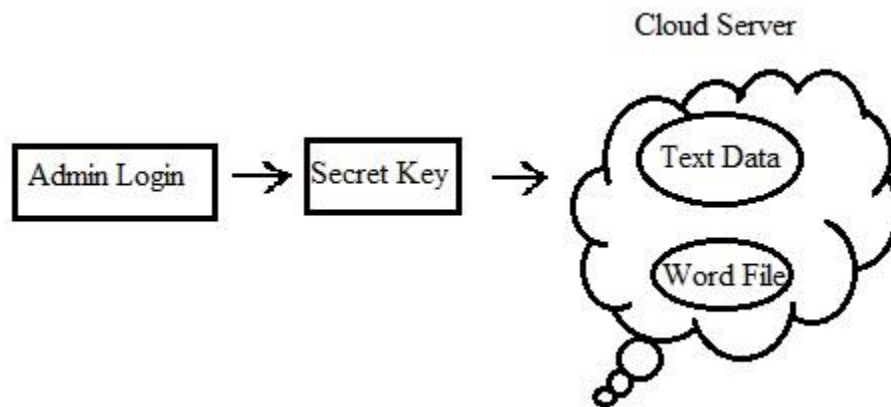


Fig 3 Data Storage in Cloud Server

VI. Different Types of Techniques

Following are the Different Techniques used in the Detection of Voice.

1. Call – Type Classification
2. A Distribute Architecture
3. Automatic Voice Signal Detection (AVSD)
4. PMVDR (Perceptual Minimum Variance Distortion Less Response) Algorithm

A. Speaker Recognition

Recognition of the speaker desires the recognition and verification. Automatic voice verification (ASV) is that the utilization of a computer to validate the claimed identity from a person's voice. The literature abounds with all totally different words for verificatory speakers, likewise as speech verification, speaker

authentication, sound authentication, speaker authentication, and speaker verification. There is no a priori identity argument in automatic speaker recognition (ASI), and conjointly the device determines World Health Organization the individual is, that community the individual is also a member of, or (in the open set case) that the person is unknown.

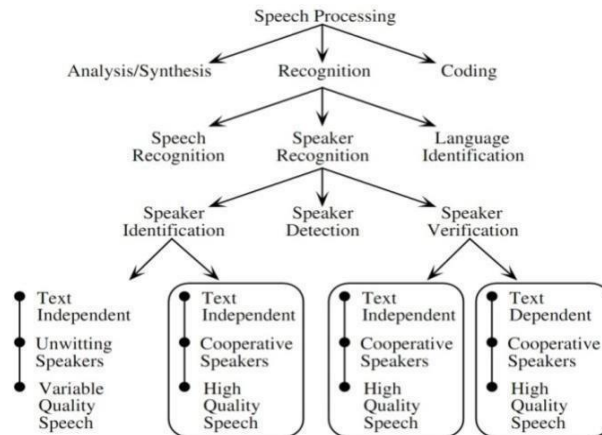


Fig 4 Speech Recognition

B. Cloud Storage

Cloud storage is outlined as "the storage of information on-line within the cloud," whereby a company's knowledge is hold on in and accessible from multiple distributed and connected resources that comprise a cloud. Cloud storage will offer the advantages of larger accessibility and reliability; fast deployment; robust protection for knowledge backup, repository and disaster recovery purposes; and lower overall storage prices as a result of not having to buy, manage and maintain pricey hardware. There are several edges to victimization cloud storage, however, cloud storage will have the potential for security and compliance issues that don't seem to be related to ancient storage systems. Historically speaking, cloud computing, as a practical pc model, isn't that new. In fact, the alleged "cloud" goes all the manner back to the '70s and '80s, once ARPANET and CNET, the predecessors of the fashionable web were already hinting at what cloud storage was about to become.



