

ARDUINO UNO based system to Develop the Smart Village

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Abstract- This paper uses the concept of ARDUINO UNO which is used to automate systems in villages, The idea of creating smart villages for sustainable growth and development in rural areas providing access to basic infrastructure like roads lights, water, power, hospitality and smart banks and healthcare facilities. Providing the soil moisture sensor through which the man power and maintenance rate will be reduced. Smart villages contain smarter govt. policies that may be street light or ration system.

RFID cards and reader system is used to have the access RATION in villages. Street Lights of villages will be handled through LDR sensors. GSM Module is used to get the SMS on mobile during the critical situation like Fire alert, robbery the authorized person.

Key Words: ARDUINO UNO, GSM module,RFID.

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1. Introduction: In India there are 600000 villages out of them 1, 25,000 villages are backward so there is a need for designing and building the village as a smart village. With modernization and urbanization, people migrate from one place to another place for different facilities such as education, employment, and affinity of people towards the locality or City. The village is the main criteria for the development of the nation. So, develop the village in such away that which is self-dependent in providing the services ,employment and well connected to the rest of the world i.e., smart village. The smart village corrects social oversight by providing accommodations for sustainable family relationships without disturbing the lifestyle of different generations. The vision of smart village is that modern energy access can act as a catalyst for development in education, health, productive enterprise, clean water, sanitation, environmental sustainability and participatory democracy which helps to support further improvement in access to energy

The idea of creating smart villages for sustainable growth and development in rural areas means focusing on productive agriculture fields as well as providing access to basic infrastructure like roads lights, water, power, hospitality and smart banks and healthcare facilities. Agriculture provides the economic growth to the villagers so that we are focusing agriculture productivity by providing soil moisture sensor through which the man power and maintenance rate will be reduced. Smart villages contain smarter govt. policies that may be street light or ration system.

For all villagers RFID cards will be provided so that the authorized card holder person can take the ration. Village streets are provided with LDR sensors, when LDR's is in darker condition then street lights gets ON automatically. If any difficult condition like fire is occurred in hospitals are provided with fire sensor so it create an alert. Also for banking security wired security will be provided. If any robbery occurred the manager get an alert SMS through GSM module.

2. Literature survey

1. Saansad Adarsh Gram Yojana (2014)-On 11th October, the birth anniversary of Loknayakan Jaya Prakash Narayan Ji, following the footsteps of Gandhi, we intend to translate the concept of gram swaraj in to reality through Saansad Adarsh GramYojana.The SAGY will keep the soul of rural India alive while providing physical amenities to enable freedom of choice to shape their own destiny. The scheme is unique and transformative as it has a holistic approach to rural development
2. Heri Sustanta, Trias Aditya, Retno Astrini (2015)-Developing smart cities requires many types of information, including geospatial information. This information serves as the base data from which other data will be referenced upon. To obtain information on the geospatial information availability in Indonesian cities, a survey has been carried out nationally from April- July 2015, as part of research on spatial data infrastructure.
3. Dr. Pritesh Y Shukla (2016)-In this paper, they focus on improved resource- use efficiency, empowered local self-governance, access to assure basic amenities and responsible for individual behavior to build a vibrant and happy society in the village.

3. Problem definition

1. In Smart Villages access to sustainable energy services acts as a catalyst for development – enabling the provision of good education and healthcare, access to clean water, sanitation and nutrition, the growth of productive enterprises to boost income, and enhanced security, gender equality and democratic engagement.
2. The smart city concept for reducing water resources in agriculture field. In hospitals, the alarms used and protect from damage with dangerous situations.

4. System model

4.1 System Architecture:

The interconnection between different components is explained using the architecture of system. Architecture diagram is shown in Fig. 1. Aurdino board is connected with various sensors like Street light sensor, Fire sensor, soil moisture sensor, Temperature & Humidity sensors, water level indicators, GSM module & connectivity switches. The LCD display is meant to display various parameters related to the agriculture like humidity or moisture content in soil. The GSM module is used to send the messages to authenticated users.

