VALLURUPALLI NAGESWARA RAO VIGNANA JYOTHI
INSTITUTE OF ENGINEERING AND TECHNOLOGY
An Autonomous, ISO 9001:2015 & QS I-Gauge Diamond Rated Institute, Accredited by NAAC with 'A++' Grade
NBA Accreditation for B.Tech. CE, EEE, ME, ECE, CSE, EIE, IT Programmes
Approved by AICTE, New Delhi, Affiliated to JNTUH, NIRF 135th Rank in Engineering Category
Recognized as "College with Potential for Excellence" by UGC
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Estd.1995

Department of ECE

Center for Embedded Systems and IoT

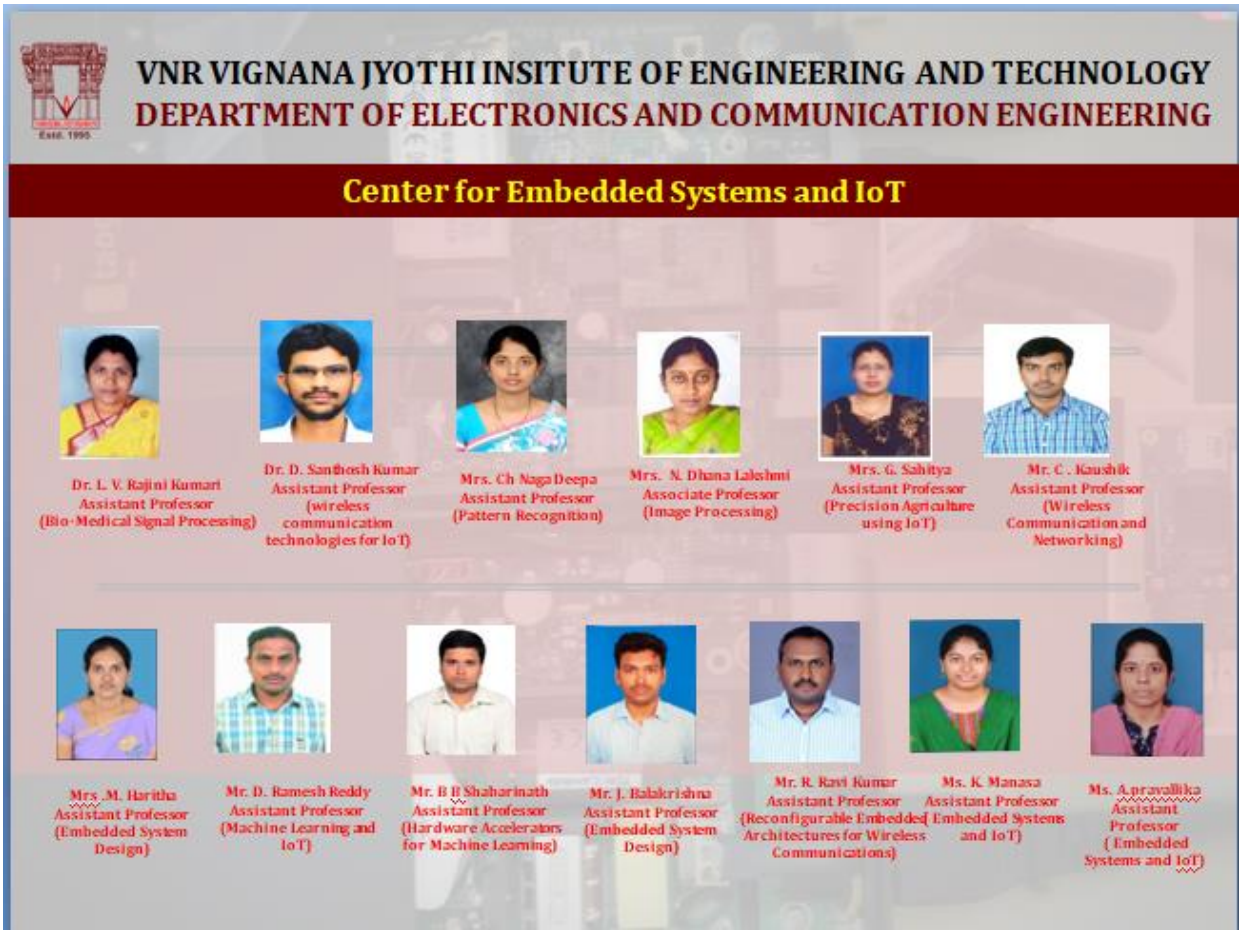
About the Center for Embedded Systems and IoT

