A BRIEF REPORT ON

TWO-DAY NATIONAL WORKSHOP

on

"Internet of Things"

30 Nov & 1 Dec, 2018

Organized

by

Department of Computer Science ,

A.S.D. Govt. Degree College For Women (Autonomous)

Re Accredited with 'B' Grade by NAAC

Affiliated to Adikavi Nannaya University

Jagannaickpur, Kakinada - 533002

Ph.: 0884-2378446

Website: www.asdgdcw.ac.in

E-mail: asd.iot.2018@gmail.com

Two- Day National Workshop

on

"INTERNET OF THINGS"

30 Nov & 1 Dec 2018

Organized by

DEPARTMENT OF COMPUTER SCIENCE

Powered By

CODETANTRA

Organizing commitee:

President:
Dr.Ratnagiri Usha M.A.,M.Phil., Ph.D.

Vice-President:
M.Suvarchala M.Sc.,M.Ed(Ph.D.)

Convenor:
N.Naga Subrahmanyeswari M.Tech (Ph.D)

Convenor:
G.Satya Suneetha M.Tech (Ph.D)

Co-Ordinator:
V.Bhavani (M.Tech)

Student Co-Ordinators:

A.V.S.Ammani
T.Sailaja
N.Pavani
B.Vijaya Lakshmi
M.Bhavana Sudha
Sk.Najini
M.Nagamani
B.Yamini
Md.Asma
B.Manisha
N.Sumitra
D.Swapna Kasturi
K.Deevena
D.Divya

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN(A)

(Re-Accredited with 'B' Grade by NAAC)
(Affiliated to Adikavi Nannaya University)
Jagannaickpur, Kakinada.

DEPARTMENT OF COMPUTER SCIENCE

Activity Register 2018-2019

Date	30-11-2018 & 01-12-2018
Conducted through (DRC/JKC/ELF/NCC/NSS/ Departments etc.)	Department of Computer Science
Nature of Activity (Seminar/Workshop/Extn. Lecture etc.,)	2 Day National Workshop
Title of the Activity	Internet of Things
Name of the Department / Committee	**COMPUTER SCIENCE**
No. of students participated	61
Brief Report on the Activity	To enable the students to gain knowledge on the recent trends and technologies in the field of Computer Science.
Name of the Lecturers who Planned & conducted the activity	N. Naga Subrahmanyeswari G.Satya Suneetha
Signature of the Dept. In-Charge /Convener of the Committee	N.N.S. Eswari.
Signature of the Principal	
Remarks	

ABOUT THE COLLEGE

"Annavaram Satyavathi Devi Government Degree College for Women", was named after the Goddess Satyavathi Devi of Annavaram. It was established in 1962 with the objective of emancipation and empowerment of women in higher education. The logo represents "Sthree Vidya Pravardhatam", which means, 'Women Education Shall Prosper'.

Initially, the college began with general UG Courses like B.A., and B.Sc. Later, B.Sc – Home Science in 1963, B.Com Courses in 1991and B.Sc – Microbiology in 1998 was introduced. Gradually Vocational Courses in B.A and B.Com were also included. To meet the current global trends, Computer Education has become a part of learning. Around 1200 hundred students have taken admission at this college.

A good number of Students of this college got employment in MNCs like Infosys, ILM, Dr Reddy's Lab etc. This is the only Government Degree College for Women in the entire coastal belt with an attached Hostel facility. The Staff work with dedication, commitment and cooperation. The college presented itself before the 'NAAC' in November 2011 and was reaccredited with 'B' grade. The College is going for reassessment in 2016. The College is conferred Autonomy status w.e.f 2015-16. The College is grooming as Centre Of Excellence under the directions of the CCE, A.P. Two P.G. courses viz. M.Com and M.A.(Telugu) are sanctioned in 2015-16 and 2016-17 respectively.

ABOUT THE DEPARTMENT:

The Department of Computer Science was established in the year 1998 as one of the Restructured Courses in the College. There are several ways to present the canonical core of computing science. Over the years we have developed a distinctive style and method that bridges the theory-practice divide while remaining grounded in the core. Technology changes rapidly, especially in the field of computing and those who are clear and thorough about the fundamentals can adapt to rapid changes in technology relatively easily. We want the education imparted to our students to be the basis of a lifetime of learning. In the recent past, we had benchmarked our curriculum with select institutions of higher learning and currently we are carefully reviewing the impact of these consequent changes with a view to make our programmes even more strong and competitive. We offer a varied study programme of Choice based Credit System (CBCS) that provides students with a wide range of options to choose from. Our passionate and exceptionally skilled lecturers are pleased to help our students achieve their full potential. Department Library has many reference books and text books for the beneficiary of the students. The faculty members in the department are striving hard with an endeavour to bring better results. Even though the students are mostly from rural background they are very much enthusiastic in attending the classes and other career-oriented programs like JKC etc.

OBJECTIVE

This program aims at providing an opportunity for participants to enrich their knowledge and skill in developing various solutions for solving engineering problems in the society. This program serves as a platform for research scholars, faculty and students to interact on cutting edge technologies in IoT. The Internet of Things (IoT) has evolved from the convergence of wireless technologies, micro-electromechanical systems and the Internet. By connecting “things” in the real world such as cars, buildings, and industrial equipment. IoT promises to revolutionize how we live and work. The IoT market is likely to experience around 28% year-on-year growth, rising to 5.4 billion connections across the globe by 2020, counting cellular, fixed line, satellite and short range wireless connections, up from 1.2 billion devices in the year 2014.

BROCHURE

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN
(Autonomous)
(Accredited with NAAC 'B' Grade)
(Affiliated to Adikavi Nannaya University)
Jagannaickpur, Kakinada

Two Day National Workshop
On

30 Nov 2018 & 1 Dec 2018

Organized by

DEPARTMENT OF COMPUTER SCIENCE
in Association with
CODETANTRA TECH SOLUTIONS Pvt. Ltd.
Hyderabad

Conveners

Mrs. N.Naga Subrahmanyeswari M.Tech (Ph.D)
Mrs. G.Satya Suneetha M.Tech (Ph.D)

ABOUT THE COLLEGE

ASD Government Degree College for Women (Autonomous), Jagannaickpur, Kakinada is the only Government College for Women for having Autonomous Status in both East &West Godavari districts together. The College is offering B.A. (H.E.P.; T.H.P.), B.Com (TM, EM, & Computers), and B.Sc (MPC,MPCS, CBZ,CBMB & H.Sc) at UG level under Semester System, and M.Com (EM) Self finance course at PG level.

ABOUT THE DEPARTMENT

The Department of Computer Science was established in the year 1998 as one of the Restructured Courses in the College. Over the years we have developed a distinctive style and method that bridges the theory-practice divide while remaining grounded in the core.

PREAMBLE

The technology which has brought about a revolution in modern technological era, Internet of things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data. The Internet of Things is the use of network sensors in physical devices to allow for remote monitoring and control. IoT systems could also be responsible for performing actions, not just sensing things. The IoT is connecting people, places and devices at a rapid pace. This technology has gained massive traction in various spheres like healthcare, banking, retail, manufacturing, consumer goods, etc .The entire world is migrating towards IoT which will have a huge impact on our lives in the coming years.

OBJECTIVE OF THE WORKSHOP

The aim of this workshop is to explore the state-of-art technologies in the area of Internet of Things (IoT) through a series of lectures and to provide hands-on-experience in setting up IoT platform with Open Source Software.

HANDS-ON- SESSION

The Hands-on- sessions shall include :

- Connecting Sensors and Actuators to IoT framework.
- Receiving Sensory Information from devices.
- Connecting IoT devices to a Local Cloud .

REGISTRATION FORM

National Workshop *on "Internet of Things"*

Name of the Participant:

Category: Student / Faculty / Scholar

Age: Gender:

Name of the Institute:

Address for communication:

Email ID:

Mobile No.:

Date: Signature of Applicant

Registration Fee(Rs)

Student :100/- Faculty /Scholar : 200/-

Last Date for Registration: 25 Nov 2018

*Restricted to two participants from a college

RESOURCE PERSON:

Tomesh Jain Proficient Developer, Technology Enthusiast, Corporate Trainer and entrepreneur with an experience of over 8 years with start-ups, mostly around mobile application development, big data, cloud computing (Azure & AWS), cognitive services, artificial intelligence and IoT. Have worked with several start-ups to make them excel in their priorities. Currently he is one of the Director of Brainvita Consulting Pvt. Ltd.

