# Innovation Strategy and Betterment Planning for Smart Village

M Chinna Rayudu*, G S Surendra Babu, Praveen K

Bheema Institute of Technology and Sciences, Adoni, Andhra Pradesh, India

## ABSTRACT

Every country has been developed a reputation as a global leader in upgrading their villages as smart as possible initiatives in its larger urban areas. Most of the countries they are focusing towards the development of cities, The Rural/village areas are in need of most essential infrastructure like roads, drinking water and power. Villages are not having most essential needs now a day's most of the villagers are moving towards to the cities because of their basic needs. The future development mainly concentrates on improving big metropolises into connected cities but failed to see where most of the population resides. The Development of town planning, opportunities for youths in villages are very less, thereby discouraging and started migration to cities. Farming remunerates occupation, with guidance and mentoring daily tracing and tacking to farmers on how to get the best yield of the crop and market with actual remunerative prices for crop the future rural development. To overcome these problems this project has been proposed. The proposed design for the planning of smart village consists of Arduino Microcontroller Unit, LCD, Ultrasonic sensor, temperature sensor, Humidity sensor, Soil moisture sensor, LDR, LED lamp, pumps and GPRS. The environment monitoring, garbage collections and street light management are difficult and complex phenomena to overcome existing problems this project has been proposed. With smart technologies it's easy to manage traffic, garbage, environment and we can ease environmental and climate impacts from the growth in mobility. In this project Thingspeak cloud application is used to store the data and all information for this project through GPRS.

**Keywords:** Audiono UNO, IoT, RC03 Finger Print Module

## I. INTRODUCTION

There are gigantic difficulties in acknowledgment of a provincial advancement that screens and coordinates the entirety of the town framework and administrations to use the system intelligence. The advancement of an IoT based village and town incorporates Cloud based system which can give a virtual framework to process and coordinate the investigation instruments checking hardware, stockpiling, and perception stage inside the framework. IT-OT union which mean to Implementation of IoT Based SmartVillage for the Rural Development keep charging and information

investigation in vitality the board. Squander assortment framework upgraded with cloud based IoT administrations which empower dynamic planning and steering in a waste assortment framework is by all accounts an effective framework. The access to sustainable energy services acts as a basic catalyst for smart village development extending the provision of efficient management of energy, water, waste and various other attributes. Major parts of rural areas are not stand-alone system it remains a part of a cluster, which are related to each other.

Smart village planning can help to reduce cost through improved process efficiency, asset utilization and productivity. The following of gadgets is improved utilizing sensors and specialized gadgets which can be profited by constant information and examination assist them with settling on more brilliant choices.

The huge IT foundation is required by provincial advancement alongside the colossal money related help which is to be joined. Sensors, a large number of systems administration hardware and figuring gadgets are worked in this mind-boggling system. Operational and maintenance procedural of such a complex system will be higher which is evident to meet reliability and efficiency improvement.

In case of irrigation management system, all fields are fitted with the sensors and data management unit, which are highly effective and highly reliable in managing the soil and water management in processing and control.

## II. LITERATURE REVIEW

1. The nineteenth CPC (Communist Party of China) National Congress report pointed out that we should adhere to the harmonious coexistence of man and nature, and accelerate the implementation of the strategy of rural revitalization. Liaoning adheres to government guidance, and takes the protection of the traditional village culture and innovation development of the tourism industry as the focus of reform. In addition, Liaoning constructs a number of characteristic villages with strong Northeast China style relying on the cultural heritage. Through networking, cloud computing and other electronic information technology with new generation, all-round and three-dimensional perception of traditional village tourism is made, and the smart collection, processing, and timely distribution of relevant information are carried out. Various tourism stakeholders make intelligent decisions based on this to realize the tourism form of the sustainable development of rural tourism. Smart village construction can not only promote the protection and inheritance of village culture, but also promote the transformation and upgrading of traditional tourism industry, to realize the coordinated development of production, life and ecology of traditional villages.

