The remote health management system with Data Analytics

Introduction:

The advancement of the Internet of Things technology is playing a key role in developing the health sector by making it much more accessible and affordable through easy to use applications for virtual and distant interactions with patients. Using IOT it is possible to overcome the difficulties faced by physically unstable or old patients in consulting a doctor physically on a regular basis. This work has led to a prototype of IoT Based Remote Health Monitoring System. This IOT is application is enhanced with data analytics using which the parameters are analysyed and the health status will be estimated and provide alert if necessary. This also reduces the medical expenses for patients significantly. In addition, the doctors can prescribe necessary medications by observing the patient's health status over time through an application.

Background study:

The main component in our project is IOT and Data Analytics. They are explained below

Internet of Things: Kevin Ashton coined the phrase 'Internet of Things' in 1999. The Internet of Things, or IoT, refers to the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. it's possible to turn anything, from something as small as a pill to something as big as an aeroplane, into a part of the IoT. Tech analyst company IDC predicts that in total there will be 41.6 billion connected IoT devices by 2025, or "things." Smart meters,

Security devices, building automation, automobile and healthcare are the prominent areas where IOT will be deployed.

Data Analytics: Data analytics is the science of analyzing raw data in order to make conclusions about that information. Many of the techniques and processes of data analytics have been automated into mechanical processes and algorithms that work over raw data for human consumption

Proposed system:

The proposed system make use of IBM platform to easily implement an IOT service with less amount of coding . Together with IBM Watson Machine Learning, IBM Watson Studio is a leading data science and machine learning platform built from the ground up for an AI-powered business. Along with this if we cam combine IBM cloud and IBM IOT platform we can make excellent IOT ptoducts. simplifying the process of experimentation to deployment, speeding up data exploration and preparation, as well as model development and training. Inorder to implement this project we need the following services from IBM
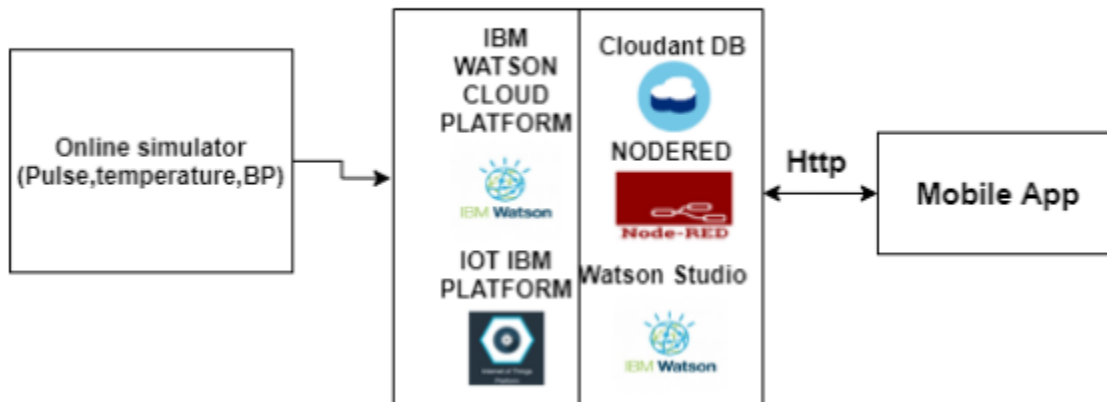
IBM IOT platform

Node red

IBM watsom studio machine learning services

IBM cloud platform

inoreder to make a mobile application we are using MIT app Inventor tool.

Proposed Technical Architecture:

working of the model:

In this the system is trained with appropriate dataset. based on the parameters the patient will be classified into three Categories. I. Normal   2. Need attention 3. Severe case. The watson studio machine learning platform wil, tratin the dataset using various machine learning algorithms and suggest the best one for our use.The health parameters will be monitored by sensors using Arduino/ raspberry platform. In our project we can either use an watson IOT simulator or inbuilt simulator in watson. Node red is a framework to accespt the data from the simulator as well as patient informmation from a Mobile App like name , age , date, gender etc. For each patient the simulator will sent a set parameters imitating the physical sensor values. using this on a trained model we call predict whether the patiiient is normal or need attention. The parameters are displayed on a web application along with the health status

Implementation and screen shots:

Add Device ⊕

All Devices	Diagnose

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

🔍 Search by Device ID

Device Simulator ⬤ || ▽

		Device ID	Status	Device Type	Class ID	Date Added
›	☐	1234	⊠ Disconnected	rhms	Device	Oct 11, 2020 11:14 PM
›	☐	123	⊠ Disconnected	dht	Device	Oct 16, 2020 5:17 PM

Items per page 50 ▾ | 1–2 of 2 items

1 of 1 page ‹ 1 ▾ ›

IBM **Watson** Studio

Upgrade ⇧   ⚓   🔔   Senoj Joseph's Account ▾   SJ

Projects / Remote Health Monitoring System

⬆   👤⁺   Launch IDE ▾   **Add to project +**   ⓘ   ↺   💬   ⊟   ?