The center for and Embedded Systems IoT is established in the year 2010 for implementing research and development projects in the specified field. A group of 13 faculty members are working in the areas of Hardware Software Co-Design, Embedded Systems and Communication technologies for IoT. The Embedded Systems and IoT center is equipped with Network Simulator and Dev Kit, Raspberry Pi-3, Beagle Bone Black, IoT development boards, Sensor Node devices, ARM KEIL Software Tool, IoT Learning Box and IoT Car, Nvidia Jetson Nano Kits, Nvidia's GPU Accelerated PC, Silicon Labs Advaced IoT Kits, IoT Rapid Prototyping kits. Xilinx PYNQ Boards, Texas Istruments Launch Pad, Embedded ARM Development Kits and PCB prototype Making & Antenna Design Machine.

Faculty associated with Center for Embedded Systems and IoT

S. No	Name of the faculty	Designation	Area of research
1	Dr. L. V. Rajini Kumari	Assistant Professor	Embedded Systems, Biomedical Signal Processing
2	Dr. D. Santhosh Kumar	Assistant Professor	Wireless Communication Technologies for IoT
3	Mrs. Ch Naga Deepa	Assistant Professor	Embedded Systems, Pattern Recognition
4	Mrs. N. Dhana Lakshmi	Associate Professor	Embedded Systems and Image Processing
5	Mrs. G. Sahitya	Assistant Professor	Precision Agriculture using IoT
6	Mr. C. Kaushik	Assistant Professor	Wireless Communication and Networking, IoT
7	Mrs. M. Haritha	Assistant Professor	Embedded System Design
8	Mr. D. Ramesh Reddy	Assistant Professor	Machine Learning and IoT
9	Mr. B. B. Shabarinath	Assistant Professor	Hardware Accelerators for Machine Learning

10	Mr. J. Balakrishna	Assistant Professor	Embedded System Design
11	Mr. R. Ravi Kumar	Assistant Professor	Reconfigurable embedded Architecture for Wireless Communications and IoT
12	Ms. K. Manasa	Assistant Professor	Embedded Systems and IoT
13	Ms. A. Pravallika	Assistant Professor	Embedded Systems and IoT



This center received a grant of Rs 15,00,000 from AICTE under MODROBS scheme in the year 2019 to modernize “Advanced Embedded Systems and IoT laboratory”.

Facilities

Center for Embedded Systems and IoT has two laboratories with the following softwares and hardware kits. The facilities are available for all faculty and students who would like to participate in Embedded and IoT R&D activities.

Softwares

NetSim for Researchers (2 User License)

Hardware Kits

Embedded System Development Boards (under TI University Program),

PCB Protoype Making & Antenna Design Machine,

NVIDIA Jetson Nano 2GB Developer Kit,

PYNQ Z2 Development Board and

Embedded Prototyping Boards

The list of Major equipment in center for Embedded Systems and IoT are given below

Personal Computer
(DELL-Intel Core)

Personal Computer

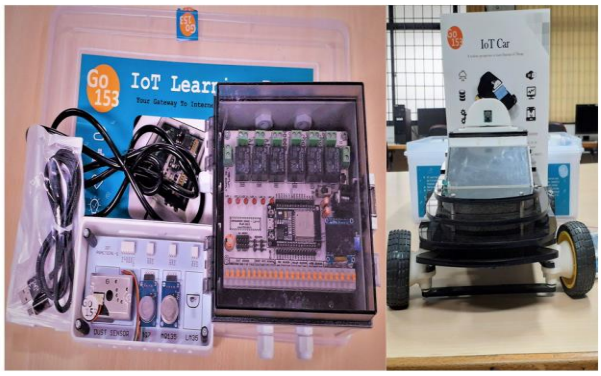
ARM Development Board
(PYNQ-Z2 BASIC KIT)

ARM Development Board

Development Board
(Nvidia Jetson Nano)

Development Board (Nvidia Jetson Nano)

IoT Dragon Board 410c
(IoT Learning Box and IoT car)