- **District 2nd Rank** in SSC
- **Bronze medalist** in academics. Bagged 3rd spot in Academics in Acharya Nagarjuna University IT (2006-2010) Batch.
- **Have** developed and designed over **20+ Mobile Applications** (Done for Clients) which are hosted over playstore.
- Have Developed over **50+ websites** for various clients
- Have designed and Developed several products like **DigiSkool** (A Complete School Management System), **Ezee Inventory** (Small Scale Inventory Management & Accounting System).
- Proven track record of analyzing requirements and designing key solutions that meet customer goals.
- Known for establishing sound training programs from scratch and improving training processes and procedures.
- Planned, scheduled and managed all training classes. professor

ORGANIZING COMMITEE:

Precident:

Dr.Ratnagiri Usha **M.A.,M.Phil., Ph.D.**

Vice-Precident:

M.Suvarchala

Convenor:

N.Naga Subrahmanyeswari **M.Tech (Ph.D)**

Convenor:

G.Satya Suneetha **M.Tech (Ph.D)**

Co-Ordinator:

V.Bhavani **(M.Tech)**

Student Co-Ordinator:

A.V.S.Ammani B.Yamini

T.Sailaja

N.Pavani

B.Vijaya Lakshmi

M.Bhavana Sudha

Sk.Najini

M.Nagamani

CONTENT:

DAY- 1 (30.11.2018)

9.00 AM to 9.30 AM : REGISTRATION
9.30 AM to 10.00 AM : Inauguration & Keynote Address

SESSION -I
Introduction to IoT and its Architecture, Applications of IoT (Real World Scenarios)

SESSION -II
Basics of Aurdino, Electronic Components (LED, Resistors, Bread Board, Probes etc.,)

SESSION -III
Sensors (Tempearture, IR, Ultrasonic) Understanding Aurdino

SESSION- IV
Hands-on Training

DAY- 2 (01.12.2018)

SESSION -V
Hands-on Training

SESSION -VI
Hands-on Training

SESSION -VII
Understanding Raspberry Pi
Hands-on Training
Sending data from Raspberry Pi to Google Cloud
Other Applications

SESSION- VIII
Future Scope of IoT

CONTACT US:

Convenor: G.Satya Suneetha
Email.id: satyasuneetha10@gmail.com
Mobile No: 9491360710

A.S.D.GOVT. DEGREE COLLEGE FOR WOMEN (A), KAKINADA.

(Re-Accredited with 'B' Grade by NAAC)
(Affiliated to Adikavi Nannaya University)

DEPARTMENT OF COMPUTER SCIENCE

Two-Day National Workshop

on

Internet of Things

Inaugural (30 Nov 2018)

1. Introduction & Inviting the Guests on to the dais	:	Ms. M. Bhavana Sudha (III B.Sc)
2. Lighting the Lamp	:	Dr.D.Ratnagiri Usha President
3. Prayer	:	Students
4. President's Opening Remarks	:	Dr.D.Ratnagiri Usha Principal
5. Convenor's Message	:	Mrs. N.Naga Subrahmanyeswari I/C, Dept. of Computer Science
6. Introduction of the Resource Person	:	Ms. B. Yamini (III B.Com)
7. Keynote Address	:	Mr.Tomesh Jain Software Trainer, CODETANTRA Tech Solutions Pvt.Ltd., Hyderabad
8. Vote of Thanks	:	Mrs. G.Satya Suneetha Lecturer in Computer Applications

A.S.D. GOVT. DEGREE COLLEGE FOR WOMEN (A)

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Jagannaickpur, KAKINADA - 533 002
ANDHRA PRADESH

Two-Day National Wokshop on *"Internet of Things"*

Schedule

DAY- 1 (30.11.2018)

9.00 AM to 9.30 AM	:	REGISTRATION
9.30 AM to 10.00 AM	:	Inauguration & Keynote Address

SESSION -I

10.00 AM to 11.30 AM	:	Introduction to IoT and its Architecture Applications of IoT (Real World Scenarios)
11.30 AM to 11.45 AM	:	Break

SESSION -II

11.45 AM to 1.00 PM	:	Basics of Aurdino Electronic Components(LED,Resistors, Bread Board, Probes etc.,)
1.00 PM to 2.00 PM	:	Lunch break

SESSION -III

2.00 PM to 3.30 PM	:	Sensors (Tempearture, IR, Ultrasonic) Understanding Aurdino
3.30 PM to 3.45 PM	:	Break

SESSION- IV

3.45 PM to 5.00 PM	:	Hands-on Training
5.00 PM to 5.30 PM	:	Feedback

(Affiliated to Adikavi Nannaya University)
Jagannaickpur, KAKINADA - 533 002
ANDHRA PRADESH

DAY- 2 (01.12.2018)

SESSION -V

10.00 AM to 11.30 AM	**:**	Hands-on Training
11.30 AM to 11.45 AM	:	Break

SESSION -VI

11.45 AM to 1.00 PM	:	Hands-on Training
1.00 PM to 2.00 PM	:	Lunch break

SESSION -VII

2.00 PM to 3.30 PM	:	Understanding Raspberry Pi Hands-on Training - Sending data from Raspberry Pi to Google Cloud - Other Applications
3.30 PM to 3.45 PM	:	Break

SESSION- VIII

3.45 PM to 5.00 PM	:	Future Scope of IoT
5.00 PM to 5.30 PM	:	Feedback
5.30 PM to 6.00 PM	:	Valedictory

NOTE:

- **Limited to 60 Participants only (First Come First Serve Basis).**
- **Registration is from 9:00 AM to 9:30 AM on 30-11-2018, Kindly Co-operate.**
- **Restricted to TWO participants from a college.**

A.S.D.GOVT DEGREE COLLEGE FOR WOMEN (A)
DEPARTMENT OF COMPUTER SCIENCE
Two Day National Workshop
on
Internet of Things (IoT)

List of participants

S.No	Name of the Participant	Name of the College	Category
1.	G. Hari Prasad	S.K.S.D.Mahila Kalasala, Tanuku	Faculty
2.	B. Peddi Raju	S.M.B.T.A.V & S.N Degree College, Veeravasaram	Faculty
3.	M. Rama Krishna	S.M.B.T.A.V & S.N Degree College, Veeravasaram	Faculty
4.	V.V. Subba Rao	S.M.B.T.A.V & S.N Degree College, Veeravasaram	Faculty
5.	V. Durga Prasad	S.M.B.T.A.V & S.N Degree College, Veeravasaram	Faculty
6.	M. Sriramulu	A.S.D. Govt. Degree College For Women(A),Kakinada	Faculty
7.	K.S.N.Sarma	A.S.D. Govt. Degree College For Women(A),Kakinada	Faculty
8.	P.Parameswari	P.R. Govt. Degree College(A), Kakinada	student
9.	M.Divya	P.R. Govt. Degree College(A), Kakinada	student
10.	P.Sai Mani	V.S. Lakshmi Degree College For Women	student
11.	J.Prasuna	V.S. Lakshmi Degree College For Women	student
12.	O.Anusha	P.R. Govt. Degree College(A), Kakinada	student
13.	M.V.S.Sirisha	A.S.D. Govt. Degree College For Women(A),Kakinada	student
14.	G.Padmanadh	P.R. Govt. Degree College(A), Kakinada	student
15.	Dr.K.Shobarani	P.R. Govt. Degree College(A), Kakinada	student
16.	D.Divya Jyothi	Ideal College Of Arts & Sciences, Kakinada	student
17.	J.Jahnavi Devi	Ideal College Of Arts & Sciences, Kakinada	student
18.	O.Divya	A.S.D. Govt. Degree College For Women(A),Kakinada	student
19.	M.D.Asma	A.S.D. Govt. Degree College For Women(A),Kakinada	student
20.	D.Swapna Kasturi	A.S.D. Govt. Degree College For Women(A),Kakinada	student
21.	B.Yamini	A.S.D. Govt. Degree College For Women(A),Kakinada	student

22.	K.Deevena	A.S.D. Govt. Degree College For Women(A),Kakinada	student
23.	M.Vanitha	A.S.D. Govt. Degree College For Women(A),Kakinada	student
24.	P.Sandhya	A.S.D. Govt. Degree College For Women(A),Kakinada	student
25.	B.Maneesha Rani	A.S.D. Govt. Degree College For Women(A),Kakinada	student
26.	P.Mounika	A.S.D. Govt. Degree College For Women(A),Kakinada	student
27.	M.Sruna Padmaja	A.S.D. Govt. Degree College For Women(A),Kakinada	student
28.	N.Sumitra	A.S.D. Govt. Degree College For Women(A),Kakinada	student
29.	R.Divya Sri	A.S.D. Govt. Degree College For Women(A),Kakinada	student
30.	M.Pavani	A.S.D. Govt. Degree College For Women(A),Kakinada	student
31.	K.Krishnaveni	A.S.D. Govt. Degree College For Women(A),Kakinada	student
32.	K.Durga Prasanna	A.S.D. Govt. Degree College For Women(A),Kakinada	student
33.	M.Nagamani	A.S.D. Govt. Degree College For Women(A),Kakinada	student
34.	G.Bala Tripura Sundari	A.S.D. Govt. Degree College For Women(A),Kakinada	student
35.	N.Vijaya Mounika	A.S.D. Govt. Degree College For Women(A),Kakinada	student
36.	Sk.Najini	A.S.D. Govt. Degree College For Women(A),Kakinada	student
37.	M.Bhavana Sudha	A.S.D. Govt. Degree College For Women(A),Kakinada	student
38.	V.Neelima	A.S.D. Govt. Degree College For Women(A),Kakinada	student
39.	B.Vijaya Lakshmi	A.S.D. Govt. Degree College For Women(A),Kakinada	student
40.	N.Pavani	A.S.D. Govt. Degree College For Women(A),Kakinada	student
41.	M.Lalitha Sri	A.S.D. Govt. Degree College For Women(A),Kakinada	student
42.	U.Udaya Sri	A.S.D. Govt. Degree College For Women(A),Kakinada	student
43.	K.Sravani	A.S.D. Govt. Degree College For Women(A),Kakinada	student
44.	Ch.Madhuri	A.S.D. Govt. Degree College For Women(A),Kakinada	student
45.	Y.Suneetha	A.S.D. Govt. Degree College For Women(A),Kakinada	student
46.	V.Devi	A.S.D. Govt. Degree College For Women(A),Kakinada	student
47.	N.Devi	A.S.D. Govt. Degree College For Women(A),Kakinada	student
48.	S.Aruna Kumara	A.S.D. Govt. Degree College For Women(A),Kakinada	student