2. This paper explains about the various requirements of different programs for villages in context of Indian scenario, strategic formulations, and various core aspects of development of smart village. In Smart Villages access to sustainable energy services acts as a catalyst for development enabling the provision of good education and healthcare, access to filter water, sanitation and nutrition, the growth of productive enterprises to boost incomes, and enhanced security and democratic engagement by various technological means of work. This attempt for developing village is for welfare of society and environment as well.

3. The IEEE, the universal largest technical professional organization advancing technology for humanity, has been announced for IEEE SmartVillage(IsV) initiative was named a finalist in the 2017 United Nations (UN) department of economic and social Affairs (desA) grant competition, "Powering the Future we want: recognizing leadership and Innovative Practices in

energy for sustainable development." the IsV was one of 13 groups out of 231 screened applicants that were invited to the UN headquarters for the face to face presentations.The UN program offers a grant of Us$1 million to fund future capacity development activities in energy for sustain- able development. The grant is awarded to an individual, institution, or partner- ship based on past and current achievements, with the objective of promoting leadership and innovative practices in meeting the global energy challenge. One winner is selected every year. The 2017grant was awarded to the Partnership of Grameen shakti and Me solshare, ltd. from Bangladesh in an event in New York City on 21 November 2017."We are extremely honored by this recognition from desA," said ray larsen, chair of the IsV Committee. larsen went on to say: Our volunteers across the world have worked hard to build this program into the positive force for sustainable development that it is. IsV is a unique model bringing the talents of IEEE Members together with local entrepreneurs and entire communities with a plan to empower millions with electricity, education, and sustainable, scalable enterprises. We also wish to congratulate the winner, Partnership of Grameen shakti and Me solshare, ltd., and to thank all of the finalists and our UN host for the unique privilege to share with and learn from them during the Capacity development seminars.

4. IsV integrated with the sustainable electricity, education, and entrepreneurial requirement to directly to guide for off grid communities to become self-sufficient and self practice. Through a global network of local entrepreneurs, expert engineers, and passionately dedicated workers, the team works in partnership with the community and other change agents to help empower local economies, create job opportunities, and foster education programs that help communities around the world to learn how to continually improve

their quality of life and change the life style of these workers.

## III. PROJECT DESCRIPTION

This chapter deals with working of "Implementation and recent progress in smart home automation". It can be simply understood by its block diagram
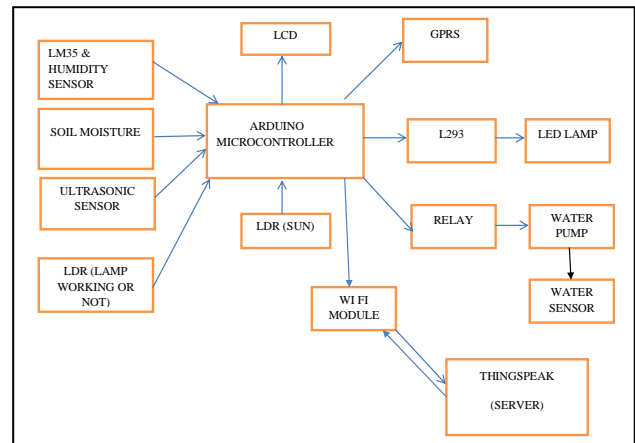


Fig 3.1: Block diagram

### Description:

This block diagram explains about the overall process of the project. The environment monitoring, garbage collections and street light management are difficult and complex phenomena to overcome these problems this project has been proposed The proposed design for smart village consists of Arduino Microcontroller Unit, LCD, Ultrasonic sensor, temperature sensor, Humidity sensor, Soil moisture sensor, LDR, LED lamp, Water pump and GPRS. The Ultrasonic sensor is used to check whether the dustbin in villages is filled or not. Temperature sensor and Humidity sensor are used to verify the temperature and humidity condition of the village. To observe the moisture condition in agriculture lands here we using moisture sensor. To control LED lamps according to the mode of day and night without manual support we using LDR. To avoid wastage of water we using water pump and is controlled by Relay. All these conditions of the

village stored in Amazon cloud through GPRS.

We have proposed a innovation strategy and betterment planning a smart village system that is intelligent enough to control environmental conditions and garbage collection and power saving the electrical poles in the village automatically using IOT that collects the status information through these systems.