IoT Dragon Board 410c
(IoT Learning Box and IoT car)

Desktop with GPU Acceleration

Desktop with GPU Acceleration

SMT Semi Auto Solder Paste Printer
(PCB Prototype Making & Antenna Design m/c)

PCB Prototype Making & Antenna Design m/c

Kinect Sensor
(Kinect Xbox 360 Sensor)

Kinect Sensor

Funded research projects carried out in Embedded Systems and IoT

The list of funded research projects carrying/carried out in center for Embedded Systems and IoT are shown below

Details of funded research projects of Embedded Systems and IoT Center

S.No.	Project Title	Funding Agency	Sanctioned Date	Duration in years	Amount Sanctioned Rs. In Lakhs	Principal Investigator(s)
1	Testing and Design Validation of IoT products used in the smart home automation projects	Blaze Automation Services Pvt. Ltd.	09/09/2021	1	6.00	Mrs. G. Sahitya, Dr.V.Krshna Sree, Mr.C.Kaushik, Dr.D.Santhosh Kumar Dr. V. Sagar Reddy
	Advanced		26/03/201			

2	Embedded Systems and IoT Laboratory	MODROB/AICTE	9	3	15.00	Dr. Y.Padma Sai
3	Development & Implementation of Algorithm for Real Time Home Automation System to assist paralysed Patients using Eye Blinking	UGC minor	16/08/2014	2	3.00	Dr. L. Padma Sree
4	Upgradation of Microprocessors and Microcontrollers Laboratory	AICTE/ MODOROBS	06/03/2012	1	5.00	Dr.V.Padmaja

Faculty Professional Body Memberships

S.No	Faculty Name	Membership No.						
		IEEE	ISTE	IETE	ISOI	IEI	Internet Society	OTHERS
1.	N.Dhana Lakshmi	-	LM62869	M234459	-	-	-	
2.	Dr.L.V.Rajani Kumari	97511211	LM79575	M234471	-	-	2236865	IAENG:293359
3.	Dr.D.Santhosh Kumar	95338534	LM 122056	-	-	-	-	IAENG:293354
4.	G.Sahitya	-	LM62870	M234462	-	-	-	-
5.	Ch.Naga Deepa	-	LM79572	M234472	-	-	-	-
6.	D.Ramesh Reddy	96282300	LM 107795	-	-	-	-	Soft Computing Research Society: 2020-08-09-1278
7.	M.Haritha	-	LM 107799	-	-	-	-	-

8	**B.B.Sabarinath**	97511599	LM 122060	-	-	-	-	
9	**V.A.Bala Krishna**	-	LM 122050	-	-	-	-	-
10	**C. Kaushik**	-	LM 122059	-	-	-	2236855	IAENG:293352
11	**K.Manasa**	-	-	-	-	-	2236872	-
12	**R.Ravi Kumar**	-	-	-	-	-	2229847	IAENG: 125297

Workshops/ Faculty Development Programs/Webinars Organized:

S. No	Title of the Workshop/FDP/Webinar	Duration	Organized by
1	Faculty Development Program on "System Design Methodologies for Embedded, IoT, AI, & HPC using Intel FPGA."	19th - 30th April 2021	IIT Guwahati, MNIT Jaipur, NIT Patna, and NIT Warangal in association with ECE Department, VNRVJIET
2	Embedded UVM Open-Source Emulation & Functional Verification	13th - 24th July 2020	VNRVJIET in association with E & ICT Academy, NIT Patna, MNIT Jaipur
3	Python Programming	7th - 18th September 2020	VNRVJIET in association with E & ICT Academy, NIT Patna
4	Basics of Python Programming	9th - 13th November 2020	ECE department in association with IEEE SP Society
5	Virtual event "IEEE SPS Summer School on Internet of Things for Biomedical and Healthcare Applications."	28th - 31st December 2020	VNR Vignana Jyothi Institute of Engineering and Technology in association with IEEE Signal Processing Society, IEEE Hyderabad Section, IEEE Women in Engineering Affinity Group Hyderabad Section, and IEEE VNRVJIET
6	Training on Network Simulator	02nd – 04th Jan 2020	VNRVJIET in association with Tetcos, Bangalore
7	FDP on Python Programming	02nd – 06th Dec 2019	VNRVJIET in association with E & ICT ACADEMY, NIT Patna