Fig 5 Cloud Storage

VII. CONSTRUCTION & WORKING

A. Speech Recognition Program

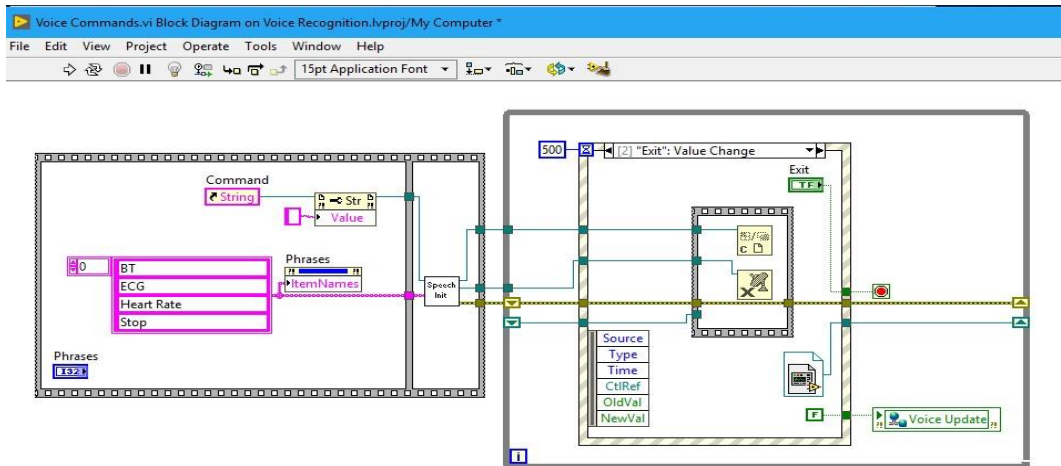


Fig 6. Front Panel Window of Speech Recognition

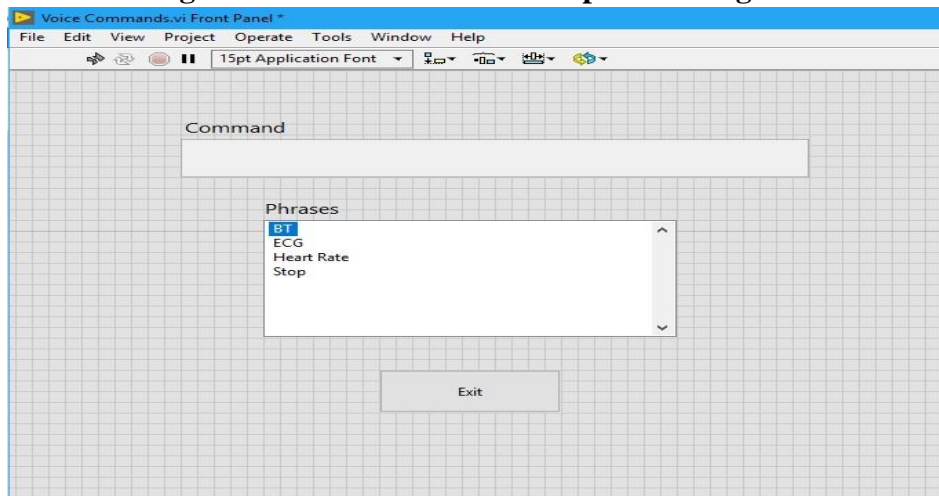


Fig 7. Block Diagram Window of Speech Recognition

Working of speech recognition VI:

1. In the phrase block the required speech commands are listed.
2. Using string function, the input command is selected.
3. Given speech command is compared with pre-set commands,
 - a. If condition is true then the specific program will execute.
 - b. If condition is false then it waits for a proper command.

B. Body Temperature (BT)

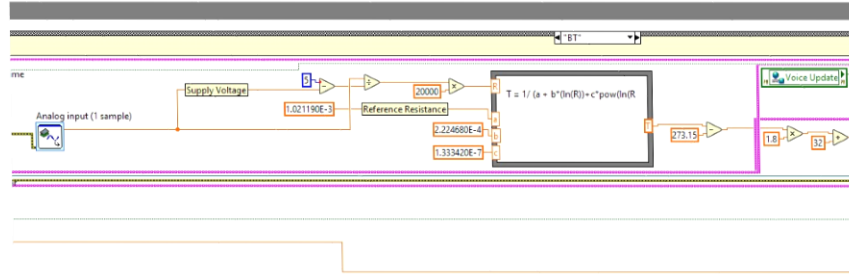


Fig 8 . Front Panel Window of Body Temperature

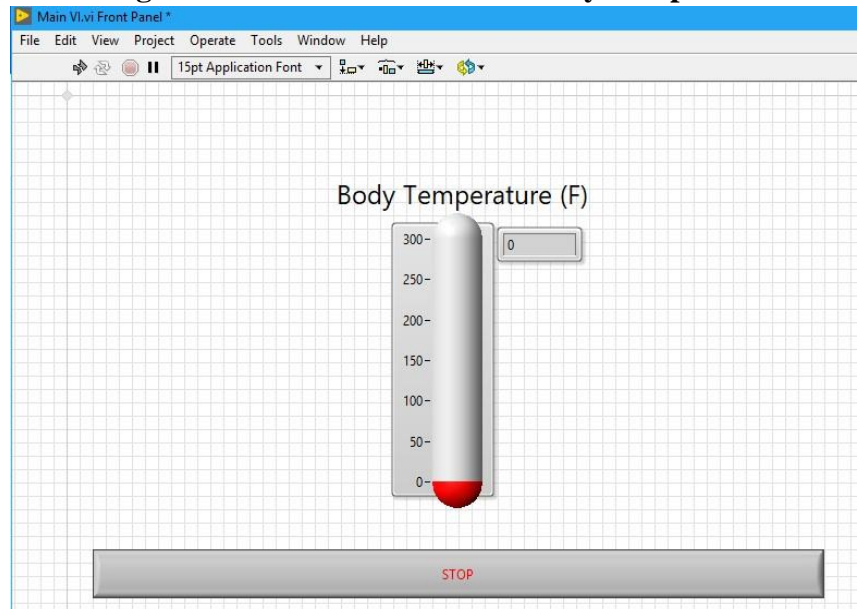


Fig 9. Block Diagram Window of Body Temperature

Working of Body Temperature Program:

1. Input analog voice signal is converted into voltage form,
2. With the help of comparators and standard formula ($T = 1 / (a + b * \ln(R)) + c * \text{pow}(\ln(R), 3)$) convert voltage into kelvin.
3. Then using comparators kelvin is converted into Fahrenheit.
4. The output temperature data is displayed in degree Celsius.