5. Block diagram:

Block diagram is shown in Fig. 1. The diagram is divided into two sections: In the First section the collected data is stored in the Ardiuno Uno and the data is sent to the server using GSM module. In the second section a meant for the getting the data from the various sensors connected across the system.

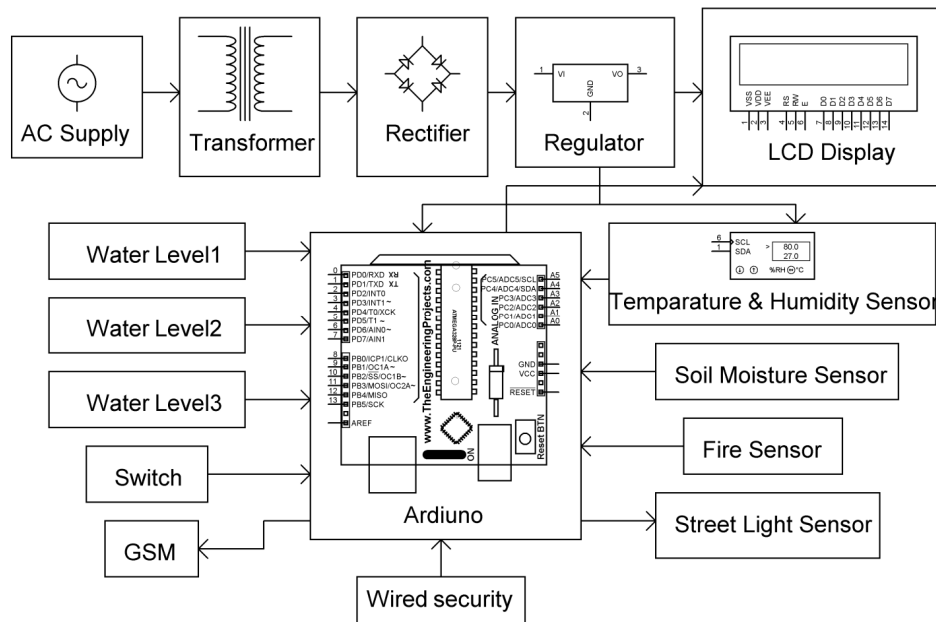


Fig. 1 Arduino based smart village

The design of the system is divided into two parts: Hardware components and software components.

A. Hardware Components:

1. Lcd display
2. Potentiometers
3. Gsm module
4. Matrix-keypad
5. Dht11 humidity sensors
6. Buzzers
7. Dc motors
8. Soil moisture sensors
9. Load cells
10. Ds18b20 digital temperature sensors
11. Thermistors
12. Light dependent resistors
13. Arduino boards

B. Software Components

- 1 Arduino IDE

6. Flow Chart

Programs written in Arduino are known as sketches. A basic sketch consists of 3 parts

1. Declaration of Variables
2. Initialization: It is written in the setup () function.
3. Control code: It is written in the loop () function.

- The sketch is saved with .ino extension. Any operations like verifying, opening a sketch, saving a sketch can be done using the buttons on the toolbar or using the tool menu.
- The sketch should be stored in the sketchbook directory.
- Chose the proper board from the tools menu and the serial port numbers.
- Click on the upload button or chose upload from the tools menu.
- Thus the code is uploaded by the bootloader onto the microcontroller.

7. Hardware Implementation of the Model.



Fig. 4 Hardware Connection Setup for Smart Village

8. Result Analysis and Discussion

Over recent years, the challenges arising from the social and economic, but also wider changes of people's communities rural and urban have been increasingly addressed through the lenses of technological developments and digitalization. In this project, we have focused on the applications of the Smart Village concept and the importance of digital transformation for rural areas, always drawing parallels between the findings and insights from different regions.

9. Conclusion

This paper proposes a novel method for making smart villages using Arduino Uno technology. This paper helps the villages to get most of the things automated which increases the productivity of the yields and which in turn improves the life style of villages.

10. Future scope

More Arduino devices can be interfaced which in turn increases the communication between the lands which situated at far places and real time monitoring is possible with this technology.

11. References

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