49.	S.V.Sailaja	A.S.D. Govt. Degree College For Women(A),Kakinada	student
50.	K.Suguna	A.S.D. Govt. Degree College For Women(A),Kakinada	student
51.	M.Sirisha	A.S.D. Govt. Degree College For Women(A),Kakinada	student
52.	B.Venkata Padma	A.S.D. Govt. Degree College For Women(A),Kakinada	student
53.	T.Lokeshwari	A.S.D. Govt. Degree College For Women(A),Kakinada	student
54.	T.Sailaja	A.S.D. Govt. Degree College For Women(A),Kakinada	student
55.	A.V.S.Ammani	A.S.D. Govt. Degree College For Women(A),Kakinada	student
56.	S.Satya Devi	A.S.D. Govt. Degree College For Women(A),Kakinada	student
57.	G.Anusha	A.S.D. Govt. Degree College For Women(A),Kakinada	student
58.	MD. Mahaboobunnisa	S.R.K.Govt. Degree Arts College,Yanam	student
59.	R. N.D.Supriya	S.R.K.Govt. Degree Arts College, Yanam	student
60.	K. Lalitha devi	S.R.K.Govt. Degree Arts College, Yanam	student
61.	N.Sudha	S.R.K.Govt. Degree Arts College, Yanam	student

GLIMPSES OF THE WORKSHOP

LIGHTENING OF THE LAMP BY PRINCIPAL

RESOURCE PERSON MR.TOMESH JAIN DELIVERING HIS TALK ON IOT

STUDENTS WORKING WITH IOT SENSORS

PARTICIPANTS FEEDBACK ON THE WORKSHOP

INTERNET OF THINGS

SESSION-1

Introduction:

Let me start this IoT tutorial by introducing the person who coined the term "***Internet of Things***". The term "The Internet of Things" (IoT) was coined by **Kevin Ashton** in a presentation to Proctor & Gamble in 1999. He is a co-founder of MIT's Auto-ID Lab. He pioneered RFID (used in bar code detector) for the supply-chain management domain. He also started Zensi, a company that makes energy sensing and monitoring technology.

So, let me first take you through a quote by Kevin Ashton, which he wrote in 2009 for RFID journal. This will help you in understanding IoT from its core.

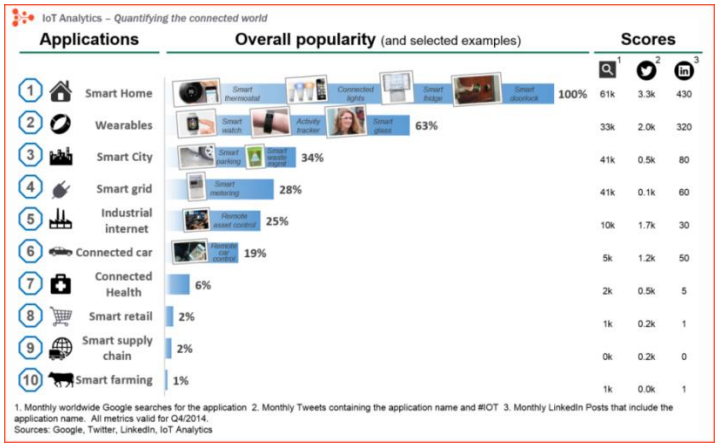
If we had computers that knew everything there was to know about things—using data they gathered without any help from us—we would be able to track and count everything, and greatly reduce waste, loss and cost. We would know when things needed replacing, repairing or recalling, and whether they were fresh or past their best.

We need to empower computers with their own means of gathering information, so they can see, hear and smell the world for themselves, in all its random glory.

The above Kevin's quote would have given you an idea about the ideologies behind the development of IoT. Let's now try to further simplify this term and understand IoT fundamentally. After this, we will be moving forward and looking towards the benefits of IoT.

The Internet of Things applications ranking

We measured three things: What people search for on Google, what people talk about on Twitter, and what people write about on LinkedIn. The highest score received a rating of 100%, the other Internet of Things applications were ranked with a percentage that represents the relation to the highest score (relative ranking).



1. Smart home

Smart Home clearly stands out, ranking as highest Internet of Things application on all measured channels. More than 60,000 people currently search for the term "Smart Home" each month. This is not a surprise. The IoT Analytics company database for Smart Home includes 256 companies and startups. More companies are active in smart home than any other application in the field of IoT. The total amount of funding for Smart Home startups currently exceeds $2.5bn. This list includes prominent startup names such as Nest or AlertMe as well as a number of multinational corporations like Philips, Haier, or Belkin.

EnOcean makes the Smart Home smarter

Energy harvesting wireless technology for self-powered wireless switches, sensors and controls the state of the art way to home automation and energy saving

EnOcean's energy harvesting wireless technology enables flexible smart home solutions for new built and retrofit from a simple switch "all on/all off" to a gateway-connected system (TCP/IP) controlled via smartphone. Thanks to interoperable devices, users can easily combine EnOcean-based products from different vendors according to their individual needs – for increased security and comfort, reduced energy consumption or technical assistance in old age.

Modular Security Concept

EnOcean offers a modular security concept to meet the power requirements of energy harvesting systems. Device manufacturers can combine rolling code and other encryption mechanisms to suit individual needs and implement different security levels according to the requirements of the respective solutions.

Expandable & Cost-attractive

Energy harvesting wireless technology is ideal for retrofitting smart homes. If you want to renovate or enlarge an attic, or need to add switches later on, EnOcean technology is the best suited and value-for-money alternative to the routing of cables and all the costly and time-consuming chores like caulking that go along with it. The EnOcean smart home is the right way to integrate into future smart grids and to create assisted living concepts.

Self-powered wireless sensors and switches in the smart home

User Benefits

- Increased comfort, convenience and security
- Reduced energy consumption
- Maximum flexibility due to battery-free, wireless devices
- Plug&Play operation and easy system expansion
- Extensive cost-savings

Advantages for OEMs

- Simply developed smart home solutions
- Use of the established EnOcean standard
- Modular enhanced security with rolling code and encryption

SESSION-II

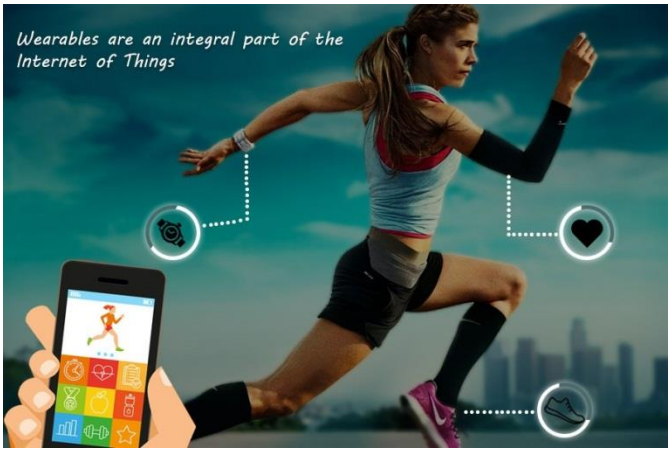
Products "Enabled by EnOcean"

- Self-powered Wireless Switches

- Self-powered Wireless Sensors
- Actuators & Controllers
- Gateway & Building Management Systems
- Accessories

2. Wearables

Wearables remains a hot topic too. As consumers await the release of Apple's new smart watch in April 2015, there are plenty of other wearable innovations to be excited about: like the Sony Smart B Trainer, the Myo gesture control, or LookSee bracelet. Of all the IoT startups, wearables maker Jawbone is probably the one with the biggest funding to date. It stands at more than half a billion dollars!



Wearables are an integral part of the Internet of Things. We at FuGenX Technologies develop highly functional Wearable apps for IoT that can be compatible for instant interoperability, profile management, data collection, notifications, security, and many other features and functionality. Our IoT app development helps you utilize the limitless potential of IoT enabled wearable devices. And supports effective synchronization of data from and between multiple Wearable devices.

Benefits of IoT App Development for Wearables:

Wearable devices are at the heart of every discussion related to the Internet of Things (IoT). Wearable IoT tech consists of an array of devices which cover fitness, health and entertainment requirements.

Wearables are the most personable item that a person can own, they offer high functionalities that can help one perfectly analyse his activities. When the Wearables become a part of IoT system, it is easier for enterprises, manufacturers, retailers, automotive companies, and hospitals to build collaboration between employees and devices.

3. Smart City

Smart city spans a wide variety of use cases, from traffic management to water distribution, to waste management, urban security and environmental monitoring. Its popularity is fueled by the fact that many Smart City solutions promise to alleviate real pains of people living in cities these days. IoT solutions in the area of Smart City solve traffic congestion problems, reduce noise and pollution and help make cities safer.

Cities around the world are getting "smarter" everyday through the implementation of *Internet of Things* (IoT) devices. "What exactly does it mean for a city to get smarter?" you ask. According to Kate Meis of Green Biz, "Smart cities are communities that are building infrastructure to continuously improve the collection, aggregation and use of data to improve the lives of their residents by harnessing the growing data revolution, low-cost sensors and research collaborations, and doing so securely to protect public safety and individual privacy." ("3 ways IoT is Already Making Cities Smarter," GreenBiz.com, June 1, 2016)

In practical terms, this means that cities are using low-cost sensors and WiFi-enabled smart devices to "talk" to people and cities. These IoT devices provide local leaders with real-time data about community needs, and city managers use this information to create transformational solutions to make crowded cities more manageable and more affordable for everyone.