C. ECG/EKG Program

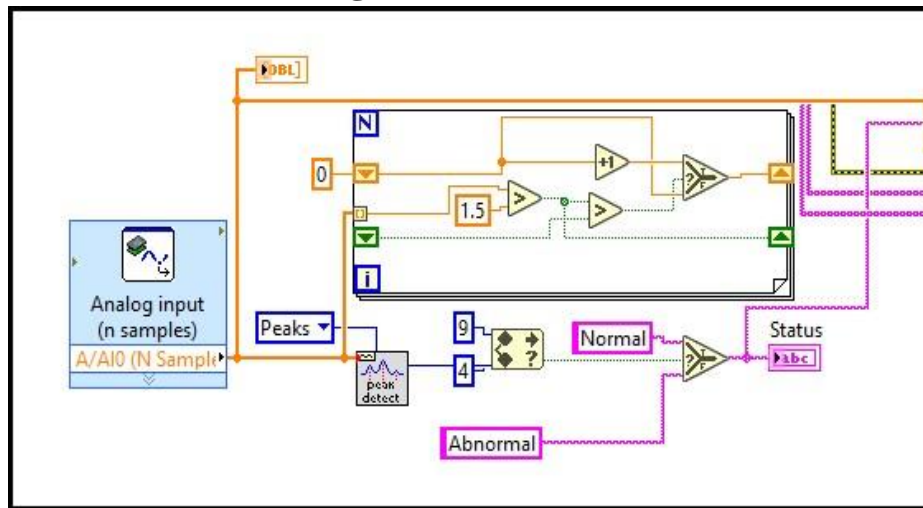


Fig 10. ECG/EKG Front Panel

Working of ECG program:

1. The analog input is converted into ECG graph using analog input function and DBL function.
2. Analog input samples are converted to the peak values using wave form peak detection VI block.
3. Using In range and coerce function voltage peak is detected.
4. If voltage is in-between 4 to 9 then output status will be normal state or else it will be abnormal.
5. Using select function output is displayed as normal or abnormal state.
6. ECG data is displayed using another select function within a FOR loop.

