



B.M.S. COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

RESEARCH CENTRE FACILITIES

INFRASTRUCTURE

The Department of Computer Science and Engineering has 395.1 (Sqft) Area of infrastructure for research and development.

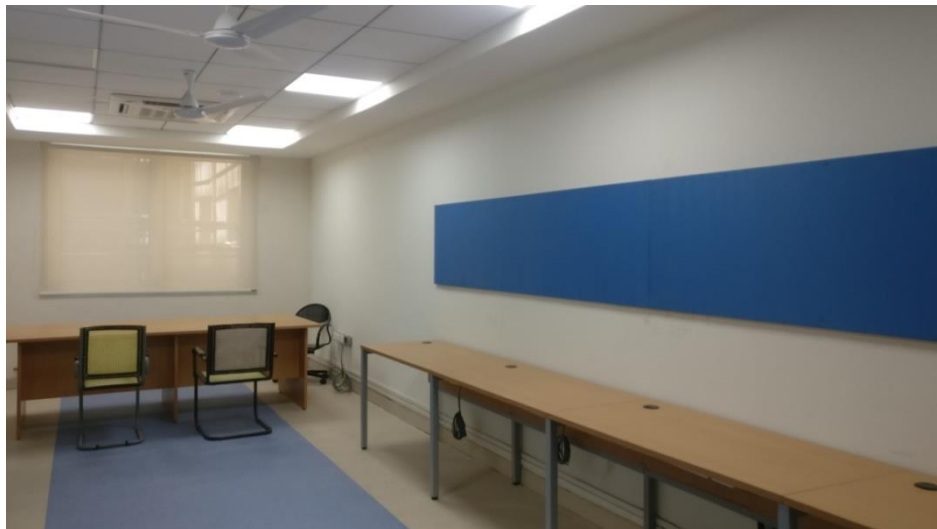


Fig 1: Research Centre

Internet of Things – Research Facility

The Research Centre has the following components to do IoT related research activities:

Table 1: IoT Components

Sl. No.	Items
1	VivoStick PC (TS10)
2	Sony X75E Full HD TV (43 Cms)
3	Samsung Galaxy A8+ (Android Phone)
4	Apple iPhone 7
5	RASPBERRY PI 3 MODEL B+ (Power cable, USB Cable, SD Card)
6	Arduino Mega 2560 R3 Kit
7	D-Link DSL-2750U Router
8	GY NEO6M GPS Module
9	GSM/GPRS TTL UART MODEM-SIM900A
10	ESP8266 ESP-01 remote serial Port WIFI wireless module
11	HC-05 Bluetooth Module
12	Mini Push Button Switch
13	CAMERA MODULE V2
14	R305 Optical Fingerprint Scanner Sensor Module
15	5V RELAY BOARD 4 CHANNEL MODULE
16	DHT22 Digital Temperature And Humidity Sensor
17	Flame Sensor Breakout
18	High Sensitivity Water Sensor
19	Hall Effect Sensor
20	Air Quality Sensor (MQ135)
21	USB To RS232 Converter- CP2102
22	Zigbee XBEE S2C low-power module



Fig 2: IOT Components

Internet of Things - Funded Project:



VGST Funded Project
 Program Coordinator: Dr. Kayarvizhy N,
 Associate Professor, CSE, BMSCE
 Fund Received : VGST : Rs. 5,00,000



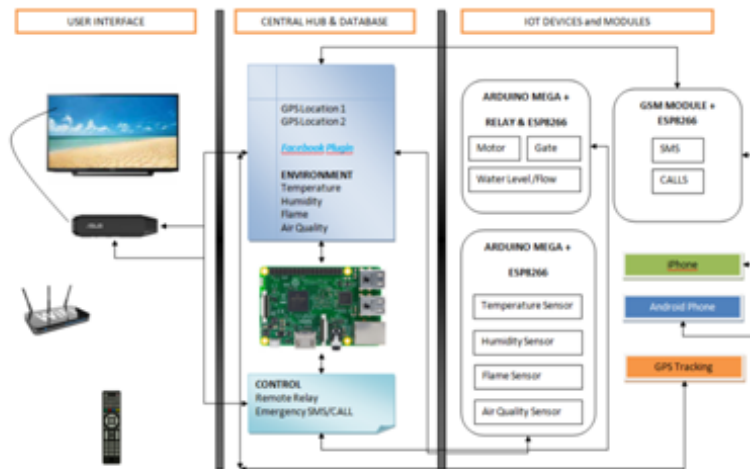
HDMI based IoT Device for enhancing the life and security of Senior Citizens

Abstract

The current social scenario of aged people who have to take care of themselves is getting worse. In most cases they either leave alone or with their aged spouse. Even every day activities become difficult in this environment. There is also a constant risk of something going wrong and help not arriving on time. Their social life with kids and grandchildren also takes a hit as they don't live nearby and are not prone to using technically complex things like a smart phone. All this leads to a scenario where an automated system needs to be in place which is as easy to use as a TV. This background analysis lead to the conclusion that an intelligent device that plugs to a TV and which can then control, aid and entertain the aged would be an ideal solution.