Specific applications include:

- Street and traffic lights
- Transportation
- Parking
- Infrastructure and maintenance
- Waste management (including waste water)
- Air quality
- Crime
- Architecture
- Energy usage and distribution
- Traffic flow
- Pedestrian and bicycle needs

Smart cities - Practical Applications

- In Los Angeles, where traffic has been a tremendous problem for decades, data from an array of magnetic road sensors and hundreds of cameras feed through a centralized computer system to control 4,500 traffic signals citywide to help keep traffic moving. Completed in

2013, the $400-million system is credited with increasing travel speeds around Los Angeles by 16 percent, and shortening delays at major intersections by 12 percent. (Meis)

- In San Francisco, SFpark uses wireless sensors to detect parking-space occupancy in metered spaces. Installed in 8,200 on-street spaces in the pilot areas, the wireless sensors detect parking availability in real time. In 2013, two years after launching SFpark, San Francisco published a detailed report showing that the program reduced weekday greenhouse gas emissions by 25 percent. Traffic volume went down, and drivers cut their search time nearly in half. By making it easier for people to pay for their parking and reducing loss due to broken parking meters, San Francisco also increased parking-related revenue by about $1.9 million. (Meis)
- London has begun tests on a smart parking project that allows drivers to quickly locate parking spaces and remove the need for lengthy searches for an open spot. This significantly alleviates urban traffic congestion, saves fuel and reduces harmful emissions. ("How Smart Cities & IoT Will Change Our Communities," Andrew Meola, BusinessInsider.com, December 20, 2016.)
- In 2011, Autolib debuted an electric car sharing program in Paris that has grown to over 3,000 vehicles. The connected cars can be tracked via GPS, and drivers can use the car's dashboard to reserve parking spaces in advance, saving time and reducing the waste associated with long searches for parking spots. (Meola)
- Copenhagen uses sensors to monitor the city's bike traffic in real time, which provides valuable data on improving bike routes in the city. This is crucial, as more than 40% of the city's residents commute by bike each day. (Meola)
- To save water, the drought-plagued town of Fountain View, California implemented the FlexNetcommunication system, iPERL residential and OMNI commercial meters to cut water usage by 23%. (Sensus.com, 2017).

There is a plethora of other applications, including the Bigbelly smart waste and recycling system, which is completely modular. Bigbelly gives historical and real-time data collection capabilities and helps with smart trash pick up, helps avoid overflows and generates other notifications to help cities manage waste better and keep them both cleaner and more beautiful. ("IoT Applications Spanning Across Industries," IBM.com, April 28, 2017)

Another useful application, CitySense, uses sensors to save electricity by intuitively adjusting the brightness of street lights, based on the presence of automobiles and pedestrians. It is also "smart" enough to filter out interferences like animals and trees. (IBM.com)

Concluding Remarks

It's easy to see that cities can benefit tremendously from technological advances that utilize the *Internet of Things*. It's also easy to see that as cities continue to grow and more devices get added to the infrastructure, the amount of data will be voluminous. In order to manage these demands, and to fully utilize the new technology, cities will need information management systems like UnifiedInbox's *Unification Engine*. The data alone will benefit nobody without a seamless system to analyze and aggregate the vast amount of information. An efficient messaging system will help cities take advantage of the new technology, and improve city life for residents and businesses while reducing costs for everyone involved.

The article was written by Richard Meyers, a former high school teacher in the SF Bay Area who has studied business and technology at Stanford and UC-Berkeley. He has a single-digit handicap in golf and is passionate about cooking, wine and rock-n-roll. Originally the article was published on Unified Inbox Blog.

4. Smart grids

Smart grids is a special one. A future smart grid promises to use information about the behaviors of electricity suppliers and consumers in an automated fashion to improve the efficiency, reliability, and economics of electricity. 41,000 monthly Google searches highlights the concept's popularity. However, the lack of tweets (Just 100 per month) shows that people don't have much to say about it.

Smart grid technology has the power to ready today's cities for tomorrow's needs. With more than half of the world's populations concentrated in urban centers, cities will need to explore new opportunities, solutions and systems to keep things running for its people, businesses, and governments.

Municipalities have already added sensors to transmission lines and introduced digitized controls and applications, creating a smart grid. By utilizing Internet of Things technologies, smart grid technology has improved two-way communications between utility companies and its customers and enabled access to near real-time data that is being used to make cost-effective and environment friendlier decisions.

As more people move into cities, the demands for energy will surge. By 2040 net electricity generation will rise by 69%, compared to 2012 figures, to keep up with consumer demands. This increase will place unprecedented stress on grids that will impact citizens, cities as well as utility infrastructures.

A more intelligent smart grid

This reality, along with evolving environmental regulations, requires governments and companies to bring more advanced IoT technologies into their smart grid ecosystem. From artificial intelligent automation to improved two-way communication and other advanced applications, the smart grid will become smarter.

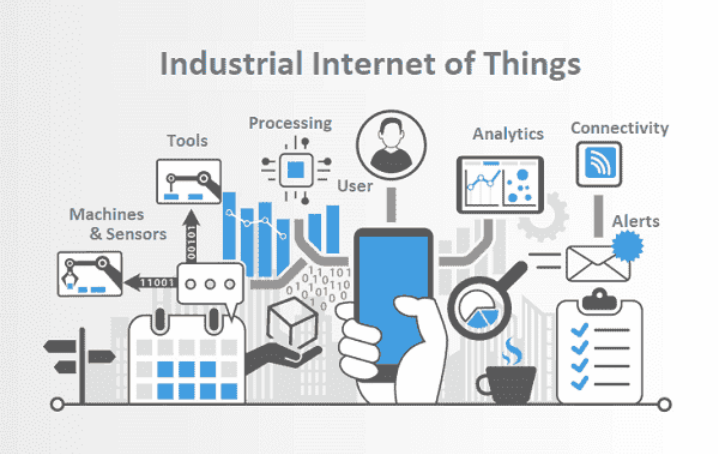
These new features will do more than digitize century-old grids. Instead, they will innovate new services and solutions that will give suppliers better control over their infrastructure and assets, and consumers and cities can rely on more sustainable and reliable energy sources.

Sustainable and reliable energy

With today's reliable wireless applications, utilities can interconnect virtually all of their assets. For example, meters and substations can be connectedto each other, as well as connect to company vehicles and employee deHere's an example: a substation experiences a power outage. Today, a consumer will have to recognize that there's a problem and call their utility provider. From here, the company will schedule field workers to investigate the issue before a course of action can be taken to correct the problem. With the help of sensors and IoT applications, emergency crews will be alerted to a problem in real-time. They will also receive additional data pinpointing the source of the issue. Not only will workers be onsite faster, but they will also be ready to repair the problem once onsite. vices. Such connectivity will create never before realized efficiencies.

5. Industrial internet

The industrial internet is also one of the special Internet of Things applications. While many market researches such as Gartner or Cisco see the industrial internet as the IoT concept with the highest overall potential, its popularity currently doesn't reach the masses like smart home or wearables do. The industrial internet however has a lot going for it. The industrial internet gets the biggest push of people on Twitter (~1,700 tweets per month) compared to other non-consumer-oriented IoT concepts.



Internet of Things is revolutionizing our world in to a smarter place. Industrial Internet of Things (IIoT) is part of bigger IoT system which focuses on devices and objects used in business environment. Find out what are the industrial applications of IoT.

How does Industrial IoT works?

Industrial IoT is a system includes smart sensors, machines, tools, software platforms, cloud servers and applications. Smart sensors are deployed at every stages of manufacturing floor for specific applications. These sensor networks continuously send data to the IoT gateway (act as a hub between IoT devices and cloud) which receive and transmit the data to the cloud application server for processing and analysis. Sophisticated application programs are developed to handle large amount data within secure network and it is accessible using Smartphone applications.

SESSION-III

Applications of Industrial Internet of Things

1. Industrial Automation

Industrial automation is one of most significant and common application of Internet of Things. Automation of machines and tools enables companies to operate in an efficient way with sophisticated software tools to monitor and make improvements for next process iterations.

Accuracy of process stages can be improved to a greater level using machine automation. Automation tools like PLC (Programmable Logic Control) and PAC (Programmable Automation Control) are used with smart sensor networks connected to a central cloud system which collect huge amount of data. Specially designed software and applications are used to analyze the data and its behavior for improvements.

Industrial automation improves accuracy, efficiency; reduces errors, easy to control and remotely accessible via applications. Machines can operate at harsh environments than humans; automation of machines and tools reduces man power requirements for specific tasks.

Connected Factories

Connected Factory concept is an effective solution for improvements in all areas of operation. Major components such as machines, tools and sensors will be connected to a network for easier management and access. Overview of process flow, monitor down time, status checking of inventory, shipment, schedule maintenance and stop/pause a particular process for further analysis etc… can be done remotely using industrial IoT solutions.

2. Smart Robotics

Many companies are developing intelligent robotics system for IoT-enabled factories. Smart robotics ensures smooth handling of tools and materials in the manufacturing line with precise accuracy and efficiency. Predefined specifications can be set for maximum precision (up to few nanometers scale for some applications) using intelligent robotic arms.

Man machine interface design concept will reduce the complexity of operation and it will reflect in future IoT enabled manufacturing as improved productivity.

