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# Smart Society Management System

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***Abstract:*** *This paper presents a SMART SOCIETY MANAGEMENT SYSTEM is also known as Building Automation System (BAS), It is a Microcontroller (Arduino Uno) based control system installed in buildings that control and monitors buildings mechanical and electrical equipment such as lighting, security systems, power systems, HVAC (Heating, Ventilation and Air Conditioning) control system, Lifts, Fire Alarm, Detection System, Smart Car Parking, Solar Tracking System, Garden Watering system.*

## 1. Introduction

The SMART SOCIETY MANAGEMENT SYSTEM is developed to manage the day -to-day activities of Society. Managing society maintenance and operation become a complicated and difficult task to perform. This society management system will automize all day-to-day operations in the society. With help of this system maintaining a society is become easy and the most common problem faced in societies are solved.
The technology of BACS may also be known by many other terms, such as Building Management Systems (BMS), Intelligent Buildings (IB), increasingly, Smart Buildings and even Smart Cities. However, a more precise term is Building Automation and Control System (BACS).

## 2. Literature survey

1. "Housing Society Management "by Shantanu Kudale, Chandan Amarnani, Harshal Sawakare, Shubhankar Kokate, Sujata Kadu. Housing society plays a significant role in our residential life. Our day to day needs such as water supply, electricity, security, maintenance comes under housing society management.
2. "Implementation of Building Management System "by Omkar Naik, Shreya Pomaje, Prof.S.S.Tamhane. This project ensures less Maintenance and reduces risk factors and also increases efficiency. Occupants can install a BMS to automate building functions such as

maintaining the temperature which can reduce the cost of operating the building.

3. Literatur esurvey "Building Management System "by Suresh Kumar, Jitendra Prasad Rajwar, Abhay Kumar Thakur.
4. "Research Methodology for Building Automation Performance Index" by Ph.D. Roozbeh Kangari, Ph.D.Toozbe.Kangari Coa garelady. Automation is designed to increase overall building performance. Building Automation Systems(BAS) are attractive to facility managers and famous due to their commitment of increased operational effectiveness.

## 3. Smart society management system

SMART SOCITY MANAGEMENT SYSTEM automation system is a system or set of systems, that provide automated control and monitoring of electrical and mechanical systems within a building. The main purpose is to provide a comfortable, consistent environment, ensure the safety of all residents, reduce the maintenance cost, reduce energy costs and increase the stability of the system.


FIGURE: Block Diagram Of SSM System

India Smart Society Management System (building automation & control systems) market reached at over $1.5 billion in 2017 and is forecasted to increase at a CAGR of more than 12% to exceed $2.9 billion by 2023. Expected growth in the market can be attributed to growing construction activities across commercial and residential sectors. Residential sector is witnessing rising inclination towards smart homes that consist of lighting and HVAC controls, which is generating demand for building automation &control systems in the country. Further, increasing awareness about energy conservation, supported by several government initiatives, need for reducing the operating costs is further suitable to accelerate demand for Smart Society Management System India over the next five years.

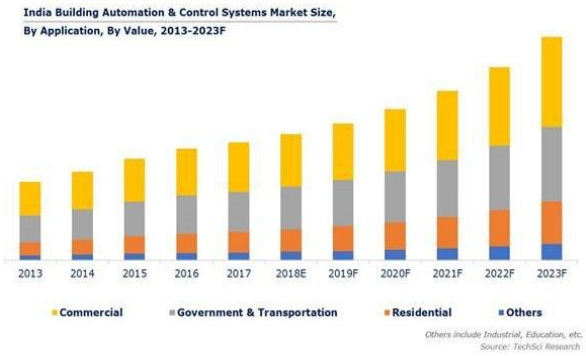


Figure no: SSMS/BACS Market India Growth

India Smart Society Management System market is controlled by these major players, namely
Honeywell Automation India Limited.
Siemens Ltd.
Johnson Controls India Pvt Ltd.
Schneider Electric India Pvt Ltd.
Legrand India, ABB India Limited.
Lutron GL Sales and Services Pvt
Ltd. Crestron Electronics India Pvt
Ltd.
Hager Electro Private Limited.