⚠ Support for Python 3.6 is deprecated and will be removed in a future release. Use Python 3.7 instead.   Learn more   ✕

Overview	Assets	Environments	Jobs	Access Control	Settings

Data   ✕

Load	Files	Catalog

🔍 What assets are you looking for?

Drop files here or browse for files to upload.

⌄ Data assets

0 assets selected.

☐	Name	Type	Created by	Last modified ↓
☐	CSV Health dataset.csv	Data Asset	Senoj Joseph	Oct 13, 2020, 06:46 PM

⌄ AutoAI experiments

New AutoAI experiment +

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Projects / Remote Health Monitoring System / myML

👁   ⇌   ▶   ⓘ   ↺   💬   ⊟   ?

Experiment summary	Pipeline comparison

Rank by: Accuracy (Optimize... ▾   Score: | Cross validation | Holdout |

Relationship map ⓘ

Prediction column: status

FEATURE TRANSFORMERS

PIPELINES

TOP ALGORITHMS

Health dataset.cs...

Progress map

Swap view ⇄

Experiment completed ✓

8 PIPELINES GENERATED

8 pipelines generated from algorithms. See pipeline leaderboard below for more detail.

Time elapsed: 6 minutes

| Experiment summary | Pipeline comparison | | | Rank by: | Accuracy (Optimize... ▾ | Score: | Cross validation | Holdout |

Rank	Name	Algorithm	Accuracy (Optimized)	Enhancements	Build time
★ 1	Pipeline 1	▌ Decision Tree Classifier	0.962	*None*	00:00:01
2	Pipeline 2	▌ Decision Tree Classifier	0.962	HPO-1	00:00:07
3	Pipeline 3	▌ Decision Tree Classifier	0.961	HPO-1 FE	00:00:38
4	Pipeline 4	▌ Decision Tree Classifier	0.961	HPO-1 FE HPO-2	00:00:16
5	Pipeline 7	▌ Random Forest Classifier	0.958	HPO-1 FE	00:01:09
6	Pipeline 8	▌ Random Forest Classifier	0.958	HPO-1 FE HPO-2	00:01:00
7	Pipeline 5	▌ Random Forest Classifier	0.948	*None*	00:00:06

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Resource list /

Node RED SLCAN 2020-10-16   ● Running   Visit App URL   Add tags ✎

Details | Actions... ▾ |

Getting started
Overview
Runtime
Connections
Logs
API Management
Autoscaling

Instances   Edit ✎

Health

100%

1/1 instance(s) are running

Instances

1 ▲▼

MB memory per instance

0 ——●———————————————— 4352   256

Runtime

SDK for Node.js™

256
Total MB allocation

7.75 GB still available ⑦

☐ Free ■ Used

FEEDBACK

Runtime cost

Connections (1)