Robots can be programmed to perform complex tasks with high end embedded sensors for real-time analysis. These robotics networks are connected to a secure cloud for monitoring and controlling. Engineering team can access and analyze this data to take quick actions for product improvements or preventing an unexpected failure due to machine fault.

3. Predictive Maintenance

Modern industrial machines equipped with smart sensors continuously monitoring the status of each major components and it can detect any critical issues before the system is completely down. Smart sensors will trigger maintenance warning to the centralized system and the alert messages will be delivered to responsible persons/groups.

Maintenance engineers can analyze the data and plan for schedules maintenance effectively without affecting routine task.

Predictive maintenance is an effective solution to avoid unnecessary downtime in the production line. Unexpected failure of machines could cause damage to products, delay in delivery and business loss for manufacturers.

Status of each machines are stored to a cloud system in a real-time basis. History of each machines, performance, and next scheduled maintenance are easily accessible remotely (on PCs, via web interface or via smartphone applications). Performance improvements can be calculated and implemented for each machines and process stages of products using collected data analysis.

4. Integration of Smart Tools / Wearables

Integration of smart sensors to tools and machines enables the workforce to perform the task with improved accuracy and efficiency. Specially designed wearables and smart glass helps employees to reduce error and improve safety at the working environments.

Smart wearables can trigger instant warning messages to employees during emergency situations like gas leak or fire. Wearables can monitor health condition of individuals continuously and feedback if not fit for particular task.

5. Smart Logistics Management

Logistics is one of the important areas in many industries, which needs continuous improvements to support increasing demands. Smart sensor technology is a perfect fit to solve many of the complex logistics operations and manage goods efficiently.

Retail giants like Amazon using drones to deliver goods to their customers. Advanced technologies like drones offer better efficiency; accessibility, speed and it require less manpower. However, initials investments are huge compared to conventional methods and implementation has limitations.

Airline is another major industry, which uses IoT for its daily operations at the production and predictive maintenance of airplanes in service. At the manufacturing plant, airline companies use IoT solutions to track thousands of components required for every single day at work. Centralised management of inventories helps to manage its supplies effortlessly.

Suppliers will be automatically informed if any items are required to top up. Without much human action, inventory management can be effectively implemented using IoT.

Smart sensors continuously monitor airplane's machineries, the data is collected real-time and send to the airplane manufacturer. Maintenance of any part of an airplane will be triggered, concerned team will be informed and maintenance will be carried out once the plane is landed without any delay. Manufacturers can plan and deliver spare parts efficiently based on the data shared by the system.

6. Software integration for product optimization

Smart analytics solution is one of most important component of any IoT system which further enhances the possibilities of the system for improvement and optimization.

Major companies are implementing customized software for deep analysis of huge amount of data collected from large sensor networks and machines. Detailed analysis of data and understanding the behavior over time gives much better overview of process improvement strategies for product optimization.

Improvement ideas could be directly related to product recipe or optimization of particular machinery for better performance and output. Cost effective solutions can be achieved using analysis of data and its behavior patterns over a period of time. Analysis of huge amount of data was a hard, inaccurate and time consuming task before introduction of these software tools.

7. Smart Package Management

Package management using IoT technology gives lot of convenience and efficiency for manufacturing units. Smart sensors can monitor each stages of packing and update status in real-time manner. Embedded sensors can detect vibrations, atmospheric conditions like temperature and humidity etc… and feedback if something goes wrong during transit or storage.

8. Enhanced Quality and Security

Introduction of IoT technology in to manufacturing offers enhanced product quality. Continuous monitoring and analysis of each stages ensure better quality by improving process steps for optimum quality.

Integration of smart tools and software assisted procedures offer higher level of security. Software controlled automation and data collection from huge sensor network is connected to a highly secure gateway and cloud server platform.

Complex encryption techniques are used in IIoT platform for enhanced security.

9. Autonomous vehicles

Automotive industries are using IoT enables self driving vehicles to supply goods and logistics management within their company premises. Smart vehicles can detect traffic congestions along its path and make deviation to reach its destination is shortest time. These vehicles are equipped with many smart sensors continuously detect location data using GPS and wireless technologies for communication with the control station.

10. Power Management

IoT can offer better solutions for power management in industries. Specific sensors can detect environment and trigger to turn on/off control of lights, air conditioners, humidity controls, liquid flow etc… for efficient power management.

Advantages of Industrial Internet of Things

- Improved accuracy
- Product and process optimization
- Predictive maintenance and analysis
- Higher efficiency
- Remote accessibility and monitoring
- Enhanced security
- Scalability of network
- Reduced down time for machines and process
- Power savings
- Cost effectiveness

Conclusion

Existing industries can adapt to an IoT ecosystem for process improvements, better management, cost effectiveness and overall efficiency. Future industries can utilize the power of IoT infrastructure for product optimization by analyzing big data from thousands of tiny sensors. Industrial IoT is fast growing technology with limitless possibilities for future industries and manufacturing units.

6. Connected car

The connected car is coming up slowly. Owing to the fact that the development cycles in the automotive industry typically take 2-4 years, we haven't seen much buzz around the connected car yet. But it seems we are getting there. Most large auto makers as well as some brave startups are working on connected car solutions. And if the BMWs and Fords of this world don't present the next

generation internet connected car soon, other well-known giants will: Google, Microsoft, and Apple have all announced connected car platforms.

Connected cars are evolving. Vehicle-centric IoT services such as the remote-controlled heaters and digital door locks are common today. But these services are merely the stepping stones to the truly connected car. After Internet of Things (IoT), connected cars seems to be the next most talked about topic in the industry. From automobile manufacturers to telecom operators to software vendors to consumer electronics companies, everyone is excited about the connected vehicle phenomenon. Contemporary cars, with the power of twenty modern PCs, already pack more punch than any other computing device. They have more than 100 million lines of code that can process up to 25GB of data in an hour. Keeping aside the hype created by the industry players, connected cars do bring a lot of value to the table.

One of the factors that's turning this concept into a reality is ubiquitous connectivity. Automobile manufacturers are teaming up with telecom organizations to provide connectivity to their vehicles. When cars equipped with cameras and sensors meet mobile connectivity, connected cars share and receive data using the cloud. There are endless possibilities for that data. Data strong enough to change the core of the automotive industry is provided by Connected Cars to automakers. Automotive IoT is changing the way we use vehicles, from location tracking to assisted and autonomous drive. Let's take a look at how IoT connectivity is transforming the automobile.

In-Car Content and Services

Connected Cars take the infotainment to the next level by delivering popular content to consumers. Car entertainment today is mostly confined to Bluetooth connectivity and FM radio. With increasing availability of high-speed networks, popular streaming services like Hulu, Pandora, and Spotify are becoming a part of the infotainment landscape in automobiles. Consumers will soon have plenty of options in digital content. Apple with Apple's CarPlay and Google with Android Auto are competing to becoming the brain behind in-car infotainment. Consumers can use familiar voice-activated technologies such as Siri and Google Now to interact with the infotainment system, while Amazon is partnering with Ford to bring its popular Alexa engine to the car. Most infotainment systems are presently in a strange period where consumers can choose between manufacturer-made infotainment applications (MyFord Touch, BMW iDrive, etc.) or third-party apps created by mobile operating system giant's Google (Android Auto) and Apple (CarPlay). The coming generation of connected car services is providing car makers paths to new revenue and new customers. In-car purchases of applications and other services will produce revenue and incentivize developers to innovate. Car sharing models are already changing the way people access vehicles, with a low initial investment, and payment based on usage, either as a driver or passenger.

Advanced Navigation

Most modern cars are equipped with GPS-based navigation systems. Connected cars will come with smart navigation features that include location-based services. For instance, your car, based on the current fuel levels, can prompt you to halt at the next fuel station. It will be able to track the distance to the nearest refilling station and automatically change the destination. The advanced navigation system of your car will be able to access your calendar to figure out the time it takes to get to your next meeting. And based on the weather conditions and real-time traffic, your car must recommend the best route. They can suggest preferred brands and points-of-interest based on prior customizations and selections, by accessing past datasets.

In fact, our work with Volkswagen on their My VWDrive application provides added convenience at the driver's fingertips. With numerous functions that include driving style and fuel consumption tracking, the app enhances the drive with smart capabilities that keep the driver safe and in control, while providing real-time insights on the car condition and performance. With graph calculations for

driver score, distance, duration, fuel efficiency and fuel consumption and periodic fetching of data or polling every three mins in the background, we ensure that the data seen on the application is always upto date. With local storage, the application can be used offline, too.

Fuel and Cost Efficiency

With Connected Cars, you reach your destination safely, quickly and in a cost-efficient manner. Before reaching a signal, a smart car can slow down by communicating with road infrastructure and traffic signals. Just before the lights turn green, it can even stop and start the car automatically. This feature allows for greater fuel efficiency. The wear and tear of a vehicle can be assessed by Connected Cars by tracking the driving patterns. Insurance agencies can leverage this information by calculating the premium that's based on the maintenance and usage of the car. To perform predictive analysis, service stations can periodically gather the diagnostic information over the air. They can even proactively connect with the car owners to fix a service appointment.

Convenient Payment Models

Mobile payments are already catching on quick across the globe. Both Mastercard and Visa are now working with automobile companies to bring electronic payments to smart vehicles. Next time you pass a toll gate, your digital wallet embedded in the car dashboard will charge your card automatically. Same with parking slots in public places like malls, parks, etc.