The proposed design for smart village consists of Arduino Microcontroller Unit, LCD, Ultrasonic sensor, temperature sensor, Humidity sensor, Soil moisture sensor, LDR, LED lamp, Water pump and GPRS.

The microcontroller located at the centre of the block diagram forms the control unit of the entire project. The output of the sensors is a voltage which corresponds to the surrounding environmental conditions. This voltage generated by the sensors is fed to the inputs of the microcontroller.

The Ultrasonic sensor is used to check whether the dustbin in villages is filled or not. Temperature sensor and Humidity sensor are used to verify the temperature and humidity condition of the village. Agriculture is one of the main source for village people. For the agriculture land moisture land is very important. Therefore to observe the moisture condition in agriculture lands here we using moisture sensor. To make smart village streets light are much essential. To control LED lamps according to the mode of day and night without manual support we using LDR (Light Dependent Resistor).To avoid wastage of water we using water pump and is controlled by Relay. Finally all these conditions of the land stored in Amazon cloud through GPRS.
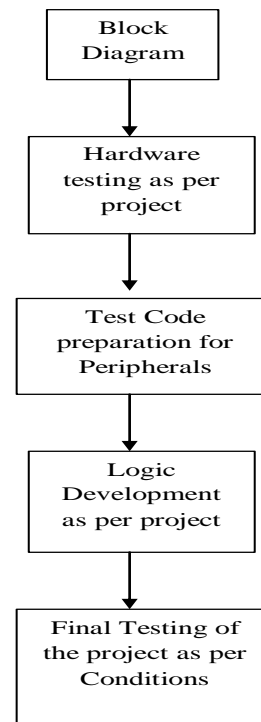


Figure: Project Flow Chart

The hardware testing as per the project and it will test the code preparation for peripherals to a logic development as per project due to the final testing of the project conditions as well as the innovation and creating a smart village with internet of things. As per this methodology the entire project can run and implementation of garbage collections and monitoring a street lamps of village.

## IV. DESIGN OF HARDWARE

ATMEGA328 MICROCONTROLLER
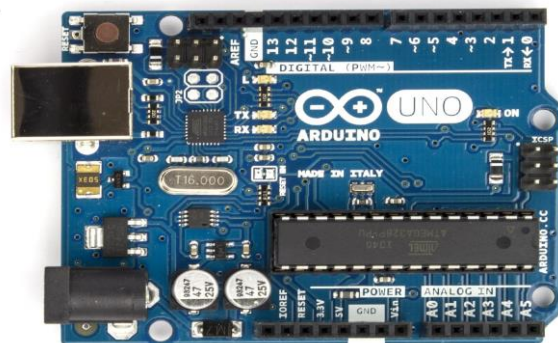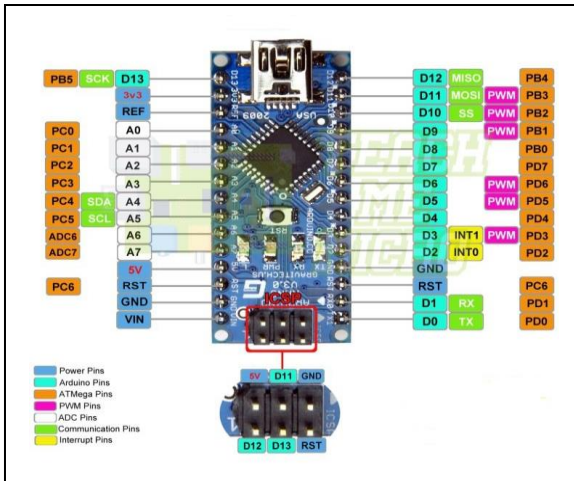
The Arduino Uno/ Nano is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2up to version R2) programmed as a USB-to-serial converter. Revision 2of the Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode

FEATURES OF ATMEGA 328 MICRO CONTROLLERS

- High Performance, Low Power Atmel ® AVR ® 8-Bit Micro controller Family
- Advanced RISC Architecture
- 131 Powerful Instructions
- Most Single Clock Cycle Execution
- 32 x 8 General Purpose Working Registers
- Fully Static Operation– Up to 20 MIPS Throughput at20MHz
- On-chip 2-cycleMultiplier
- High Endurance Non-volatile Memory Segments

