PRESENTATION BY STUDENTS

SETHU INSTITUTE OF TECHNOLOGY

(An Autonomous Institution| Accredited with 'A' Grade by NAAC)

PULLOOR, KARIAPATTI – 626 115.

DEPARTMENT OF BIOMEDICAL ENGINEERING

PRESENTATION BY STUDENTS

Batch No.	Reg. No.	Name of the Student	Title of the Presentation
1.	2018111001	ABDUL RAHMAN U M	Smart Braille based Communication Device
	2018111030	RAJESH KANNA D	
	2018111040	SIMEER SIDDIQ UMAR M	
2.	2018111002	ABINAYA S	Cloud based Pregnant Women Monitoring System
	2018111048	TAMIL ARASI S	
	2018111051	YOGESHWARI N	
3.	2018111003	ALTHAF SAMEER S	Diabetic Foot Healer
	2018111007	DINESH P	
	2018111047	TAMIL ALAGAN L	
4.	2018111004	ASHOK M	Asthma Prediction System using Machine Learning Algorithm
	2018111026	NISANTH KUMAR R	
	2018111036	SATHISHKUMAR S	
5.	2018111005	AYESHA A	Wheelchair an Autonomous Vehicle with Smartness
	2018111032	RITHI G	
	2018111033	RIZWANA FATHIMA M J	
6.	2018111006	DHINA ROHITH S	Wireless ECG with Android
	2018111010	GOWSHICK S	
	2018111013	HARISH B	
7.	2018111009	GOPALAKRISHNAN R	Smart and Non Invasive Glucose Monitoring
	2018111020	MANOJ M	
	2018111024	MUKESH PANDIYAN K	

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Batch No.	Reg. No.	Name of the Student	Title of the Presentation
8.	2018111011	HABIBRAHMAN MR	Advanced Integrated Intensive Care Monitor
	2018111019	MANI RATHINAM M	
	2018111027	PIRITHIVIRAJAN M S	
9.	2018111014	HEMALATHA B	ELN for Next Generation Sequencing for Blood Samples
10.	2018111015	JUHIE S	Smart Recognition of Flex by Sensors for Fractured Victims
	2018111038	SELVA NIRAIMATHI S	
	2018111041	SOWMIYAA M	
11.	2018111016	KANNAN M	Smart Wheel Chair for Physically Disabled People
	2018111018	KEERTHAN P	
	2018111045	SWETHA M	
12.	2018111021	MEERA VARSHINI J	Free Analyzing of Breast Cancer using LabVIEW
	2018111037	SATHYAPRIYA S	
	2018111039	SHANMUGA PRIYA R	
13.	2018111017	KARPAGAKANI T	Classification of MRI Brain Images using Convolutional Neural Network
	2018111022	MERLIN RENAXY A	
	2018111034	SARANYA G	
14.	2018111023	MOHANA PREETHA M	Wearable Device for Pre-diagnosing Hypertension
	2018111050	VIGNESH S	
15.	2018111028	PRAVEEN KUMAR E	Background for Electronic Lab Notebook for Multiplex Cell based Screening Assay for HIV Type I

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Batch No.	Reg. No.	Name of the Student	Title of the Presentation
16.	2018111031	RAJKUMAR M	Blind Assistance for Visually Paralyzed People
	2018111035	SARAVANAKUMAR A	
	2018111049	VEERENDRAN E	
17.	2018111042	SRUTHI I M	Configuration of CDISC Submission Framework for Submission of Clinical Trial

HEAD OF THE DEPARTMENT
Department of Biomedical Engineering
Sethu Institute of Technology
Pulloor,Kariapatti- 626 115

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DEPARTMENT OF BIOMEDICAL ENGINEERING

"ADVANCED TECHNOLOGY USED IN BIOMEDICAL FIELD"

Presentation by students

SETHU INSTITUTE OF TECHNOLOGY

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PULLOOR, KARIAPATTI – 626 115.

DEPARTMENT OF BIOMEDICAL ENGINEERING

Presentation by students

WEARABLE DEVICE FOR

PRE-DIAGNOSING

HYPERTENSION

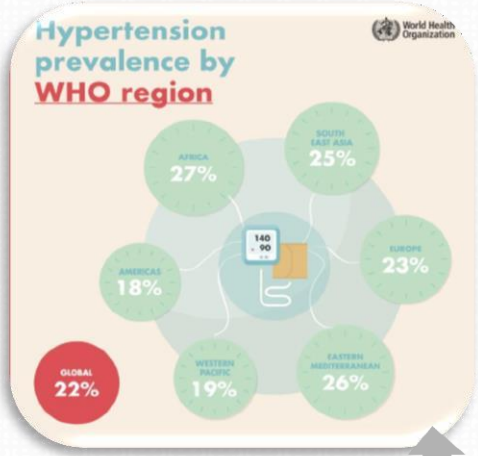
TEAM MEMBERS
1.M.Mohana preetha,
2.S.Vignesh.
BATCH – 14