8	Workshop on Advanced Internet of Things with Machine Learning (IoT with ML)	23 - 25 Sep 2019	VNRVJIET in collaboration with IEEE Hyderabad Section Joint Chapter of Circuits and Systems and Electron Devices (CAS/ED) Societies
9	FDP on Sensor Networks and IoT	26 - 31 Aug 2019	VNRVJIET in association with E & ICT ACADEMY, NIT Warangal
10	Workshop on "Arduino Hands-On Training session."	25th July 2019	VNRVJIET in association with IIT, Hyderabad
11	FDP On Embedded Systems & Interfacing- Hands-on	10 - 14 June 2019	VNRVJIET in association with E & ICT ACADEMY, NIT Patna

Details of Patents and their current Status

S.No.	Name of the Inventors	Title of invention	Patent File Number & Date of Filing	Status
AY 2021-2022				
1.	**Dr. Nagadeepa Choppakatla**	Design and Implementation Of IOT-Enabled Agribot For Smart Farming	202241031614 & 02/06/2022	Awaiting Request for Examination
2.	Dr.Y Chalapathi Rao **Dr. L V Rajani Kumari** Dr. V Sagar Reddy	IoT Based Smart Electrical Power Plug	2021105184 & 09-08-2021	**Granted Patent on 30-03-2022**
AY 2020-2021				
1	**Mrs. Narra Dhanalakshmi** Mrs. J. L.V. Ramana Kumari Mrs. K Jyostna	I-Mobile Charger: Automatic Disconnect The Charger If Mobile Battery Status-97%	202141024094 & 31/05/2021	Awaiting Request for Examination
2	**Mr. D. Ramesh Reddy**	Sheltered Driving System For Automotive Vehicles For Streamlined Operation On Roads With Adherence To Extant Rules	202041045360 & 19/10/2020	FER Issued, Reply not Filed

		And Regulations		

Industry Interactions

List of MOUs with Embedded and IoT industries

Sl. No.	Name of the industry	Impact
1	Blaze Automation Services Pvt Ltd.	➢ Sanctioned consultancy project on "Testing and Design Validation of IoT products used in the smart home automation projects" for an amount of Rs.6 Lakhs. ➢ Provide Internship Opportunity for 2 M.Tech Embedded Systems Students.
2	Redpine Signals India Private Limited	➢ Provided Training for 4 Faculty Members.
3	IDEALABSFutureTech Ventures	➢ Provided Training for B.Tech Students on "Internet of Things". ➢ Organised Hackathons for Students
4	Edgate Technologies Ltd.	➢ Provided Embedded Boards for Embedded Systems Laboratory ➢ Conducted Competitions for Students.
5	TCS, Hyderabad	➢ Remote Internships are provided to the students.

Guest lectures delivered by Industry experts during last 3 Years

S.No	Name of the industry personal	Industry associated	Course name	Date
Academic Year: 2020-21				
1	M Dinakar	Co-Founder & Chief Solution Architect SecurWeave	Embedded Systems	18-06-2022
2	Mr.PVN Pavan Kumar	SAP Labs, Bangalore	Internet of Things	05-10-2020
Academic Year: 2019-20				
1	K. Rama Krishna Reddy	Advanced Micro Devices (AMD) Ltd, Hyderabad	Embedded Real Time Operating Systems	31-8-2019

2	Dr.Vijender Reddy	ADRIN, Hyderabad	Internet of Things	31-9-2019
3	K.Sai Deep	TCS, Hyderabad	Machine Learning	9-9-2019
4	Mr. Ravi	Monitra Healthcare Pvt Ltd	Internet of Things	24-9-2019
Academic Year: 2018-19				
1	Mahesh Gummaraju	UTL Technologies, Hyderabad	Embedded Systems	9-8-2018
2	K.Swetha	TCS, Hyderabad	Data Analytics	3-8-2018
3	Mr Mahesh Patil	CDAC, Hyderabad	Micro Processors and Micro Controllers	21-1-2019