Fleet Management

Leveraging in-cloud data management, in-vehicle data collection and user analytics, automotive IoT encourages end-to-end fleet management implementation. Fleet Management solutions encompass vehicle location tracking and scheduling, connected vehicle sensors, fuel tracking, vehicle usage analytics, speed control, car leasing solutions, fleet and driver management, workload management even and traffic management.

Convenient Car Maintenance

The condition and status of almost every aspect of the connected car are visualized on the dashboard. Additionally, a wide range of information is accessible to drivers through mobile phone apps. By showing average miles per gallon in different environments, it can even tell a driver how efficiently he or she is driving. Information on scheduled maintenance can be sent automatically to an assigned garage to facilitate smooth, efficient service.

Stolen Vehicle Tracking and User-Based Insurance

With rates based on driving behavior, usage, and other variables, insurance companies are offering policies using data from connected vehicles. Called pay as you drive (PAYD), user-based insurance

(UBI) and pay how you drive (PHYD), is already practiced in certain countries. The Stolen Vehicle Recovery (SVR) or Stolen Vehicle Tracking (SVT), an extension of the UBI service, wherein the system works with the police to locate and recover the stolen vehicle in the event of reported theft.

7. Connected Health (Digital health/Telehealth/Telemedicine)

Connected health remains the sleeping giant of the Internet of Things applications. The concept of a connected health care system and smart medical devices bears enormous potential (see our analysis of market segments), not just for companies also for the well-being of people in general. Yet, Connected Health has not reached the masses yet. Prominent use cases and large-scale startup successes are still to be seen. Might 2015 bring the breakthrough?

The healthcare industry is in a state of great despair. Healthcare services are costlier than ever, global population is aging and the number of chronic diseases are on a rise.

What we are approaching is a world where basic healthcare would become out of reach to most people, a large section of society would go unproductive owing to old age and people would be more prone to chronic disease. Isn't it the end of the world we suspected? Whatever, IoT app development is at your rescue.

While technology can't stop the population from ageing or eradicate chronic diseases at once, it can at least make healthcare easier on a pocket and in term of accessibility.

Medical diagnostic consumes a large part of hospital bills. Technology can move the routines of medical checks from a hospital (hospital-centric) to the patient's home (home-centric). The right diagnosis will also lessen the need of hospitalization.

A new paradigm, known as the Internet of Things (IoT), has an extensive applicability in numerous areas, including healthcare. The full application of this paradigm in healthcare area is a mutual hope because it allows medical centers to function more competently and patients to obtain better treatment.

With the use of this technology-based healthcare method, there are unparalleled benefits which could improve the quality and efficiency of treatments and accordingly improve the health of the patients.

SESSION-IV

Benefits

Simultaneous reporting and monitoring

Real-time monitoring via connected devices can save lives in event of a medical emergency like heart failure, diabetes, asthma attacks, etc. With real-time monitoring of the condition in place by means of a smart medical device connected to a smartphone app, connected devices can collect medical and other required health data and use the data connection of the smartphone to transfer collected information to a physician.

Center of Connected Health Policy conducted a study that indicates that there was a 50% reduction in 30-day readmission rate because of remote patient monitoring on heart failure patients.

The IoT device collects and transfers health data: blood pressure, oxygen and blood sugar levels, weight, and ECGs. These data are stored in the cloud and can be shared with an authorized person, who could be a physician, your insurance company, a participating health firm or an external consultant, to allow them to look at the collected data regardless of their place, time, or device.

Tracking and alerts

On-time alert is critical in event of life-threatening circumstances. IoT allows devices to gather vital data and transfer that data to doctors for real-time tracking, while dropping notifications to people about critical parts via mobile apps and other linked devices.

Reports and alerts give a firm opinion about a patient's condition, irrespective of place and time. It also helps make well-versed decisions and provide on-time treatment.

Thus, IoT enables real-time alerting, tracking, and monitoring, which permits hands-on treatments, better accuracy, apt intervention by doctors and improve complete patient care delivery results.

8. Smart retail

Proximity-based advertising as a subset of smart retail is starting to take off. But the popularity ranking shows that it is still a niche segment. One LinkedIn post per month is nothing compared to 430 for smart home.

SESSION-V

IoT Applications in Retail

1. Automated Checkout

You've probably seen how long lines deter your customers from purchasing products. And, as a manager, it can feel unprofitable to pay multiple employees to work during busier shopping times. With IoT, you can set up a system to read tags on each item when a customer leaves the store. A checkout system would then tally the items up and automatically deduce that cost from the customers' mobile payment app.

Creating an automated checkout system using IoT devices would make your customers happier and more willing to enter your store, especially if they are on a time crunch. It can also save you a ton of money -- McKinsey estimates automated checkout can reduce cashier staff requirements by up to 75%, resulting in savings of $150 billion to $380 billion a year in 2025.

2. Personalized Discounts

If you have frequently returning customers, I bet you'd like to reward them for their loyalty. With IoT, you can set up sensors around the store that send loyalty discounts to certain customers when they stand near products with their smartphones, if those customers sign up for a loyalty program in advance.

Additionally, you can use IoT to track items a customer has been looking at online, and send that customer a personalized discount when she's in-store. Imagine if your customer perused your purses online, and then, in-store, received a discount on her favorite purse? Rather than offering general discounts on a wide variety of products, you can tailor each discount using IoT to maximize your conversion rates.

Ultimately, finding ways to incorporate IoT devices into your day-to-day business requires creativity and foresight, but the benefits of IoT in retail -- as outlined above -- can help your business discover innovative solutions to attract more valuable and loyal long-term customers.

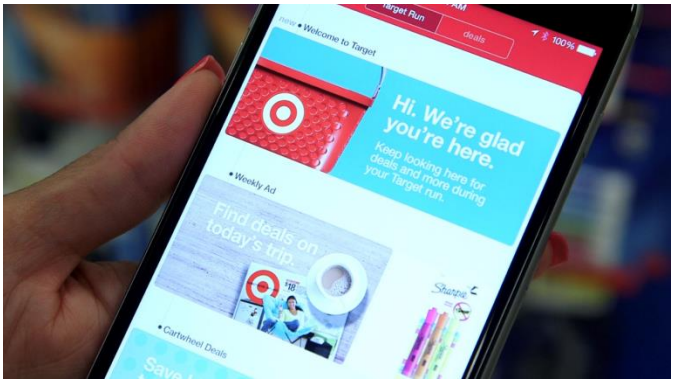
3. Beacons

Beacons, first introduced by Apple in 2013, are small Bluetooth devices that send alerts to smartphones based on location proximity. In the retail industry, this means customers can receive discounts, special events, or other reminders when they're near a shop and have previously downloaded the store's app.

Macy's has been using beacons nationwide since 2014. After opening the Macy's app in-store, shoppers are alerted to promotions and discounts. The app also recognizes which area of the store you're in -- so if you've entered the makeup section, the app will remind you of the makeup brands you liked online.

Along with helping customers in-store, beacons also send alerts to passersby. This can be used to effectively advertise promotions or in-store events. Swirl Networks Inc. found over 70% of shoppers say beacon-triggered content and offers increased their likelihood to purchase in-store.

Besides Macy's, stores including Urban Outfitters, CVS, Lord & Taylor, and Timberland already use beacon technology.



4. Smart Shelves

A lot of your employees' time and energy is focused on keeping track of items to ensure they're never out-of-stock, and checking that items aren't misplaced on various shelves. You can use Smart Shelves to automate both of those tasks, while simultaneously detecting potential theft.

Smart shelves are fitted with weight sensors and use RFID tags and readers to scan the products on both display and stock shelves. Smart Shelves inform you when items are running low or when items are incorrectly placed on a shelf, which makes your inventory process cost-effective and more precise. Additionally, each RFID tag is connected to a reader, so Smart Shelves are able to detect in-store theft -- saving you money on security personnel and cameras.

5. In-store Layout Optimization

You might be surprised to find your retail space isn't optimized for your customers' behavior -- maybe your least popular products are in the front, or your customers' would prefer more space around the couches in the back. By employing aisle-analytics software with infrared sensors, you can use IoT technology to improve your retail layout.

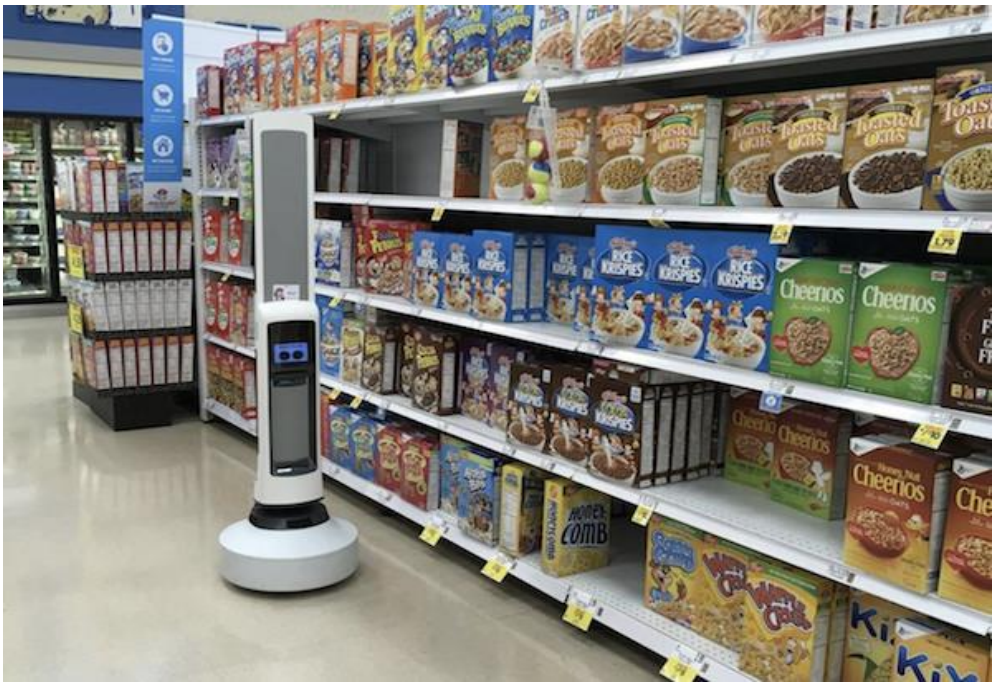
Perhaps you find most of your customers spend the majority of their time checking out your TV's -- but those TV's are placed in the back of the store, behind rarely-touched DVD players. This information arms you with important customer behavior knowledge, so you can place items they care about most, like TV's, in the front of your store.