D. Heart Rate

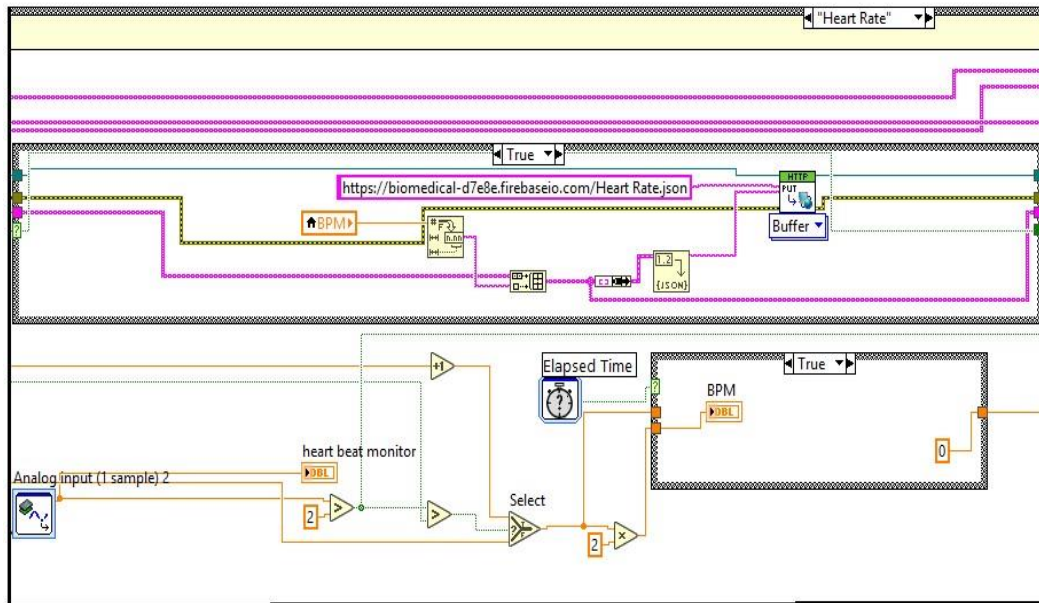


Fig 11. Front Panel Window of Heart Rate

E. LabVIEW Connection to the Cloud Server

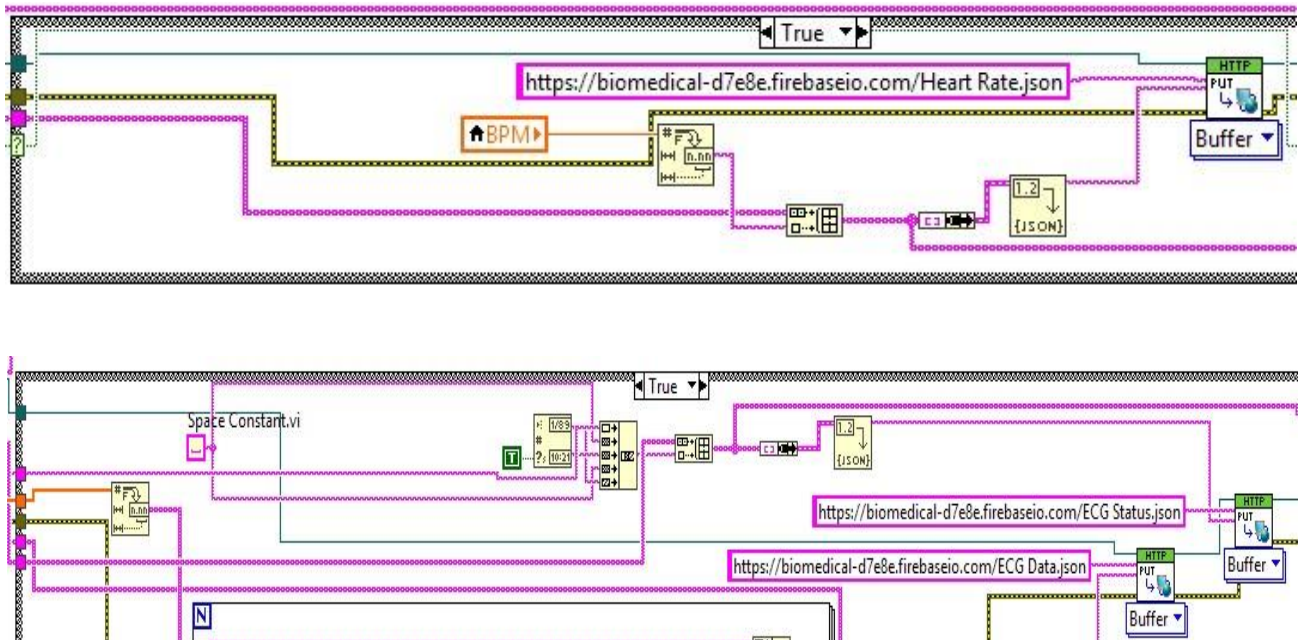


Fig 12. Front Panel Connection to the Cloud Server

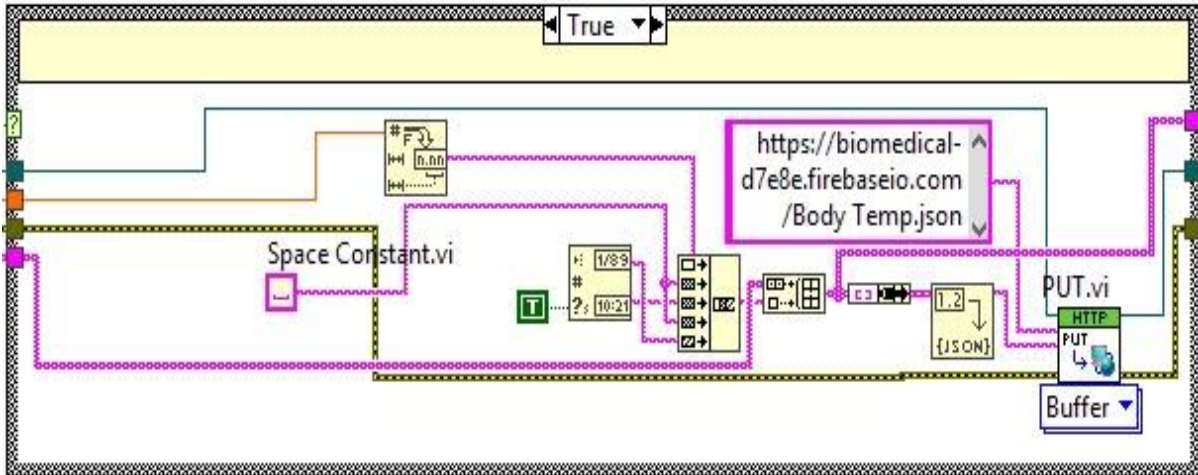


Fig 13 Front Panel of Body Temperature

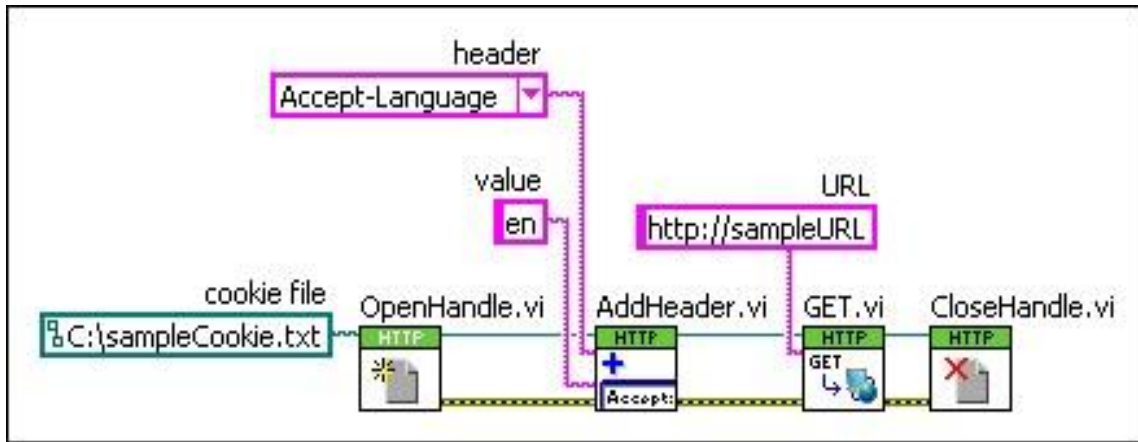


Fig 14 General Connection B/w Cloud Server and LabVIEW

The above fig shows code that performs the following:

1. The OpenHandle VI opens a client handle and a client-side cookie that can store persistent data.
2. The AddHeader VI adds a new header field line that sets the preferred language for subsequent Web requests associated with the client handle.
3. The GET VI performs a Web request that includes the Accept-Language header.
4. The CloseHandle VI closes the client handle and deletes any persistent data, including headers.