List of Industry personels associated

1. Mr. M Dinakar, Co-Founder & Chief Solution Architect SecurWeave, Hyderabad.
2. Mr Mahesh Patil, CDAC, Hyderabad.
3. Mr.PVN Pavan Kumar, SAP Labs, Bangalore
4. K. Rama Krishna Reddy, Advanced Micro Devices (AMD) Ltd, Hyderabad
5. Dr.Vijender Reddy, ADRIN, Hyderabad.
6. Mr. K.Sai Deep, TCS, Hyderabad
7. Mr. Ravi, Monitra Healthcare Pvt Ltd, Hyderabad.
8. Mr. Mahesh Gummaraju, UTL Technologies, Hyderabad
9. Mrs. K.Swetha, TCS, Hyderabad

Department of ECE organised a guest lecture for II B.Tech ECE students on "Embedded Systems" by **Sri. M Dinakar**, Co-Founder & Chief Solution Architect SecurWeave, Hyderabad on 18-06-2022

Internships Opportunities in Embedded and IoT related industries

S.No	Name of the Industry	Name of the Student	Roll No
1	**ACS Solutions**	Mallepally Kesari Nandan	18071A0492
2		J.Sreekar	18071A04E9
3		Reddy Dhanush Reddy	18071A04P8
4		Mehrunnisa Begum	18071A0432
5		Teja Yelagonda	19075A0424
6		Koyada Naveen Kumar	18071A04N0
7		Ram Kumaraswamy	18071A04P4
8		U.Karthik Reddy	18071A0458
9		Nikesh Bathula	18071A04J4
10		Yara Sai Chandu	18071A04R0
11		P. Akhil	19075A0411
12		B Thirumalesh	18071A04C6
13		Kusupati Pruthvinath	18071A04F6
14		Bhaskar Sai Kothala	18071A0489
15		Katta Shashikumar	18071A04M6
16		Dhanda Vinay Reddy	19075A0416
17		T.Swaroopa	18071A04H7
18	**NCR**	Sathya Krishna Ramayanam	18071A04P5
19		Mohammed Khaja Mohiuddin	18071A0434
20		Guda Madhavi	18071A0476
21		Dachepally Sai Prabath	19075A0414
22		Sammeta Srinivas	18071A04H1

23		Bindu Vaishnavi Y	18071A04C9
24	**TCS**	Kotla Anurag Reddy	18071A04M8
25		Eppeti Sai Tareesh Reddy	18071A04E1
26		Shaik Fayazuddin	18071A04H3
27		Ch.Vinay	18071A04K0
28	**NCR Corporation**	Bareddy Karunakar Reddy	18071A0404

**All the students are converted to full time employees

Academic projects carried out by Student Projects during 2021-22

S.No	H.T.No	Title	Name of the Guide	Relevance (Societal Impact, Simulation, Prototype, Research, Industry)
1	18071A0460 18071A0427 18071A0439 19075A0401	IoT based Driver Assistance System	Mr.J V A Bala Krishna	Prototype
2	18071A0444 18071A0450 18071A0449 19075A0403 18071A0409	IoT based Smart Growth Chamber for Monitoring Plant Environment and Disease Prediction using Deep Learning	Dr C D Naidu/Mr.D Ramesh Reddy	Prototype
3	18071A0423 18071A0428 18071A0442 18071A0446	Energy Optimization and Optional Routing in Wireless Sensor Networks	Mr.C Kaushik	Research
4	18071A0451 18071A0453 18071A0456 19075A0405	Localization techniques for Autonomous Vehicles	Dr D Santhosh Kumar	Simulation

5	18071A0475 18071A0471 18071A0484 18071A0499	An Improved Routing Protocol for Heterogeneous WSN for IoT based Environmental Monitoring	Ms.G Sahitya	Research
6	18071A0473 18071A0481 18071A04A4 18071A04B1	Genome Sequence Analysis	Mr.B B Shabarinath	Prototype
7	18071A0464 18071A0466 18071A0496 18071A04A8	Edge Computing based Image Enhancement using Jetson Nano Board	Mr.R Ravi Kumar	Research
8	18071A04F7 18071A04D5 18071A04G2 18071A04H9	Automatic Detection of Human Blood Group using Image Processing	Dr.Ch Naga Deepa	Research
9	18071A04C2 19075A0413 19075A0416 18071A04G9	Real-Time surveillance of goods vehicle using IoT	Ms.K Manasa	Prototype, Societal Impact
10	18071A04C5 18071A04F5 18071A04G4 18071A04G8	Content representation and Classification of Videos	Ms.N Dhanalakshmi	Research
11	18071A04Q4 18071A04K5 18071A04J4 18071A04J5	Minimizing the failover scenarios through over-lay networks	Dr.D. Santhosh Kumar	Industry
12	18071A04P1 18071A04P8 18071A04M6 19075A0423	Leaf disease detection using Raspberry Pi and CNN	Ms.G Sahitya	Research