**SMART SOCITY MANAGEMENT SYSTEM:**

1. Fingerprint Based Security System.
2. Home Automation System.
3. Lightning System.
4. Fire Alarm System.
5. Garden Watering System.
6. Car Parking System.
7. Solar Energy System.
8. Power Supply System.

### 3.1 Fingerprint based security system

Managing society security is one of the major concerns in society .it's very difficult to manage their entry and exit and also doing their authentication manually becomes a very time-consuming and critical task to perform. so, with a Fingerprint-based security system, we can solve this problem.

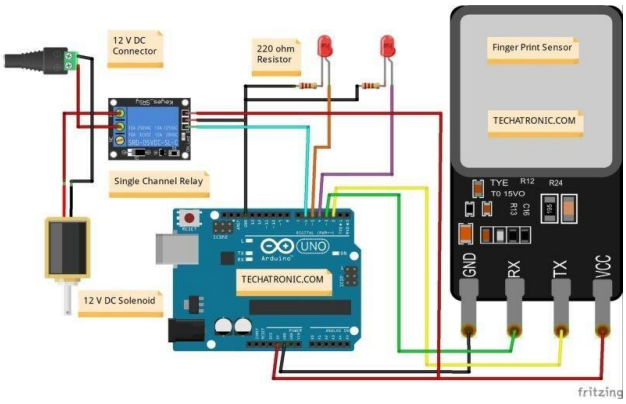


FIGURE: Fingerprint security system

Arduino-based finger print system working is quite simplistic and straight forward. The finger print sensor is interfaced with the Arduino Uno and first, we have to record the finger print to the finger print sensor and saved our finger print sensor. we can save up to 137finger print sin our module and we can increase the number by adding extra memory. it saves your fingerprint data into the inbuilt memory. and then we match this saved file with every finger scanned. And if it gets the same finger print then it will send the command to open the lock other wise the lock will remain close. Finger print sensor captures the image of the finger print and makes the pattern inside the memory of the fingerprint. the shape of the pattern will convert into the binary code and then save into the memory of the fingerprint. for e very fingerprint, it will create a unique pattern. Because as we know we all have different fingerprints even in our hand each finger having its unique fingerprint. it will never match the other finger and according to the research, the accuracy of the fingerprint is near about 98% which is good enough to secure any system.
***Key Words*:** Fingerprint Sensor, Arduino, Solenoid Lock

**Fingerprint Sensor**: We have used R305 Finger Print Sensor. It has an Optical biometric fingerprint reader. It also has inbuilt flash memory. It performs the function of image processing and gives out data on its output pin.

**Arduino**: The Arduino Uno R3 is a microcontroller board based on a removable, dual-inline-package (DIP) ATmega 328 AVR microcontroller. It has 20 digital I/O pins (of which 6 can be used as analog inputs and 6 can be used as PWM outputs). Programs can be loaded on to it with computer by using Arduino software. This is the CPU (central processing unit) of our project. Arduino is used when there are interactions between inputs and outputs. It is used to control the output according to the inputs command such as controlling the light or motor by using a switch. **Solenoid Lock:** It's basically an electronic lock, designed for a basic safe or door system. When 9 -12VDC is applied, the slug pulls in so it doesn't stick out and the door can be opened. It does not use any power in this state.

## 3.2 HOME AUTOMATIONSYSTEM

Home automation is an emerging technology. Which reduces human efforts and save time for required activities in daily life and also have energy saving benefits. In this technique many home appliances are getting input signal from controller according to our requirement. We use a combination Audino uno R3 and Bluetooth module HC 05 as controller with relays. By using this we can operate whole appliances from smart phone.

Applications and Advantages of this system are:

- Home automation using Bluetooth hand Arduino can use ful for hand icap and senior citizens
- A single android smart phone can control many devices
- No internet
- Required once the application is downloaded.
- You can controlled kinds of devices and gadgets.
- There is no need for special skills for using this app.