- 32KBytes of In-System Self-Programmable Flash program Memory
- 1Kbytes EEPROM
- 2KBytes Internal SRAM
- Write/Erase Cycles: 10,000 Flash/100,000EEPROM
- Data Retention: 20 years at 85°C/100 years at25°C(1)
- Optional Boot Code Section with Independent Lock Bits
- In-System Programming by On-chip Boot Program
- True Read-While-Write Operation
- Programming Lock for Software Security
- Atmel® Q Touch® Library Support
- Capacitive Touch Buttons, Sliders and Wheels
- Q Touch and Q Matrix® Acquisition
- Up to 64 sense channels
- Peripheral Features
- Two 8-bit Timer/Counters with Separate Prescaler and Compare Mode
- One 16-bit Timer/Counter with Separate Prescaler, Compare Mode, and Capture Mode
- Real Time Counter with Separate Oscillator
- Six PWM Channels
- 8-channel 10-bit ADC in TQFP and QFN/MLF package
- Temperature Measurement
- 6-channel 10-bit ADC in PDIP Package
- Temperature Measurement
- Two Master/Slave SPI Serial Interface
- One Programmable Serial USART
- One Byte-oriented 2-wire Serial Interface (Philips I2C compatible)
- Programmable Watchdog Timer with Separate On-chip Oscillator
- One On-chip Analog Comparator
- Interrupt and Wake-up on Pin Change Special Microcontroller Features
- Power-on Reset and Programmable Brown-out Detection
- Internal Calibrated Oscillator

➢ External and Internal Interrupt Sources

➢ Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby, and Extended Standby

➢ I/O and Packages– 23 Programmable I/O Lines

➢ 28-pin PDIP, 32-lead TQFP, 28-pad QFN/MLF and 32-pad QFN/MLF

➢ Operating Voltage

➢ 1.8 – 5.5V

➢ Temperature Range:– -40°C to105°C

➢ Speed Grade:– 0 - 4MHz @ 1.8 –5.5V

➢ 0 - 10MHz @ 2.7 – 5.5V

➢ 0 - 20MHz @ 4.5 –5.5V

Soil Moisture Sensor Features

➢ The working voltage of 3.3 V to 5 V.

➢ Simple digital output, g + v directly by single chip microcomputer.

➢ The sensitivity is adjustable using digital potentiometer (blue).

➢ A fixed bolt hole, convenient installation.

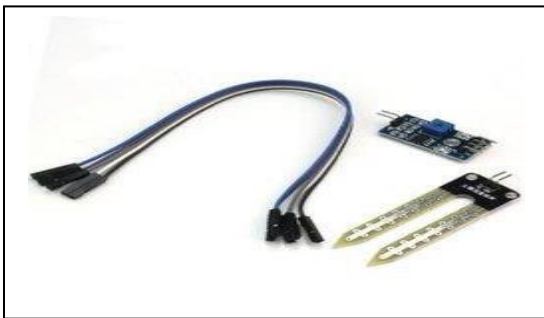➢ The power indicator light (red) and digital switch output indicator light (green).



Figure: Moisture Sensor

Water Sensor



## Specifications

➢ Diaphragm pump (not metal to water contact)

➢ 12 v DC 2.5amp (peak) Pumps at around 1 amp

➢ 3.8 litres per minute – Open Flow. Flow rate will vary dependin on hose size/length, drawing height and supply voltage

➢ Intermittent Duty Cycle

➢ Max water temperature of 540 C

➢ Hose barb connections suit 3/8" ID hose

## Dimensions

➢ Height: 60mm

➢ Mounting Hole Centres: 60mm x 75mm

## Weight

➢ 650 gm (net weight)

➢ 730 gm (packed weight)

➢ Carton size: 200x110x65 mm.