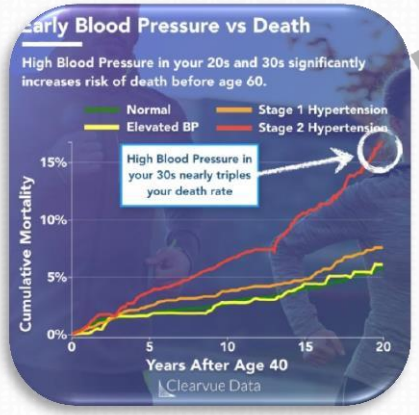
GUIDE :
Dr.E.Maheswaran
Asst.prof(Sr.Gr)/BME

ABSTRACT

- Hypertension is a chronic disease causing risk of different types of disorders such as hypertension attacks, cerebrovascular attacks, kidney failure and cardiovascular diseases.To prevent such risks, statistics related to hypertension have to be monitored and analyzed in real time.
- We are planning to construct a system for pre diagnosing hyper tension with arduino nano interfacing Max30100sensor, EPS8266,OLED,buzzer and Li-ion battery with diet plan management and emergency alert system using IOT.
- In this proposed system ,a wearable device with reminder alert and self control hypertension management with high accuracy, high response device and free friendly environment devices.

INTRODUCTION:





INTRODUCTION:

- HYPERTENSION is a global health issue which is caused due to elevated Blood Pressure (BP) in the arteries.
- The various factors responsible for elevated BP are unhealthy diet, lack of physical activity, human emotions, surrounding environmental conditions and geographical location.
- If BP is extremely high, it causes certain symptoms such as fatigue, severe headache, disorientation, chest pain, shortness of breath and irregular heart beat.
- In 2014, nearly 4,10,000 Americans died due to high BP. US targets to spend $48.6 billion in 2017 on health care support services and medications to treat BP.

LITERATURE REVIEW MATRIX

S.NO	TITLE OF THE PAPER	JOURNAL NAME & YEAR OF PUBLICATION	METHODOLOGY ADOPTED	FINDING	ISSUSES/ PROBLEM
1.	Knowledge and Poor Understanding Factors of Stroke and Heart Attack Symptoms.	ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH 2019	Greater knownledge of symptoms and sign of CVD,which ma ultimately result in a better prognosis and increased survival rate.	Need common Warning sign and symptoms knownledge of CVD.	Unable to explain and understand the feel of discomfort.
2.	Association of Wearable Device Use With Pulse Rate and Health Care Use in Adults With Atrial Fibrillation	JAMA NETWORK 2021	To compare pulse rate and health care use between individuals who use wearables and those who do not.	In market evolution, wearable devices are commonly used and commercial available	Excessive no of alert remainder in clinicians due to false positive.
3.	Wearable Real-Time Heart Attack Detection and Warning System to Reduce Road Accidents	MPDI 2019	Wearable &portable ECG monitorning devices in which based on basic technology i.e labview mobile module and bluetooth, specialy for driver.	It suitable for car environmental and need more advanced technology.	Low accuracy Of detection of heart attack.

S.NO	TITLE OF THE PAPER	JOURNAL NAME & YEAR OF PUBLICATION	METHODOLOGY ADOPTED	FINDING	ISSUSES/ PROBLEM
4.	Comparison of Continuous ECG Monitoring by Wearable Patch Device and Conventional Telemonitoring Device	JKMS 2020	Continuous ECG monitoring by wearable patch device is better than conventional telemontoring devices.	Monitoring duration is long term effective in wearable patch devices without an signal loss.	Conventional Telemonitoring Device can inferred with other radio signal during transferred of data.
5.	Artificial Intelligence for Detection of CardiovascularRelated Diseases from Wearable Device	YNJ 2020	AI model can use to detection and prediction of cardiovascular related disease , design to development and applicatable of wearable devices.	Machine language and its algorithm are used, highly accuracy output can predict.	Its black box-like characteristic that makes undersdtanding its operation and judgement principle is difficult.
6.	The Effect of Smartphone App–Based Interventions for Patients With Hypertension: Systematic Review and Meta-Analysis	JMIR MHEALTH AND UHEALTH 2020	Use of mobile health app are increased and provided abnormal warning to the user.	Feasible in general practice and easy to use .	Risk of bias may low or high.