The device connects as one of HDMI input in TV and shows the following menu options

- Track a person using maps (One senior citizen might have, to track his/her spouse to know that they are safe)
- Photo Album : Family members can post photos which show up in the album
- Know the status of and control important appliances like motor, front gate etc.
- Call emergency number and post emergency status
- Alert system
- Local alert network that gets data from nearby sensors at home and alerts through SMS and Notifications to the enrolled persons
- Device is simple to use with a clean UI and big text/graphics
- Device can be operated using voice commands and or TV Remote
- Device can also be operated by another person from outside if required (son/daughter)



Architectural Diagram

Data Science – Research Facility

The high configured desktop is available for Research scholars to do data analysis. The configuration is as shown in Table 2.

Table 2: Desktop Configuration

Sl.No	Specification of desktop	No of Units
1	Processor Motherboards RAM Hard Disk Graphics Connectivity Peripherals Monitor Others Optical Drive Software (OS) Software	1

Image Processing– Research Facility

TiX560 and TiX520 -Infrared Cameras -The Fluke Expert Series is available to capture high quality images and the desktop with Nvidia GeForce GTX1060 with 6GB DDR5 is available for processing high resolution images for image processing application



Fig 3: Infrared Camera

Table 3: Desktop Configuration for image processing

Sl. No.	Feature	Specification		
1	Processor	Intel Core i7 7 th gen 7700 -3.60 ghz -4core/8threde-8 mb L3 catch		
2	Motherboard	Gigabyte H110		
3	RAM	Min 16GB DDR4, Upgradable upto 32 GB		
4	Hard Disk	240GB SSD + 1TB HDD SATA		
5	Optical Drive	DVD		
6	Graphics card	Nvidia GeForce GTX1060 with 6GB DDR5		
7	Audio	Integrated High Definition audio (all ports are stereo) – IN BUILT		
8	Networking	Integrated Gigabit Ethernet – IN BUILT		
9	Keyboard	USB Keyboard		
10	Mouse	USB Optical mouse		
11	Ports	<table border="1"> <tr> <td>Front: 2 USB Front: 1 Microphone Front: 1 Headphone Rear: 6 USB</td> <td>Rear: 1 VGA / Display Port Rear: 1 Ethernet (RJ-45) Rear: 1 Audio Line in Rear: 1 Audio Line out</td> </tr> </table>	Front: 2 USB Front: 1 Microphone Front: 1 Headphone Rear: 6 USB	Rear: 1 VGA / Display Port Rear: 1 Ethernet (RJ-45) Rear: 1 Audio Line in Rear: 1 Audio Line out
Front: 2 USB Front: 1 Microphone Front: 1 Headphone Rear: 6 USB	Rear: 1 VGA / Display Port Rear: 1 Ethernet (RJ-45) Rear: 1 Audio Line in Rear: 1 Audio Line out			
12	Power Supply	550 Watts or higher with 92% Efficiency Active Power Factor Correction (PFC) -CORSAIR BRAND		
13	Monitor	LED 21.5’’ or higher Wide Screen Monitor --LG		
14	Compliance And Certification	Certified for Microsoft and Linux Products compatibility		
15	Cabinet	Mini Tower		
16	Warranty	ALL DIRECT BY BRANDS SERVICE		

Image Processing – Funded Project:



Collaborative Research Project

PI: Dr Umadevi V, Department of CSE
 CI: Dr Joshi Manisha, Department of Medical Electronics
 International Collaborator: Dr Mohamed Yacin,
 Majmaah University



Intelligent System for the Assessment of Diabetic Foot and Varicose Vein Complications using Thermography

Objective

To build an intelligent system for diabetic foot and varicose vein complications assessment using Thermography, Image Processing and Machine Learning.

Infrared Thermography

Scanning procedure using infrared camera to measure and capture infrared radiations emitted from the skin surface as thermal image.