Water sensor block is intended for water discovery, which can be broadly utilized in detecting the precipitation, water level, even the liquate spillage. The block is fundamentally involved three sections: An Electronic block connector, a 1 Mω resistor, and a few lines of exposed directing wires. This sensor works by having a progression of presented follows associated with ground and entwined between the grounded follows are the sense follows. The sensor follows have a frail draw up resistor of 1 Mω. The resistor will pull the sensor follow esteem high until a drop of water shorts the sensor follow to the grounded follow. In all honesty this circuit will work with the advanced I/O pins of your Arduino or you can utilize it with the simple pins to recognize the measure of water incited contact between the grounded and sensor follows.

Humidity Sensor
Microcontroller based temperature estimation in the present condition includes a wide assortment of requirements and applications. To meet this wide

exhibit of necessities the procedure controls industry has built up countless sensors and gadgets to deal with this interest. In this task you will have a chance to comprehend the ideas and utilization of the LM35 sensor, and really run a test utilizing a choice of this gadget Temperature is a basic and generally estimated variable for most conditions or a specific covering.
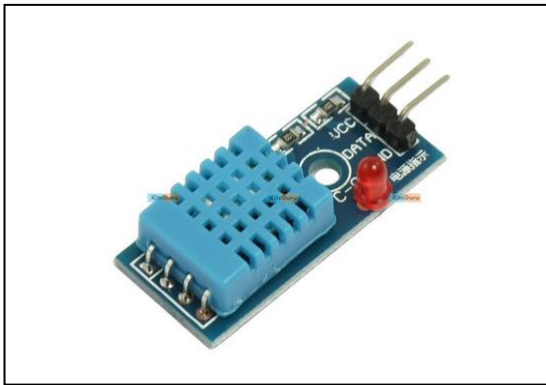


Figure : Humidity Sensors

Temperature estimation fluctuates in various area deciding by the temperature should be met at that area. Numerous procedures must have either an observed or controlled temperature. More troublesome estimations, for example, the temperature of smoke stack gas from a force producing station or impact heater or the fumes gas of a rocket might be should be observed. Considerably more typical are the temperatures of liquids in procedures or procedure bolster applications, or the temperature of strong articles, for example, metal plates, orientation and shafts in a bit of apparatus.

TEMPERATURE SENSOR-LM35

The LM35 arrangement are accuracy incorporated circuit temperature sensors, whose yield voltage is straightly relative to the Celsius (Centigrade) temperature. The LM35 in this way has a preferred position over direct temperature sensors adjusted in Kelvin, as the client isn't required to take away a huge steady voltage from its yield to get advantageous Centigrade scaling. The LM35 doesn't require any

outside alignment or cutting to give run of the mill correctnesses of ±1⁄4˚C at room temperature and ±3⁄4˚C over a full –55 to +150˚C temperature go. Minimal effort is guaranteed by cutting and alignment at the wafer level. The LM35's low yield impedance, direct yield, and exact inborn adjustment make interfacing to readout or control hardware particularly simple. It tends to be utilized with single force supplies, or with in addition to and short supplies. As it draws just 60 µA from its gracefully, it has low self-warming, under 0.1˚C in still air. The LM35 is evaluated to work over a –55˚ to +150˚C temperatures go.
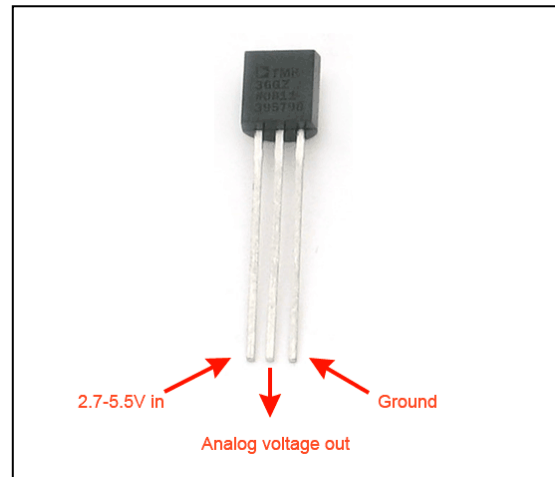


Figure : PIN DIAGRAM OF LM35

ULTRASONIC SENSOR

Used to identify the move of human or article. Reasonable for indoor and open air criminal evidence application, vehicle thief confirmation application, ATM observation camera, distribution center reconnaissance camera, and wellbeing cautioning application in perilous site where voltage and temperature exist.