S.NO	TITLE OF THE PAPER	JOURNAL NAME & YEAR OF PUBLICATION	METHODOLOGY ADOPTED	FINDING	ISSUSES/ PROBLEM
7.	AMBtalk: A Cardiovascular IoT Device for Ambulance Applications	SENSORS 2021	Cardiovascular device basic on IOT technology In ambulance application	Emergency service to the patient in ambulance.	Need high management
8.	Using Sleep Time Data from Wearable Sensors for Early Detection of Migraine Attacks	MPDL 2018	Early detection of migraine attacks was studied based on sleep time data collected using wearable sensors	Sleep data can used in pre diagnosis.	some migraine types are more difficult to predict than others.
9.	Advances in Non-Invasive Blood Pressure Monitoring	MPDI 2021	Based blood pressure sensor which uses machine-learning techniques to extract blood pressure values from the shape of the pulse waveform.	Non-invasive ease of use makes the technology attractive for emergent, trauma, and pre-hospital care.	More cost required for non invasive method

S.NO	TITLE OF THE PAPER	JOURNAL NAME & YEAR OF PUBLICATION	METHODOLOGY ADOPTED	FINDING	ISSUSES/ PROBLEM
10.	Automated Detection of Hypertension Using Physiological Signals	INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH 2021	Physiological signals can be used to monitor health status but are not directly correlated with BP measurements.	To use as aid the staff to alert the sudden rise in the BP of patient.	Need more physiological signal database.
11.	Commercial Devices-Based System Designed to Improve the Treatment Adherence of Hypertensive Patients	INTELLIGENT SENSOR 2019	white-coat effect syndrome	using machine learning and data mining tool based system	Not cooperation with medication
12.	Mobile Personal Health Care System for Noninvasive, Pervasive, and Continuous Blood Pressure Monitoring	JMIR MHEALTH AND UHEALTH 2020	:Smartphone-based blood pressure (BP) monitoring by PPG sensor	artificial neural network model had good average accuracy	small size of the validation and more complex

S.NO	TITLE OF THE PAPER	JOURNAL NAME & YEAR OF PUBLICATION	METHODOLOGY ADOPTED	FINDING	ISSUSES/ PROBLEM
13.	The quest for accuracy of blood pressure measuring devices	WILEY 2018	development of efforts to improve and validate the accuracy of BP measuring devices	device should be accurate	cost effective
14.	Wearable Piezoelectric-Based System for Continuous Beat-to-Beat Blood Pressure Measurement.	MPDI 2020	PTT-based methods for blood pressure	suitable for continuous long-term blood pressure-monitoring application.	easily induce air gaps under extended use during daily activities
15.	Twenty-Four-Hour Ambulatory Blood Pressure Monitoring	Journal of Primary Care & Community Health 2020	small devices connected to the arm cuff with tubing that measure blood pressure every 15 to 30 minutes	office BP readings and ABPM are not robust	invasive method

PROBLEM IDENTIFICATION

- Unable to understand and operate the devices.
- Need friendly devices with suitable environmental.
- Need more accuracy response.
- More pre-reminder alert before any emergency risk.
- Need high storing space.

SOCIAL RELEVANCE OF PROJECT

- The popularity of wearable technologies have increased day by day, In the near future, wearable technologies are expected to become an indispensable part of our daily life.
- wearable technologies will be a milestone both for daily life of people and the way of doing businesses of the companies in the future.
- The potential applications indicate that the future will be safer, easier, healthier, quicker, and more entertaining with the wearable technologies.

MOTIVATION

- Nowadays each and every individual person face more tension in every situation such as family pressure, work pressure, traffic, noise pollution that is reach to hypertension
- To prevent such disease we design the wearable devices for hypertension using patient monitoring system principles.

  If patient monitoring system can be wearable?

  If wearable then you can use for it device to avoid the risk of health?

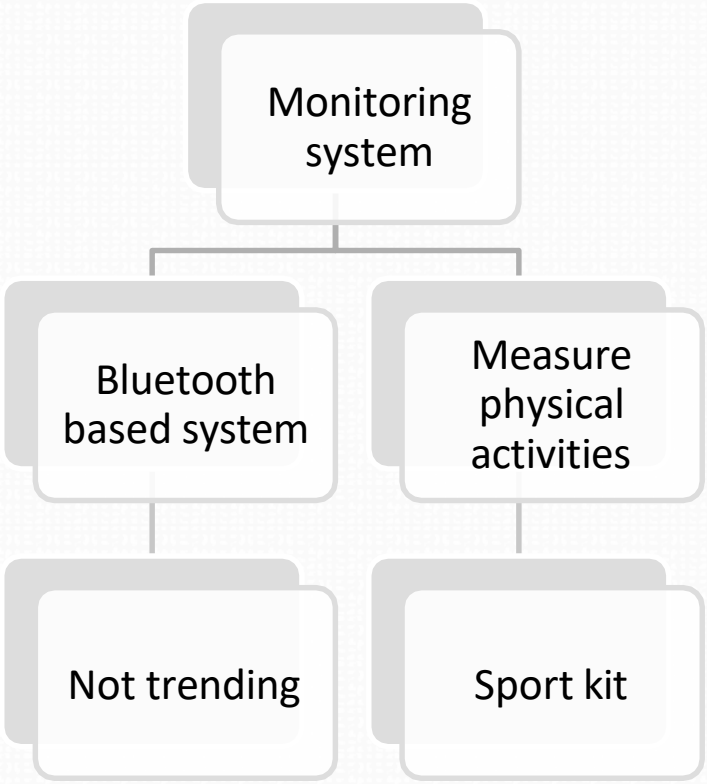
  Is not possible in today's world ?