6. Robot Employees

While it's a little frightening to trust a robot to be your customer service representative, it's also a fantastic opportunity to cut down on menial tasks burdening your workforce.

OSHbot, Lowe's newest robot employee, helps customers find specific products and provides information on promotions and inventory -- plus, he's (she's?) bilingual and can answer both English and Spanish questions.

Other retail stores, such as Target, use robots to roam the store and take note of misplaced items, or products running out of stock. By taking over simple inventory tasks, Target's robot frees up Target's human employees to focus on providing top-notch customer assistance.



7. Optimizing Supply Chain Management

While retail stores can already track products without the help of IoT, that tracking information is pretty limited. With RFID and GPS sensors, you can use IoT to obtain more precise data, like the temperature at which an item is being stored, or how long it spent in transit. You can use that data to improve the quality of transportation moving forward -- and, better yet, you can also act in real-time if a product is being kept at temperatures too low or too high, avoiding a substantial loss.

According to a TATA Consultancy Survey and Business Insider, manufacturers utilizing IoT solutions in 2014 saw an average 28.5% increase in revenues between 2013 and 2014. If you've got a long line of suppliers, truck drivers, and vendors handling your products, it's imperative for you to accurately keep track of how your product is handled and where it's located in the supply chain. This information helps you ensure your process is running as efficiently as possible, and can helpyou get your product into your customers' hands faster.

9. Smart supply chain

Supply chains have been getting smarter for some years already. Solutions for tracking goods while they are on the road, or getting suppliers to exchange inventory information have been on the market for years. So while it is perfectly logic that the topic will get a new push with the Internet of Things, it seems that so far its popularity remains limited.

10. Smart farming

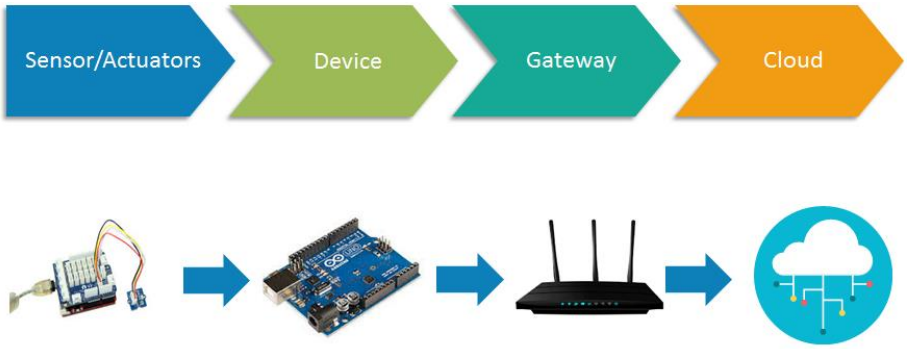
Smart farming is an often overlooked business-case for the internet of Things because it does not really fit into the well-known categories such as health, mobility, or industrial. However, due to the remoteness of farming operations and the large number of livestock that could be monitored the Internet of Things could revolutionize the way farmers work. But this idea has not yet reached large-scale attention. Nevertheless, one of the Internet of Things applications that should not be underestimated. Smart farming will become the important application field in the predominantly agricultural-product exporting countries.

SESSION-VI

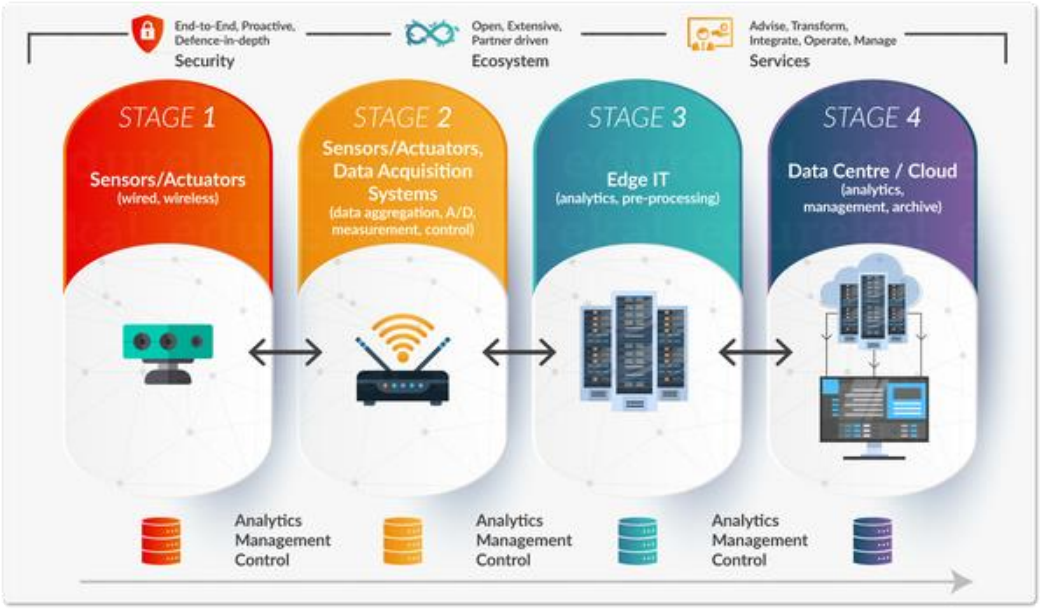
Architecture:

IoT architecture varies from solution to solution, based on the type of solution which we intend to build. IoT as a technology majorly consists of four main components, over which an architecture is framed.

- **Sensors**
- **Devices**
- **Gateway**
- **Cloud**



The following is the basic 4 Stage Architecture of IoT example:sssssss



STAGE 1:

- **Sensors:** Sensors collect data from the environment or object under measurement and turn it into useful data.
  For example: gyroscope in mobiles
- **Actuators:** Actuators can also intervene to change the physical conditions that generate the data.
  An actuator might, for example, shut off a power supply, adjust an air flow valve, or move a robotic gripper in an assembly process.
- **Sensing/Actuating** stage covers everything
  Example: Industrial devices to robotic camera systems, water-level detectors, air quality sensors, accelerometers, and heart rate monitors

STAGE 2:

The stage 2 systems often sit in close proximity to the sensors and actuators.

For Example: a pump might contain a half-dozen sensors and actuators that feed data into a data aggregation device that also digitizes the data. This device might be physically attached to the pump. An adjacent gateway device or server would then process the data and forward it to the Stage 3 or Stage 4 systems

STAGE 3:

- Once IoT data has been digitized and aggregated, it's ready to cross into the realm of IT
- However, the data may require further processing before it enters the data centre
- This is where edge IT systems, which perform more analysis, come into play
- Edge IT processing systems may be located in remote offices or other edge locations, but generally these sit in the facility or location where the sensors reside closer to the sensors, such as in a wiring closet

STAGE 4:

- The data from Stage 3 is forwarded to physical data centre or cloud-based systems, where more powerful IT systems can analyse, manage, and securely store the data
- It takes longer to get results when you wait until data reaches Stage 4, but you can execute a more in-depth analysis, as well as combine your sensor data with data from other sources for deeper insights
- Stage 4 processing may take place on-premises, in the cloud, or in a hybrid cloud system, but the type of processing executed in this stage remains the same, regardless of the platform

Specifications of arduino IoT Starter Kit

- 8 Nos. Point LEDs (Logic Output)
- 8 Nos. Digital Input (Slide Switches)
- 4x4 Matrix Keypad
- 2X16 Character LCD (Background Light)
- 2 Nos. 7-Segment Display
- Stepper Motor Interface
- MEMS
- RTC with Batter-Backup
- UART(RS232)
- USB(Power Supply Only)
- Buzzer (Alarm)
- Humidity

Ultrasonic

- LM35 Temperature
- WIfi Module

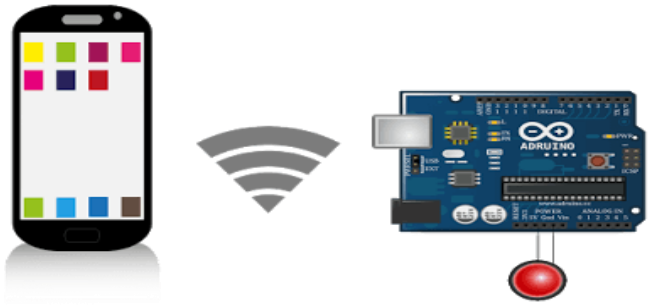
Supported Sensors

- Humidity
- Temperature
- Gas
- Soil Mositure

Supporting Cloud

- Thingspeak

The picture below shows the main objects involved in the IoT project:

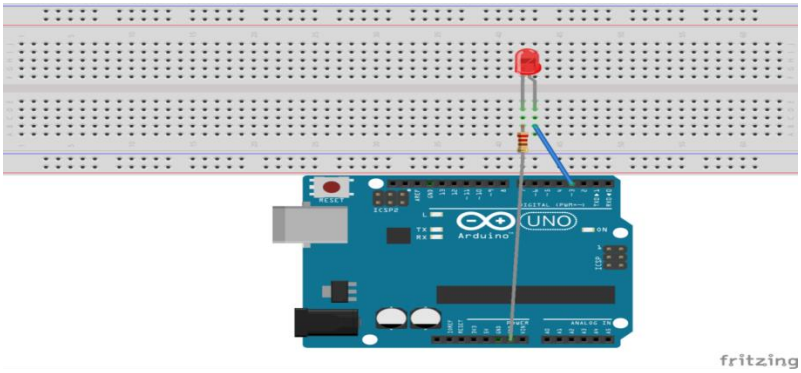


- Arduino Uno
- Ethernet shield
- Smartphone with Android

All the objects are on the same network for simplicity. The idea is that the smartphone sends an HTTP request to the Arduino. A very small and simple Web server runs on Arduino, accepting HTTP request. For simplicity, the app sends JSON data that holds the led status.

Arduino: Web server and connections

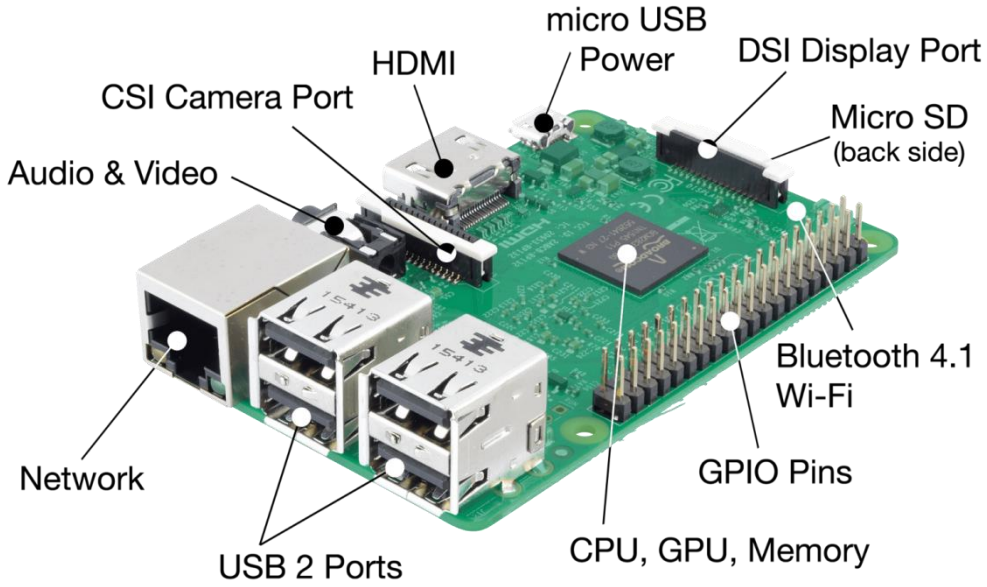
In the Internet of things context (IoT), on the Arduino side, we simply need to connect the led to Arduino main board and control it using one of the Arduino output. The most complex part is creating a Web server that handles HTTP request. The image below shows how Arduino is connected to the led:



SESSION-VII

Raspberry Pi

The history of the Raspberry Pi was basically introduced in 2006. Its main concept is based on Atmel ATmega644 which is particularly designed for educational use and intended for Python. A Raspberry Pi is of small size i.e., of a credit card sized single board computer, which is developed in the United Kingdom(U.K) by a foundation called Raspberry Pi. The main motto of this foundation is to promote the teaching of basic computer science in the education institutes and also in developing countries. The first generation of Raspberry (Pi 1) was released in the year 2012, that has two types of models namely model A and model B.



In the subsequent year A+ and B+ models were released. Again in 2015, Raspberry Pi2 model B was released and a immediate year Raspberry Pi3 model B was released in the market.

Raspberry Pi can be plugged into a TV, computer monitor, and it uses a standard keyboard and mouse. It is user friendly as can be handled by all the age groups. It does everything you would expect a desktop computer to do like word-processing, browsing the internet spreadsheets, playing games to playing high definition videos. It is used in many applications like in a wide array of digital maker projects, music machines, parent detectors to the weather station and tweeting birdhouses with infrared cameras.

All models feature on a Broadcom system on a chip (SOC), which includes chip graphics processing unit GPU(a Video Core IV), an ARM compatible and CPU. The CPU speed ranges from 700 MHz to 1.2 GHz for the Pi 3 and on board memory range from 256 MB to 1 GB RAM. An operating system is stored in the secured digital SD cards and program memory in either the MicroSDHC or SDHC sizes. Most boards have one to four USB slots, composite video output, HDMI and a 3.5 mm phone jack for audio. Some models have Wi-Fi and Bluetooth.

The Raspberry Pi Foundation provides Arch Linux ARM and Debian distributions for download, and promotes Python as the main programming language, with support for BBC BASIC, Java, C, Perl, Ruby, PHP, Squeak Smalltalk, C++, etc.

The following are essential to get started

- Video cable to suit the TV or monitor used
- SD card containing Linux Operating system
- Power supply (see Section 1.6 below)
- USB keyboard
- TV or monitor (with DVI, HDMI, Composite or SCART input)

Recommended optional extras include

- Internet connection, Model B only: LAN (Ethernet) cable
- USB mouse
- Powered USB hub
- Internet connection, Model A or B: USB WiFi adaptor

SESSION-VIII

FUTURE SCOPE OF IOT

According to Gartner (an information technology research and advisory firm), consumer applications will drive the number of connected things, while Enterprise will account for most of the revenue. Gartner estimated that 2.9 billion connected things are in use in the consumer sector in 2015 and would increase to over 13 billion till 2020.

The UK Government allocated £40,000,000 towards research into the Internet of Things in their 2015 budget. The British Chancellor of the Exchequer George Osborne posited that the Internet of Things is the next stage of the information revolution and referenced the inter- connectivity of everything from civil transport to healing devices to home appliances.

IOT - the new revolution

When we look at today's state of technologies, we get a clear indication of how IoT will be implemented on a global level in near future. Use of the internet is increasing day-by-day. Commute and connectivity became easier in the present scenario. In near future, the number of internet connected devices would increase exponentially.

Although there are some issues in IoT. These issues can be removed in near future. With such a rapid growth, the day is not too far that we can decide our dinner even before reaching home on the way.

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CODETANTRA

DEPARTMENT OF COMPUTER SCIENCE

Two- Day National Workshop
on

"INTERNET OF THINGS"

Feedback on Day-1 **Date: 30 Nov 2018**

Name of the Participant: College and Station:

Email.id:

1. How do you rate the Topics/Themes of the National Workshop? [ ]

   a. Satisfactory b. Good c. Very Good d. Excellent

2. Are the contents delivered with apt explanation? [ ]

   a. Yes b. No

3. Did the National Workshop succeed in fulfilling the purpose of its conduct? To what extent?

   _____

4. How do you rate the Instructor's Knowledge and Presentation Style? [ ]

   a. Excellent b. Good c. Fair d. Poor

5. Instructor Covered Material Clearly?

   a. Excellent b. Good c. Fair d. Poor

Signature & Date

A.S.D. Govt. Degree College For Women (A)Kakinada

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CODETANTRA

DEPARTMENT OF COMPUTER SCIENCE

Two- Day National Workshop

on

"INTERNET OF THINGS"

Feedback on Day-2 **Date: 1 Dec 2018**

Name of the Participant: College and Station:

Email.id:

1. How do you rate the Topics/Themes of the National Workshop?

a. Satisfactory b. Good c. Very Good d. Excellent

2. Which aspect of the Themes, in your opinion, helped to learn more and increase your knowledge?

_____

_____

3. Did the National Workshop succeed in fulfilling the purpose of its conduct? To what extent?

_____

_____

4. What is your overall impression of the National Workshop? Please provide your suggestions for improvement?

_____

_____

Signature & Date

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DEPARTMENT OF COMPUTER SCIENCE

Two-Day National Workshop

on

Internet of Things

Valedictory (01 DEC 2018)

1.	Welcoming Delegates on to the dais	**:**	**M. Bhavana Sudha (III B.Sc)**
2.	President's Opening Remarks	**:**	**Dr. D.Ratnagiri Usha,** Principal, A.S.D.Govt.Degree College for Women(A)
3.	**Special Invitee**	**:**	**Dr. Krishna Chappidi** Principal, P.R. Govt. College (A), Kakinada & E.C. Member,ANUR.
4.	Convener's Brief Report	**:**	**Mrs. G.Satya Suneetha** Convenor
5.	Certificate Presentation to Participants	**:**	**Dr. D.Ratnagiri Usha** Principal, A.S.D.Govt.Degree College for Women(A) **Dr. Krishna Chappidi** Principal, P.R. Govt. College (A), Kakinada & E.C. Member,ANUR
6.	Vote of Thanks	**:**	**Mrs. N.Naga Subrahmanyeswari** Convener
7.	National Anthe	**:**	Students

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