13	18071A04K3 19075A0422 18071A04P7 18071A04K0 18075A0444	Development of prototype for vehicle accident avoidance, detection, and rescue system	Mr.R Ravi Kumar	Prototype
14	18071A04J6 18071A04M1 18071A04M3 19075A0421	Hardware Accelerator for face mask detection using PYNQ Z2	Mr.B B Shabarinath	Prototype
15	18071A04J3 18071A04N9 18071A04P2 18071A04P3 18071A04Q1	AI and IoT based Monitoring System for increasing the yield in Crop Production	Mr.D Ramesh Reddy	Prototype

Best academic projects from the Center for Embedded Systems and IoT for the academic year 2020-21

S.No.	Project Title	Roll No.	Description
1	Genome Sequence Analysis	18071A0473 18071A0481 18071A04A4 18071A04B1	This work focuses on Genome Sequence Analysis. The Basic objective is o find the presence of ncRNA molecules in DNA. Machine Learning code is computed to detect the presence of ncRNA which SVM algorithm in classification approach. This detection process yields good accuracy as compared to biological methods to analyze genome sequences. But for longer genome sequences the computational time is very high. So hardware compatibility is what we suggest. Long genomic sequences are aligned using the Adaptively Banded Smith-Waterman method (ABSW). ABSW finds alignment of a pair of arbitrarily long sequences with constant memory by using the banded Smith-Waterman algorithm to align subsequences

			of fixed lengths. We propose the hardware design of banded Smith-Waterman with trace back to enable ABSW hardware acceleration. ABSW yields **near**-optimal alignment scores for sequences with up to 40% error rates, according to experiments. Our hardware implementation of ABSW outperforms the software implementation by more than 200 times.
2	Real-Time surveillance of goods vehicle using IoT	18071A04C2 19075A0413 19075A0416 18071A04G9	Vehicle surveillance is an important aspect of business it also plays a major role, and its importance increases with the value of the goods it carries. If the Goods that are in the vehicle are of high value, then the owner wants to know the live location of the vehicle and accessibility of goods i.e., the owner needs to know if anyone accessed the goods in the vehicle.There are devices to track the vehicle but not for alerting the owner when the driver or any person gets access to the goods. This alerting owner is the important part when the goods are highly valuable like a vehicle carrying money to an ATM. The solution, we are proposing for tracking is through a GPS tracker, and the data is passed to the owner through NodeMCU the solution for alerting the owner on goods access is by setting a sensor to the door of the truck.Tracking the real-time location of the vehicle and displaying the movement of the vehicle in living.Alerting the owner when the backdoor of the vehicle is opened and also when the vehicle is stopped for a long duration. The owner can also lock

			the backdoor remotely from the mobile application. Motivation is to alert the owner when goods are accessed, to provide safe transport for high-value goods, and to alert the owner when the vehicle is under attack.Installing the GPS tracker in the vehicle. Transferring the information to the owner through NodeMCU. Sensing the access to the goods. Unlocking the backdoor when the user wants through the mobile application.

Students carrying their major projects in Center for Embedded Systems and IoT

Outcome of the Student Academic projects (2021-2022)

Papers published/communicated

S.No	Title of the Paper	Name of the Conference/Journal	Conference Dates	Status of the paper(Submiited/Accepted/Published)
1.	Hardware Accelerator For Face Mask Detection Using PYNQ Z2	INDICON 2022 IEEE 19th India Council International Conference	24-26 November, 2022	Accepted
2.	Genome Sequence Analysis	International Conference on Recent Trends in Microelectronics, Automation, Computing	28-30 Decemebr 2022	Accepted

		and Communication Systems (ICMACC-2022)		
3.	Energy Optimization and Optional Routing in Wireless Sensor Networks	4th International Conference on Inventive Research in Computing Applications ICIRCA 2022	21-23 September 2022	Accepted
4.	Real-Time surveillance of goods vehicle using IoT	Prototype designed Planing to file Patent	-	-