OBJECTIVE

- To design an IoT-fog based healthcare system to provide remote diagnosis of hypertension stage as well as prediction of hypertension attack based on user's health symptoms.
- To provide fog computing facility at the proximity of the hypertensive patients for continuous monitoring and generating timely alerts of BP fluctuation to users.
- To have effective medical record sharing mechanism to provide precautionary measures and suggestions according to the current state of hypertension.

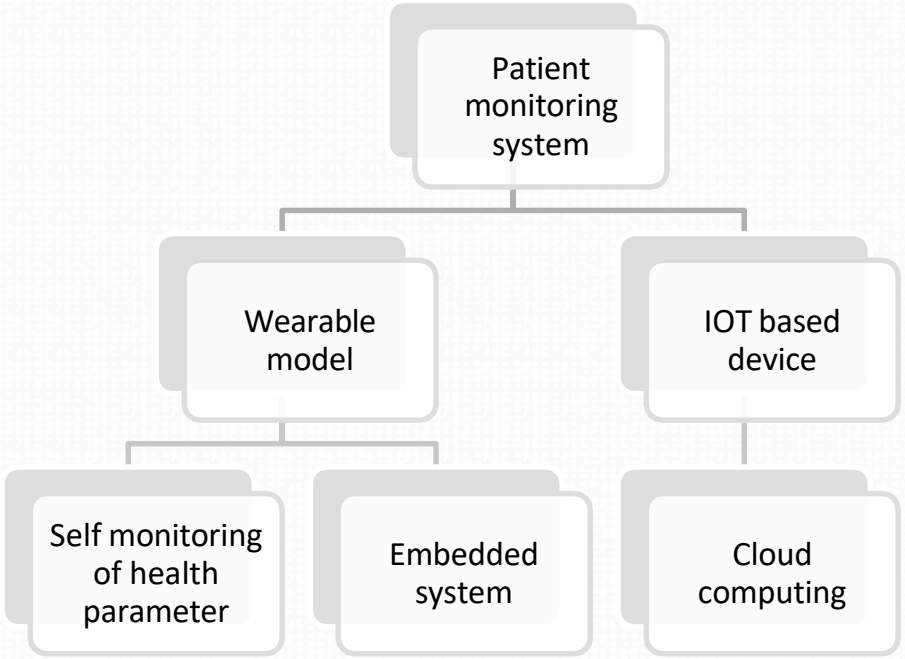
SYSTEM MODEL

- EXITING SYSTEM
  - Sport kit application
  - Not IOT based system
  - Medical uses is low
  - More complication