VIII. CREATING OUR BASE OF OPERATIONS PROJECT

A base of operations project offers we have a tendency to a singular name house for our information. Currently, base of operations isn't simply a time period info however it's a complete suite of services that creates it straightforward for USA to jot down mobile applications. It offers an info, notifications, development tools, authentication, crash reportage, analytics and additional.

In our case, but we are going to be targeted on the info solely i.e. a cargo area within the cloud for work our Bio-Medical Parameters values. In alternative words, we are able to assume one in every of perform of the project as Temperature lumberjack wherever I need to log the Temperature being collected from Temperature sensing element.

In the Welcome screen, we are going to see a button to feature project as shown below:

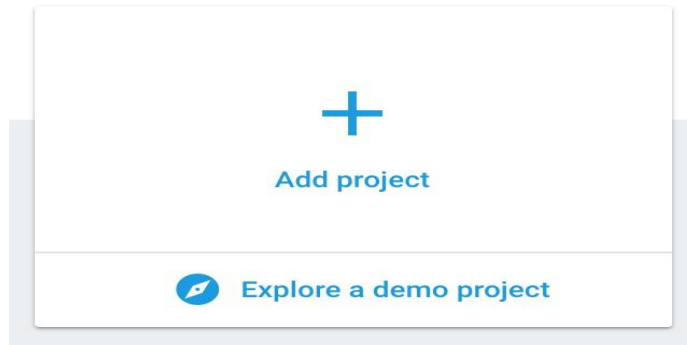


Fig 15 Add Firebase Project

Click on Add project. this may observe the produce a project screen as shown below, wherever we'll got to offer a project name. Note that base can generate distinctive a singular a novel} Project ID (our Google Cloud Platform project ID) if our name isn't unique across all comes. choose a Country/region wherever we'd like our information to be hosted. Click on produce Project.

This will produce a base information below the Spark arrange.

To tell once more, we have a tendency to square measure solely attending to consider the information feature of base and no alternative services for currently. Click on the information link on the left so click on start button as shown below. this may show up some details regarding our information as shown below:

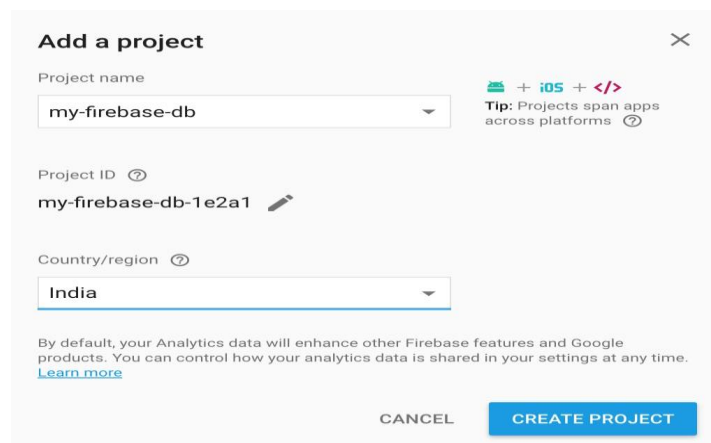


Fig 16 Create a Firebase Project

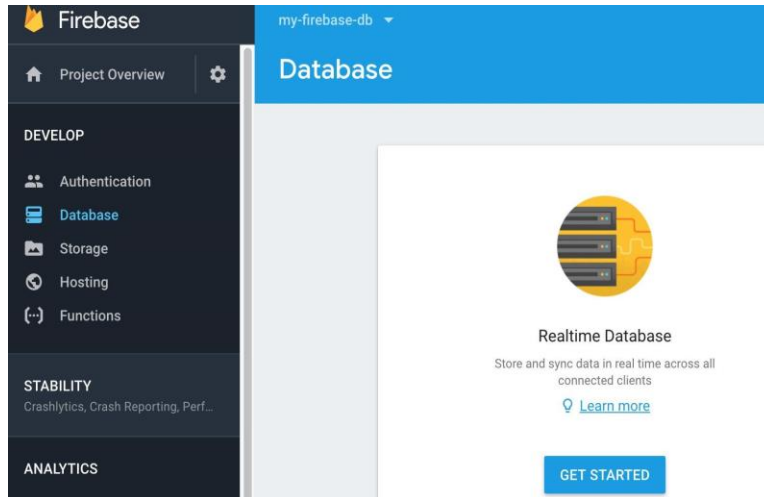
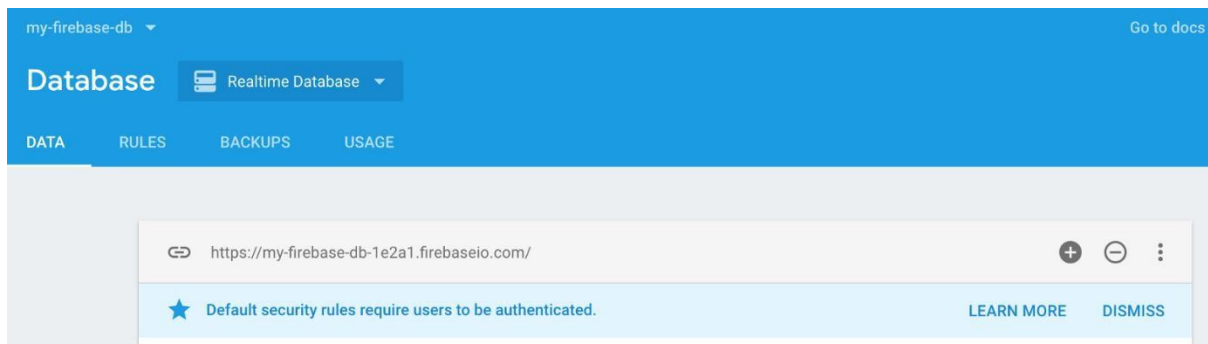