SONAR RANGE FINDERS

SONAR, abbreviation for Sound Navigation and Ranging, an identification framework dependent on the impression of submerged sound waves, similarly as radar depends on the impression of radio waves noticeable all around. A run of the mill sonar framework emanates ultrasonic heartbeats by utilizing a lowered transmitting gadget; it tunes in with a touchy receiver, or hydrophone, for reflected heartbeats from possible hindrances or submarines. The LV-MaxSonar®-EZ1™ identifies objects from 0-creeps to 254-inches (6.45-meters) and gives sonar go data from 6-crawls out to 254-creeps with 1-inch goal. Items from 0-crawls to 6-inches extend as 6-inches. With 2.5V - 5.5V force the LV-MaxSonar®-EZ1™ gives extremely short to long-extend identification and running, in an unfathomably little bundle.



## V. EXPERIMENTAL RESULT

In this project, the main idea of the proposed system is to provide better and efficient usage of energy and environment conditions of services to the village by implementing a networked information cloud so that the monitoring and store the data through the GPRS make use of this data and provide a fast and an efficient solution. The final model will be well equipped with the features of cleaning and maintain some as well and any other system of where village can examine the conditions of village from anywhere and anytime. And all the data to send an emergency mail or message to the consent department of current status and full of information can also be worked on.
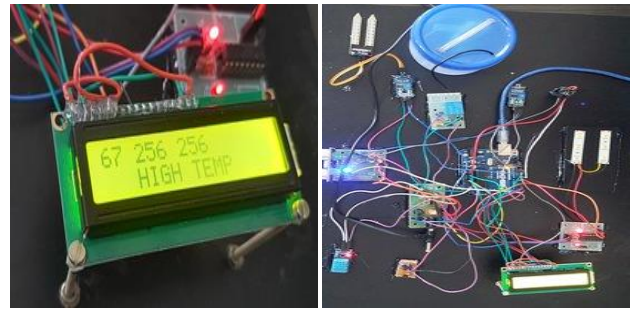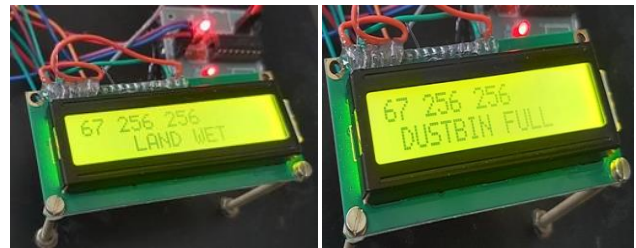


Figure: Implementation of Kit Showing the Temperature



Figure: Indication Of  Garbage Status And Moisture Status Of Land
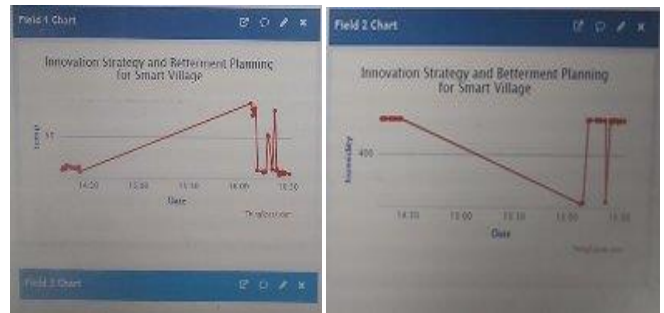
### Output Images



Figure: Temperatures and Humidity Graph



Figure: Moisture Graph

## VI. Conclusion

Smart village planning can have a major impact on national development. These efforts can increase the decision-making power of society by allowing them to make intelligent and effective decisions at appropriate times. In this paper, we propose a system for smart village planning by using an IoT-generated data analysis. The proposed architecture consists of three tiers that have functionalities including collection, communication, processing, and interpretation. The complete system is developed using node MCU connect with the cloud storage. The simple IoT-based smart city datasheets, such as vehicular networks, smart parking, smart home, weather, pollution, surveillance, and so on are analyzed for developing a smart city as well as for urban village planning decisions also. The proposed system benefit for villagers while providing them with the facilities to make intelligent and quick decisions.