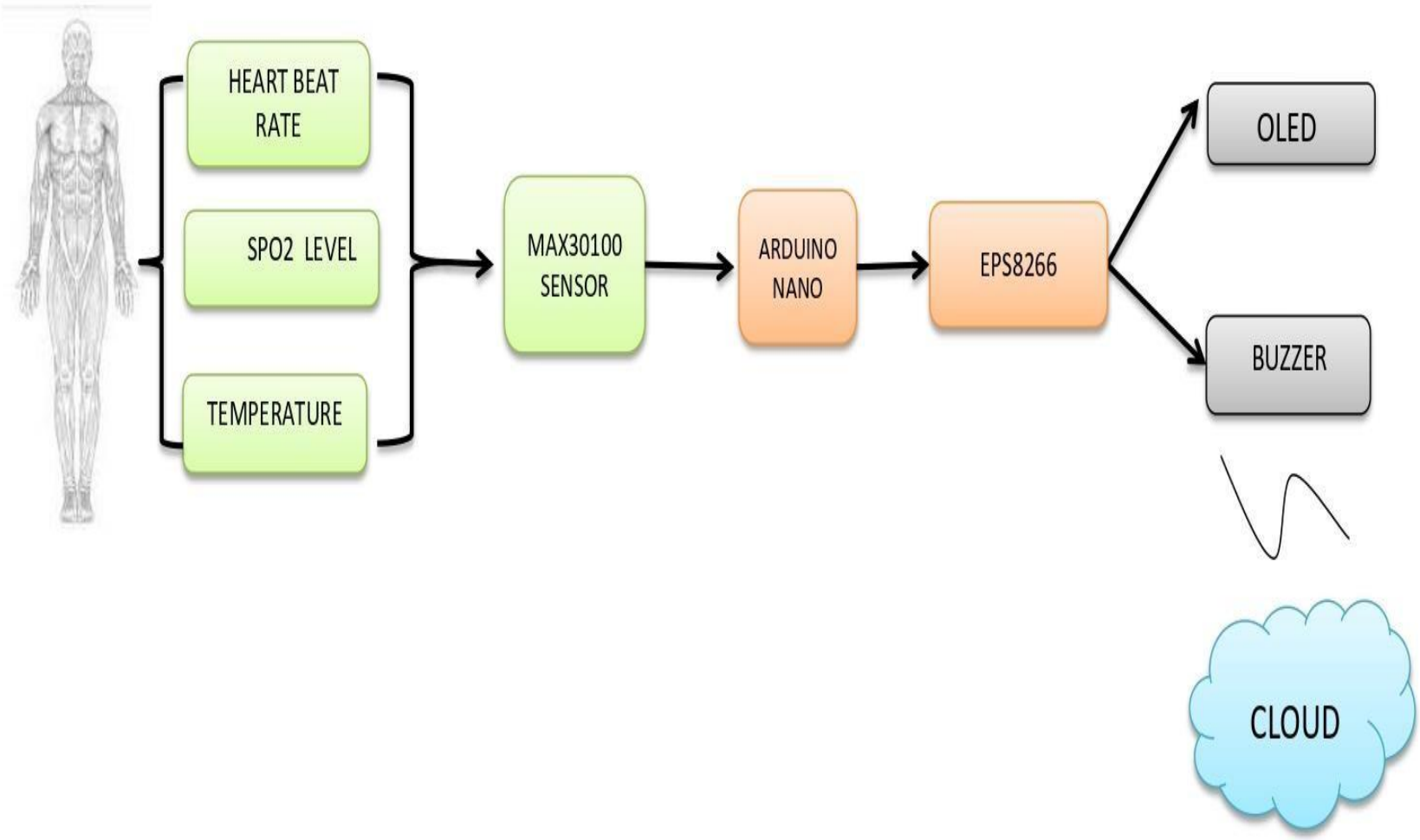


SYSTEM MODEL

- PROPOSED SYSTEM
  - Wearable model
  - Non invasive
  - Medical diagnosing application
  - IOT based device
  - Rechargeable properties
  - Long lasting device



BLOCK DIAGRAM



CONSIDERATION FOR PUBLIC HEALTH, SAFETY AND ENVIRONMENT

- As it is a monitoring device it will not make any harm to the users and surrounding environment.
- It is an Non-invasive method of diagnosing.
- It is an emergency alerting device so it will not make any irritation to the users.
- It is an user friendly device.

METHODOLOGIES

1. Collecting all necessary data using sensors.
2. Hardware construction.
3. Create program code for Arduino Nano to process the data
4. Hardware construction.
5. Display output via OLED and webpage.
6. Alerting system-buzzer and self monitoring system.

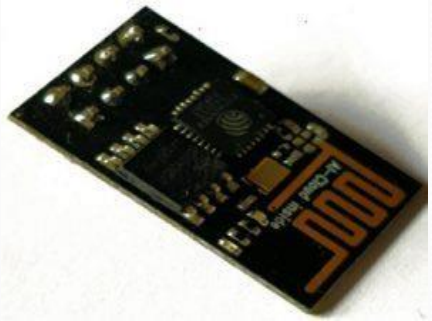
REQUIREMENT ANALYSIS

HARDWARE REQUIREMENT

- MAX30100 sensor
  - Pulse oximetry and heart rate sensor
  - Perfectly suitable for wearable
  - Non invasive sensor
  - Non electrode sensor
- ARDUINO NANO
  - Microcontroller
  - ATmega328 (I2C)
  - Small in size
- EPS8266
  - EPS-01 modulus
  - AT command set
  - Low cost
  - Developed by Espressif system
- OLED display
  - Organic light emitted diode display
  - 0.96” inch(I2C)
  - 4 pin modulus(128X64)
- BUZZER
  - Piezoelectric effect buzzer
  - Audio alert (vibrate)
- Li-ion Battery
  - Rechargeable battery
  - Flat in shape
  - Mobile charger