Fig 17 Realtime Database Window

IX. RESULT & DISCUSSION

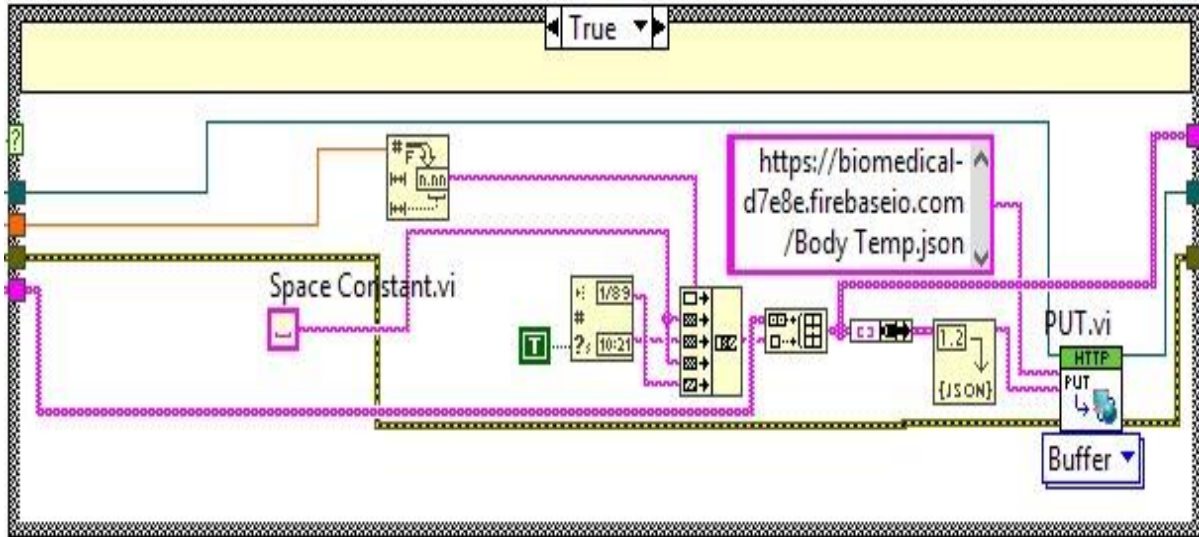
A. Firebase URL



Our database URL (**https://<something>/firebaseio.com**) in the screen on top of is that the distinctive info universal resource locator that's on the market to the skin world for integration. In our case, the LabVIEW application that we have a tendency to shall be writing are victimization this distinctive universal resource locator as our backend information.

B. Firebase Realtime info & Authentication

The base of operations Realtime info lets we tend to build made, cooperative applications by permitting secure access to the info directly from client-side code. Data is maintained domestically, and although offline, Realtime events are still fireplace, offering a sensitive expertise to top users. once the device regains affiliation, the Realtime info synchronizes the native knowledge changes with the remote updates that occurred whereas the consumer was offline, merging any conflicts mechanically.