Age ⌒

Temperature ⌒

IBM IoT
■ connected

Systolic ⌒

Diastolic ⌒

msg.payload ▤ ◻

Pulse ⌒

Status abc

ƒ function

timestamp

ƒ Pre-tocken

msg.payload ▤ ◻

ƒ Pre-Prediction

http request

http request

msg.payload ▤ ◻

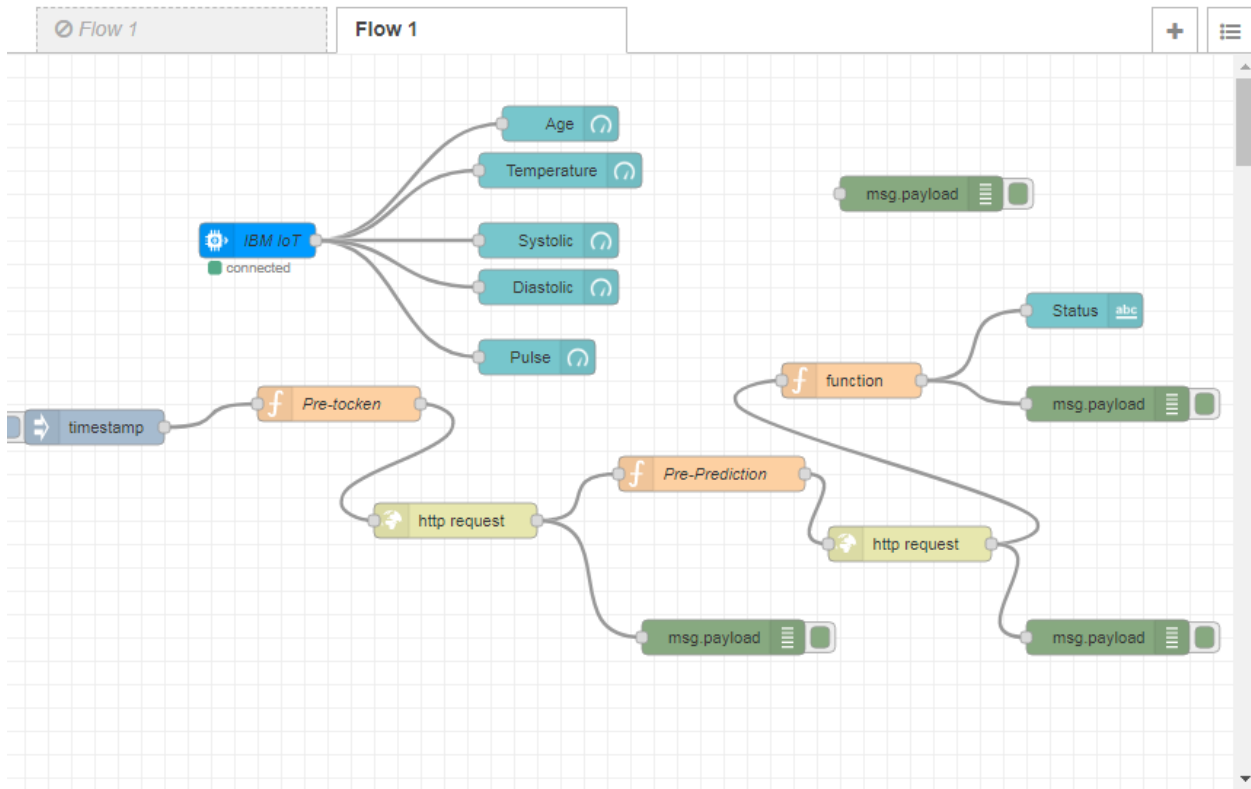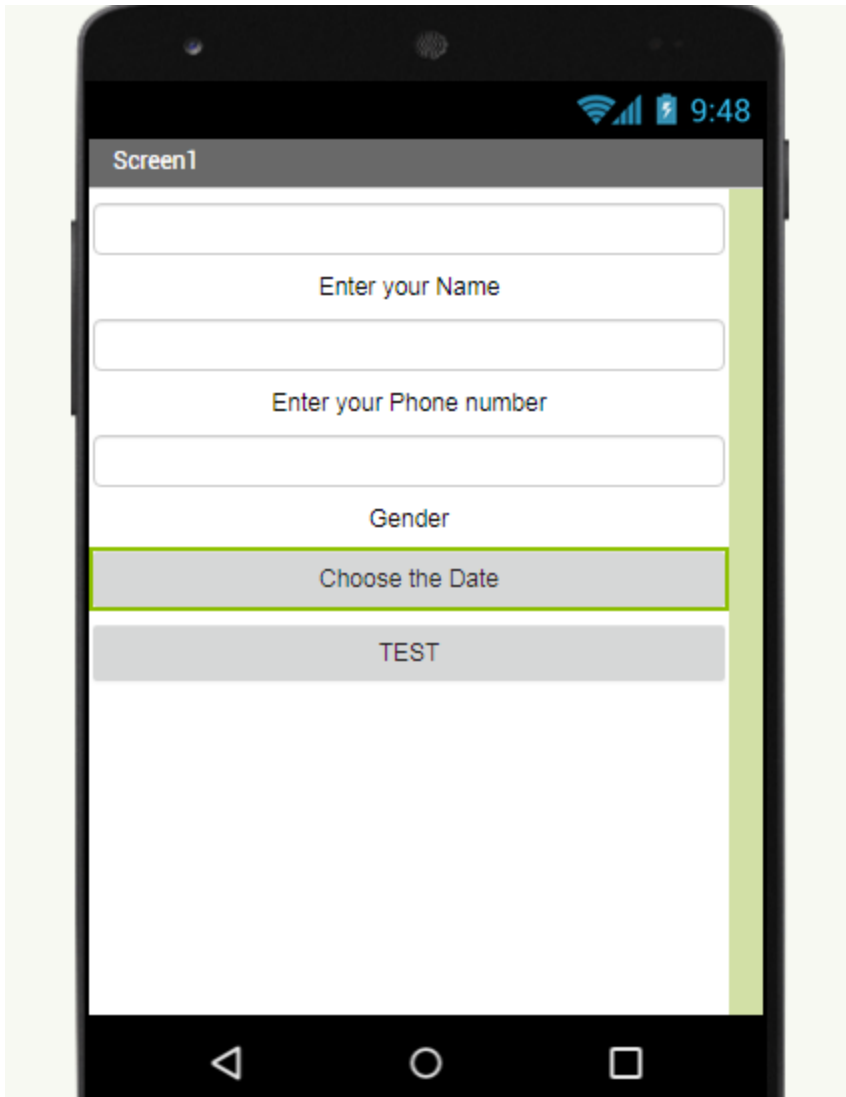msg.payload ▤ ◻

Conclusion: A remote helath management system with data analytics is implemented and tested on IBM platform.