HARDWARE REQUIREMENT

MAX30100 sensor



EPS8266-EPS01

Arduino Nano

OLED display

Piezoelectric Buzzer

Li-ion battery

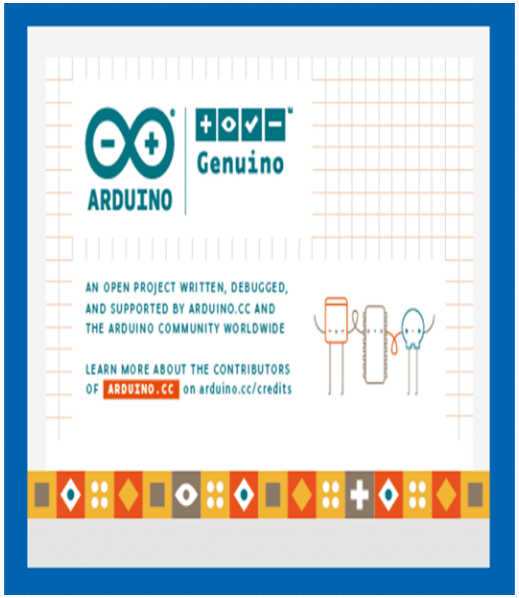
Li-ion battery charger

SOFTWARE REQUIREMENT

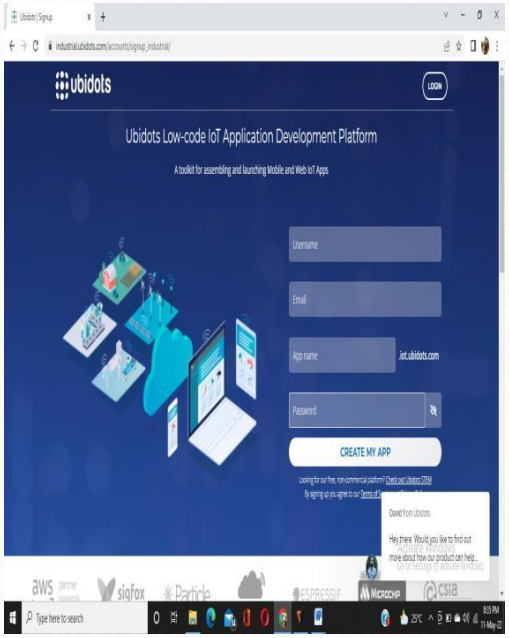
- ARDUINO IDE
  - Arduino Integrated Development Environment
  - More convenient and cost effectively software
  - Use to coding the embedded system
  - Easy to add any feature in system using this software

- UBIDOTS SERVER
  - IOT platform application builder
  - Use to send data to cloud
  - with help of EPS8266 modulus
  - Free server to create webpage and mobile apps.