https://biomedical-
d7e8e.firebaseio.com
/Body Temp.json

Fig 18 Firebase URL

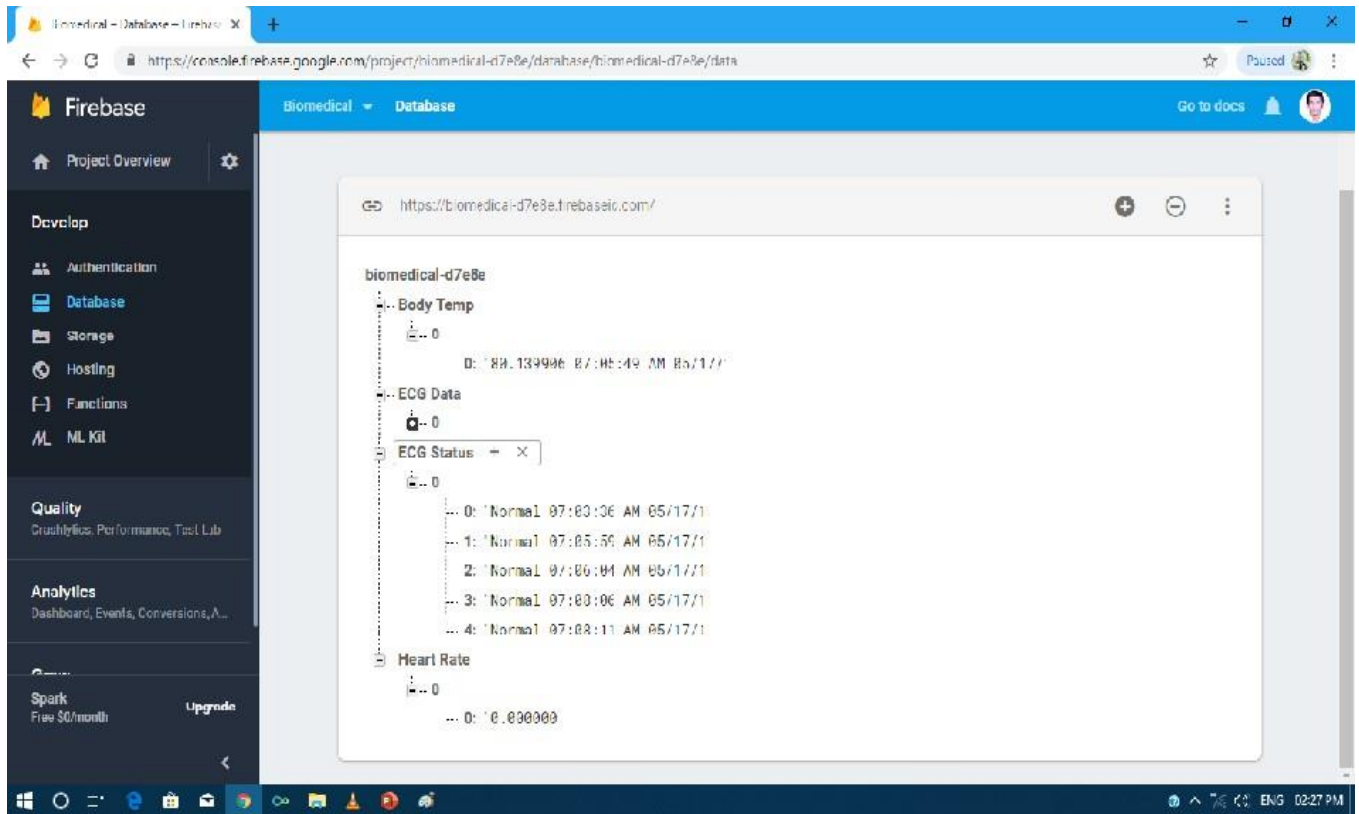


Fig 19. Firebase Realtime Database

The Realtime info provides a versatile, expression-based rules language, referred to as base of operations Realtime info Security Rules, to outline however our knowledge ought to be structured and once knowledge may be scan from or written to. once integrated with base of operations Authentication, developers will outline World Health Organization has access to what knowledge, and the way they will access it.

To sign a user into our app, we have a tendency to 1st get authentication credentials from the user. These credentials may be the user's email address and word, or associate Auth token from a united identity supplier. Then, we have a tendency to pass these credentials to the base of operations Authentication SDK. Our backend services can then verify those credentials and come a response to the shopper.