## VII. Future Scope

The Internet-of-Things (IoT) has taken over the business spectrum, and its applications vary widely from agriculture and In future we can extend with a camera, because if any person damages the light can be captured and sent to Server. In future we can also use the GSM to send condition of agriculture land and condition of environment to the respective land owner of the village. This project mainly finds it use in the field of medical diagnosis, in a country like India where rural population and remote areas plays an important role. It is important to have an effective and on-time diagnosis system. We can make the whole diagnosis process better by introducing this idea. We can maintain the village environmental conditions and saving energy.

➢ IoT is reshaping a smart village as well. Wearable technology to monitor village environment condition at anytime and anywhere is very common now. Sensors are collecting data and at the same time, the data can be available at cloud. This is helping for smart villages and closely monitors environments from far away.

➢ The manufacturing industry is making use of smart machines to improve the overall manufacturing process and to produce better goods. IoT has something to offer to everyone, it has completely changed the way we used to do business, socialize and have fun.

➢ There is no doubt that IoT is a game-changer and there is enough potential for professionals to innovate further. If you need more information about IoT or if you want to be an IoT professional, Collaborate TACT offers comprehensive IoT training.

## VIII. REFERENCES

[1] Anagnostopoulos, A. Zaslavsky, "Robust Waste Collection exploiting Cost Efficiency of IoT potentiality in Smart Cities", IEEE 1st International Conference on Recent Advances in Internet 2015.

[2] A. P. Castellani, M. Dissegna, N. Bui, and M. Zorzi, "Web IoT: A web application framework for the internet of things," in Proc. IEEE Wireless Commun. Netw.Conf. Workshops, Paris, France, 2012.

[3] R. Bonetto, N. Bui, V. Lakkundi, A. Olivereau, A. Serbanati, and M. Rossi, "Secure communication for smart IoT Objects: Protocol stacks, use cases and practical examples," in Proc. IEEE IoT-SoS, San Francisco, CA, USA, 2012, pp. 1–7.

[4] P. Suresh, "Understanding Challenges in e-Governance," Better Account with e-governance, pp. 61–63, 2011.

[5]     Glouche, Yann, and Paul Couderc. "A smart waste management with self-describing objects." In The Second International Conference on Smart Systems, Devices and Technologies 2013.

[6]      Alghamdi, Ibrahim A., Robert Goodwin, and Giselle Rampersad. "E-government readiness assessment for government organizations in developing countries." Computer and Information Science 4.3 (2011): p3.

[7]     International Journal of Information and Education Technology, Vol. 6, No. 5, May 2016 ICT Based Education for Literacy in India: Vision Beyond 2015.

[8]     Fuller, J. C., Schneider, K. P., and Chassin, D. (2011). Analysis of residential demand response and double-auction markets.In IEEE Power and Energy Society General Meeting.

[9]     Loganthiran, T., Srinivasan, D., and Shun, T. Z. (2012). Demand side management in smart grid using heuristic optimisation. IEEE Transactions on Smart Grid, 3(3), 1244–1252.

[10]    M. Kovatsch, S.Duquennoy and A. Dunkels, "A Low-Power CoAP for Contiki ", In Proceedings of the IEEE Workshop on Internet of Things Technology and Architectures, Valencia, Spain, October 2011.

[11]    R.Hussain, J.Sehgal, A.Gangwar, M.Riyag " Control of irrigation automatically by using wireless sensor network" International journal of soft computing and engineering, vol.3, issue 1, march 2013, pp.48t 324-328.

[12]    Fan TongKe, "Smart Agriculture Based on Cloud Computing and IOT", Journal of Convergence Information Technology, Vol. 8, Issue 2, pp.1, Jan 2013.

[13]    Hong, Insung, Sunghoi Park, Beomseok Lee, Jaekeun Lee, DaebeomJeong, and Sehyun Park. "IoT-based Smart Garbage System for efficient food waste management." The Scientific World Journal 2014.

[14]    T. Anagnostopoulos, A. Zaslavsky, "Effective Waste Collection with Shortest Path Semi-Static and Dynamic Routing", IEEE 14th International Conference on Next Generation Wired/Wireless

## Cite this article as :