SOFTWARE REQUIREMENT

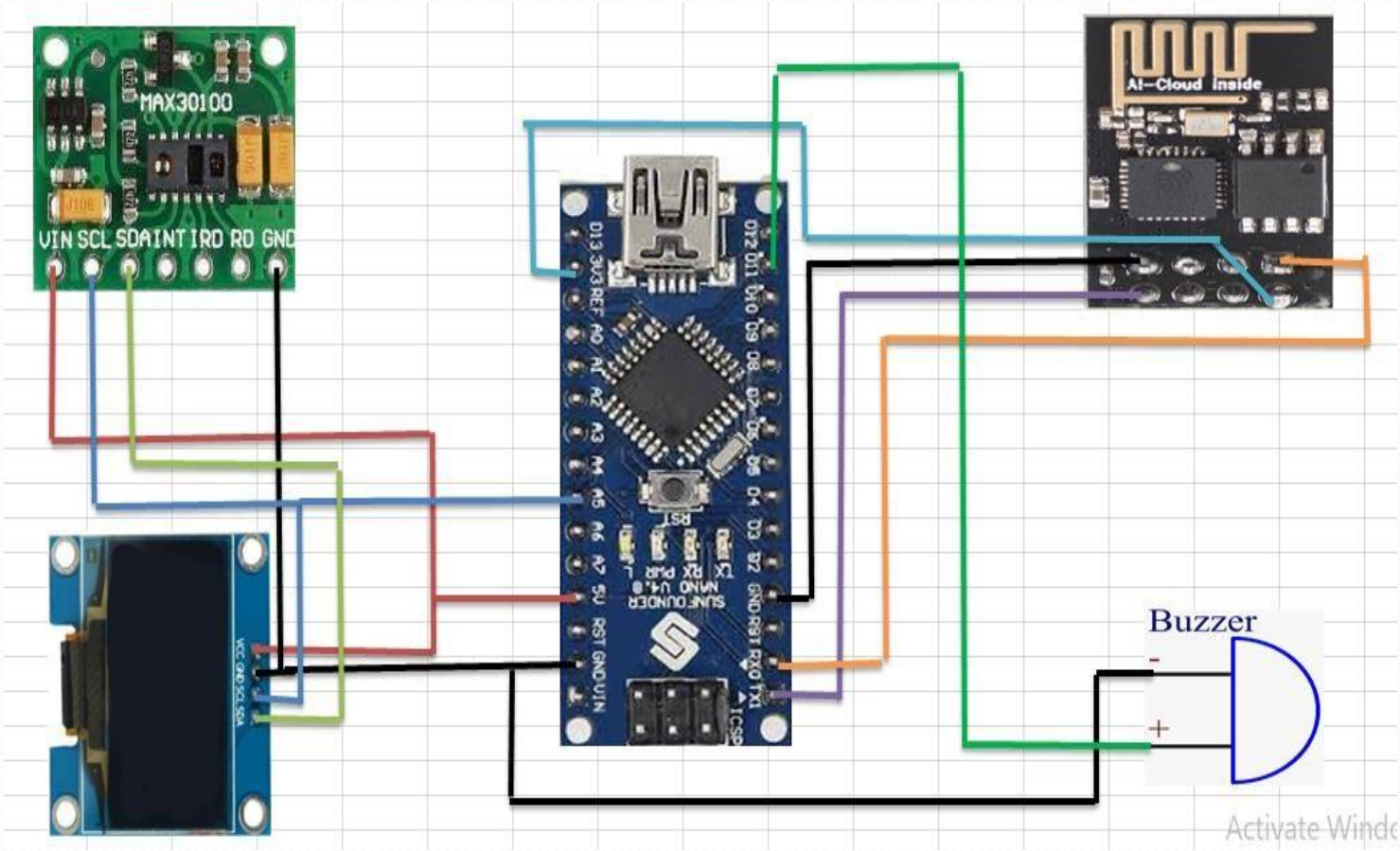


ARDUINO IDE



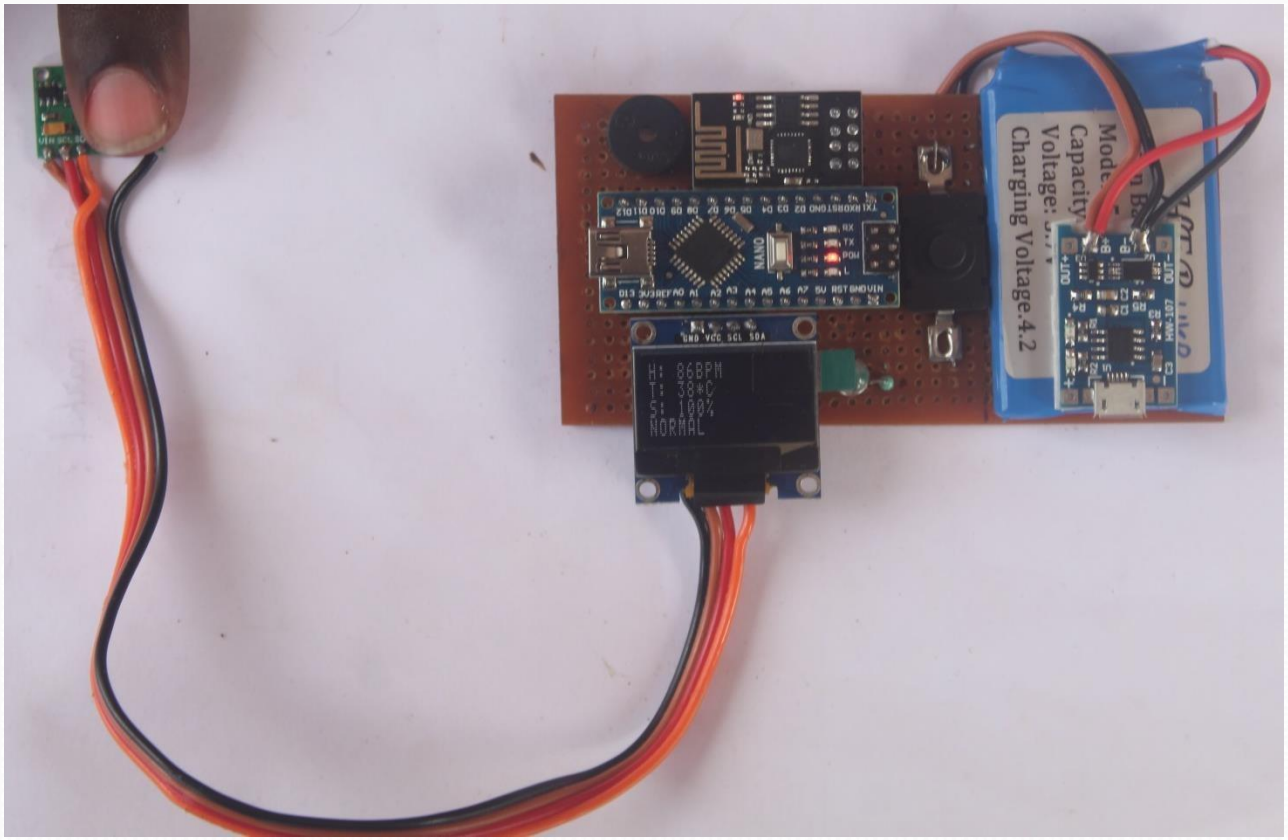
UBIDOTS SERVER

CONNECTION DIAGRAM