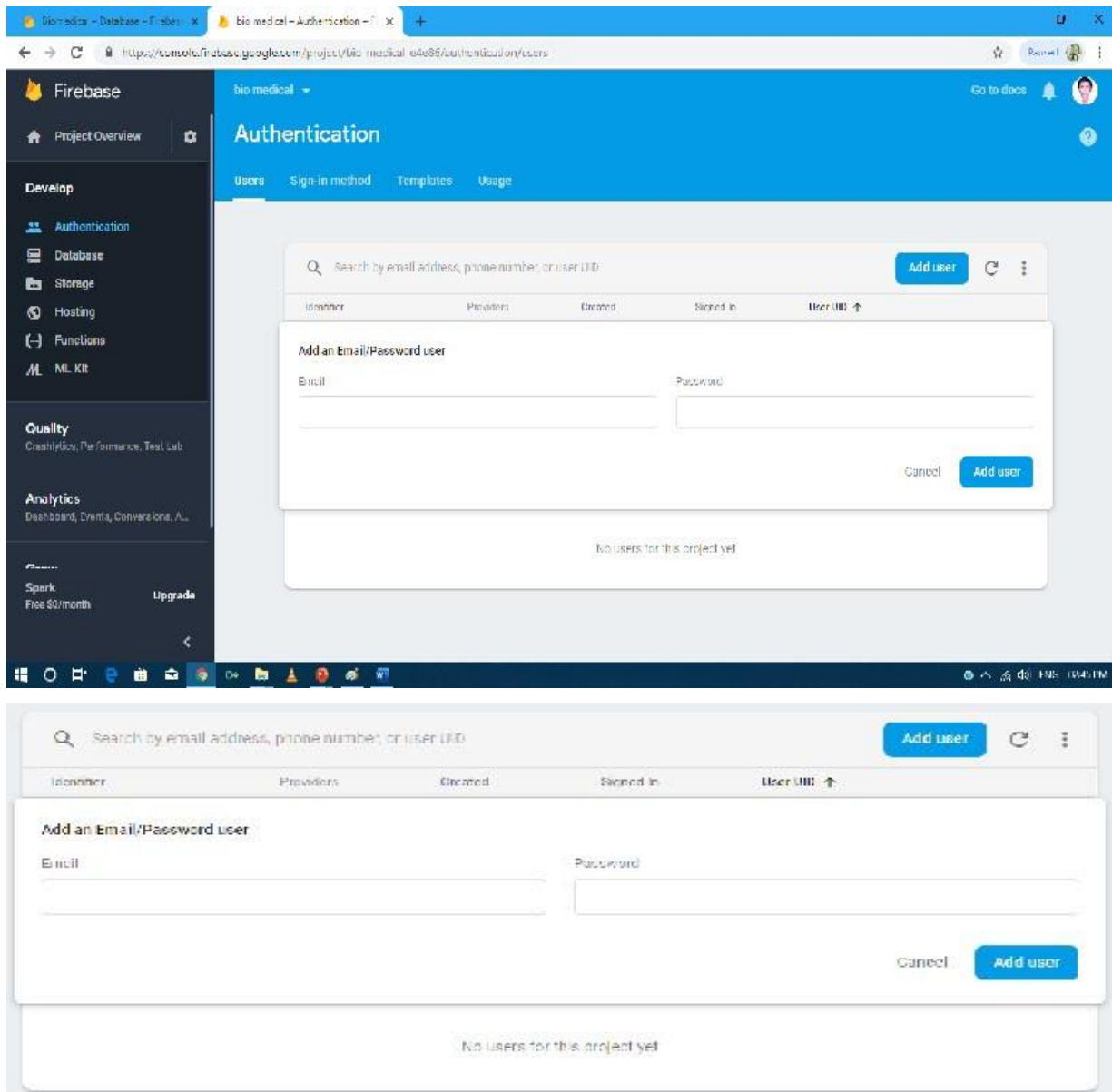


Fig 20. Firebase Authentication & Sign-In Method

We can access the user's basic profile information after a successful sign-in, and we can monitor the user's access to the data contained in other Firebase items. We can also use the authentication token provided in our own backend services to check the identity of users.

X. Applications

In the attention IT market, remote patient observance devices had greatly decrease the burden of patients and delivered prime quality of care with lower risk. on the far side the patient interface, the technology platform is being increased in each corner and solve all medical connected downside of the patient at remote locations.

i. Maintain diabetes:

The patient needs to take care of their blood pressure, blood glucose, weight etc. to regulate diabetes. To this end, these monitoring systems allow the real-time distribution of blood pressure & blood glucose level & healthcare provider warnings for treatment when necessary.

ii. Reduces risk of heart failure:

Most people suffer from cardiac devices because of hectic lifestyle. To reduce the risk of heart failure, technology has brought into the market devices such as cardiac resynchronization therapy, pacemakers, etc. which indicates that RPM improves quality of life, reduces mortality rates, and shortens hospital stay period.

iii. Preventing dementedness and Falls:

As we tend to mature we tend to run the chance of dementedness and falling. Remote watching technology avoids damage & encourages protection by continuous watching to avoid these risks. differing types of sensors ar connected to the patient's quality devices like walkers and canes that indicate warning within the event of fall & loss. Locating or watching senior folks, GPS or {wifi|wireless local ara network|WLAN|wireless fidelity|WiFi|local area network|LAN} or frequence technologies are used.

iv. Remote patient monitoring benefits:

With the growing demand, most countries are embracing this technology and using apps to provide patients with quality treatment. Among the advantages of remote patient monitoring for patient & providers are: Timely & Early-stage care, multiple doctors may diagnose the condition from remote places, proximity to home and community.

XI. Benefits of Cloud in patients Monitoring

We already see that the technology that is transforming healthcare makes this sector less dependent on humans (and thus less vulnerable to human error) and at the same time more patient-oriented. The main benefits of the Internet of Things from which healthcare organizations will benefit are reduced costs Better patient experience Better medication control and adherence to medicine improved outcomes for the treatment

XII. CONCLUSION AND FUTURE SCOPE

In this research, supported the parameters and communication needs of the medicalsystem along with the need for security, nonpublic cloud computing is intended and modelled wherever the medical data of card iac patients WHO below are registered or resided in the hospital, in the medical ward and outdoors in the hospital premises; Is accessed and tracked in the manner of an era. In addition, the security needs square measure of the device was consummated by applying the AES law, which resulted in the safety of overall communication within the planned non-public cloud computing environment.

In addition, the study provided associate degree vast data platform against the causes of heart disease / heart disease / heart disease / heart disease / heart disease } and about the arrhythmia chat engine during which

medical advisors will share their ideas and suggestions that might be outstanding in the fight against large condemning heart disease.

This research will be expanded in early future work with the latest advances in hybrid cloud computing, whereby the most significant aim is to provide the medical services to remotely distributed patients, and also the concept of constantly living the medical data. In addition, the analysis is updated with the newly-used technologies within the information technology arena known as the net of things (IoT), which offers machine-controlled communication services over net access and can be useful for the current advanced medical systems case.

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