Fig.1 Thermal Image Acquisition



Fig.2 Image Acquisition

Deep Learning Approach

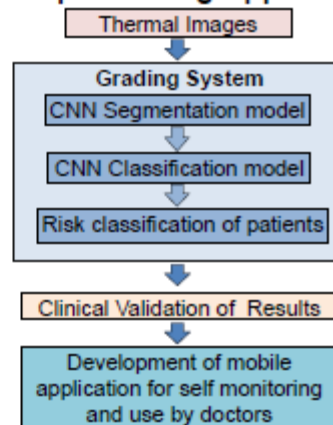


Fig. 3 System Architecture

Funds Received

Majmaah University : 10,000 SAR
 TEQIP : 8,76,812 INR

Collaborating Hospital

KIER - Karnataka Institute of
 Endocrinology and Research

Publications:

1. Sudha Bandalakunta Gururajarao, Umadevi Venkatappa, Joshi Manisha Shivaram, Mohamed Yacin Sikkandar, Abdulrah Al Amoudi, Chapter 4 - Infrared Thermography and Soft Computing for Diabetic Foot Assessment, Editor(s): Nilanjan Dey, Surekha Borra, Amira S. Ashour, Fuqian Shi, Machine Learning in Bio-Signal Analysis and Diagnostic Imaging, Academic Press, 2019, Pages 73-97, ISBN 9780128160862
2. B. G. Sudha, V. Umadevi, J. M. Shivaram, M. Y. Sikkandar, A. Al Amoudi and R. C. Chaluvanarayana, "Statistical Analysis of Surface Temperature Distribution Pattern in Plantar Foot of Healthy and Diabetic Subjects Using Thermography," 2018 International Conference on Communication and Signal Processing (ICCSPP), Chennai, 2018, pp. 0219-0223.

Wireless Sensor Network– Research Facility

The following components are available to do Wireless Sensor Network research work.

- OSSILSCOPE,
- VARIABLE DCPOWER SUPPLY,
- DEVELOPMENT BOARD,
- WIRELESS INTERFACEKIT,
- SESSOR KIT ULTRASONIC DISTANCE MEASURE, PROJECT BOARD,
- TARGET BOARD,
- MOTOR KIT,
- SERVER MOTOR,
- DISPLAY KIT,
- GRAPHIC DISPLAY,
- LAPTOP INTEL CORE I5 2 NOS



Fig 4: Wireless components

Wireless Sensor Network– Funded Project:



UGC Funded Research Project

PI: Dr Golla Varaprasad, Department of CSE

Sponsoring authority : University Grants Commission, New Delhi.

Funds Received : Rs. 43.50 lakhs

Development of Intelligent Traffic Control System by using RFID Technology

Objective

This is the idea behind Intelligent Transport Systems (ITS). In India, however, ITS cannot be a mere replication of the deployed and tested ITS in developed countries. The vehicular traffic in India is non-lane based, heterogeneous and highly disordered. Significant R&D efforts are needed to adapt the existing ITS techniques to address this scenario. The main objective of the proposed work is to identify the vehicle automatically and autonomously send control signals based on the vehicle density in a particular path. The proposed work also aims to give clearance for emergency vehicles over the network and detection of stolen vehicles over the network.

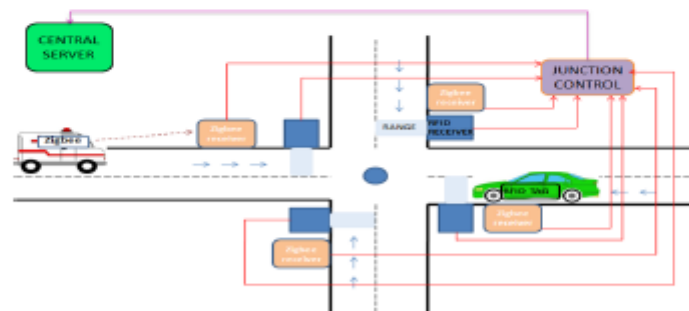


Fig. 1 Proposed Work

Publications:

1. Kumar S., Abhish P.G., Jyothi D.G., Varaprasad G., "Violation Detection Method for Vehicular Ad Hoc Networking", Wiley Security and Communication Networks, Special Issue on Security in Cooperative Vehicular Networks, Vol.9, No.3, pp.201-207, February 2016, DOI: 10.1002/sec.427, Impact Factor: 0.806.
2. Santhosh Hebbar, Praveenraj P., Varaprasad G., "A Mobile ZigBee Module in Traffic Control System", IEEE Potentials, Vol.35, No.1, pp.19-23, January 2016, DOI: 10.1109/MPOT.2014.2341331, H Index: 21
3. Rajeshwari S., Santhosh Hebbar, Varaprasad G., "Implementing Intelligent Traffic Control System for Congestion Control, Ambulance Clearance and Stolen Vehicle Detection", IEEE Sensors Journal, Vol.15, No.2, pp.1109-1113, February 2015, DOI: 10.1109/JSEN.2014.2360288, Impact Factor: 1.852.