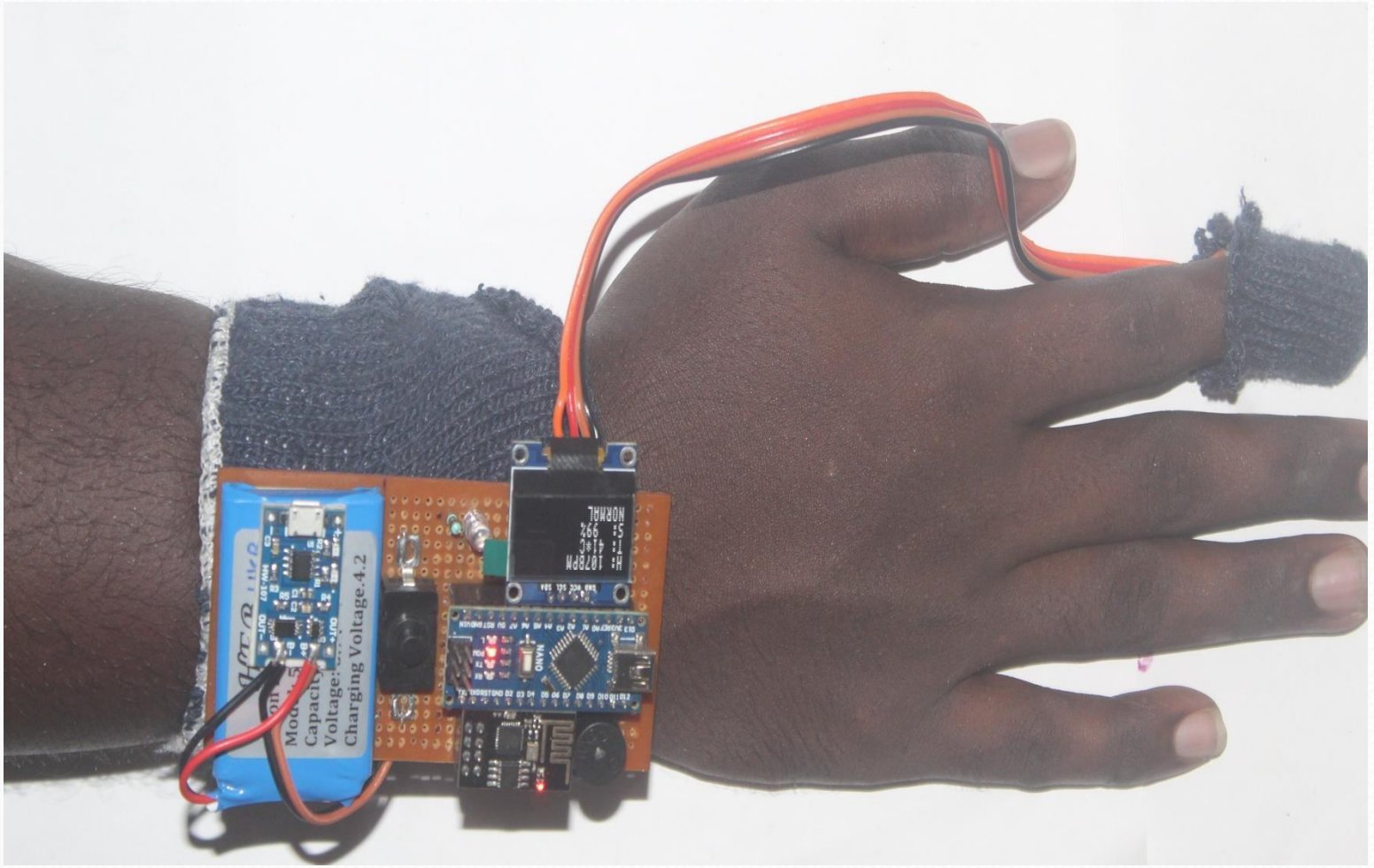


RESULT

- COMPLETED DESIGNED PROTOTYPE SYSTEM



RESULT (CONT.)



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