***Key Words*:** Arduino Uno, Bluetooth HC 05, Relay

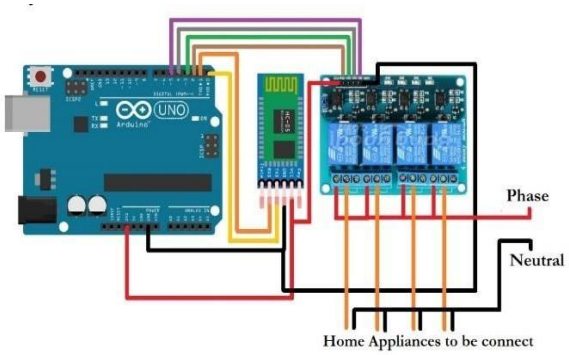


FIGURE: HOME AUTOMATION SYSTEM

**Bluetooth 05** : HC-05 Bluetooth Module a simple to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. HC-05 Bluetooth module provides switching mode between master and slave mode which means it able to use neither receiving nor transmitting data.

**Relay:** Relay works on the principle of electromagnetic induction. So relay is a switch which open and close circuits electromechanically. The main operation of this device is to make or break contact with the help of a signal without any human involvement in order to switch it ON or OFF.

### 3.3 Lighting system

Thelightingsystemisthesolutiontowastageofexcessenergyduringalowrushofthevehicleonsociety Roads,also it will manage the lights in common places like building passage, parking, garden, etc. We have to know the importance of energy because there is alimitedsourcetofulfilltheincreasingdemandforenergyallovertheworld. To meet the demand instead of focusing on increasing energy production we should focus on saving energy at unnecessary places, with help of such systems. So basically, what this system does is it will reduce the light illumination when the is no flow of vehicle on road. When the car passes through Society's roads at that time it recognized by IR sensors then the intensity of lights increases by Arduino Uno and it will provide sufficient light for cars. Due to this wastage of energy is reduce and saves energy which ultimately reduces electricity bill.

***KeyWords*:** Arduino Uno,IR Sensors, LED

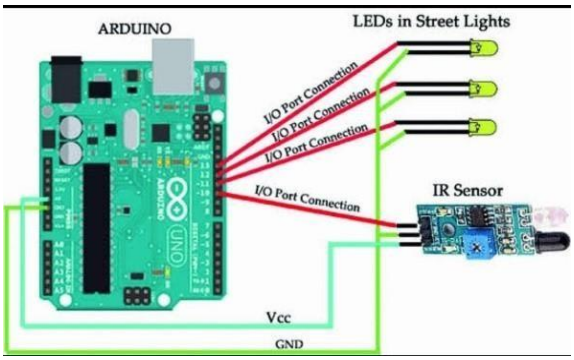


FIGURE: LIGHTING SYSTEM

**IR Sensors:** IR sensor is an electronic device/sensor. it is passive infrared detector which measures infrared light radiation from object present on field. they used in PIR based motion sensors. There are many applications of PIR sensors as like security alarms and a automatic lighting applications.

**LED:** A light-emitting diode (LED) is a semiconductor light source that emits light when a current flow through it.

Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons.

## 3.4 FIRE ALARM SYSTEM

This system is designed for the purpose of fire detection in huge architectures like buildings, banks, gas stations, shopping malls, etc. This fire alarm system can detect the flame or smoke in air with help of smoke detector sensor in the mean time and actuates the alarm/buzzer (Piezo buzzer)which prevents large damage and also provides sufficient amount of time for preventive actions. The alarm used in this type of system are activated automatically via heater smoke detector.

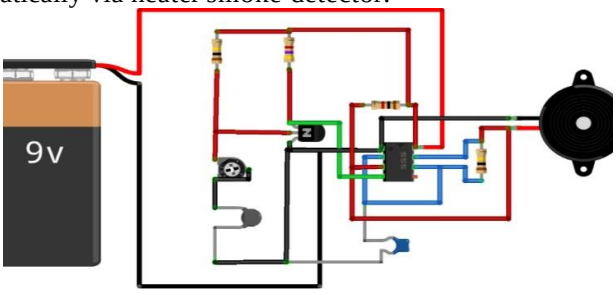


FIGURE: FIRE ALARM SYSTEM

**Buzzer: A** buzzer/fire alarm is an electronic device which produces sound. The buzzer is used to make a high-pitched sound. The Piezo Buzzer is used in fire alarm system. Its construction is very simple, light weight with a very low cost. The sens or in the fire alarm system senses the heat and activates the buzzer which produces loud noise.

**Smoke Detector:** A smoke detector or temperature sensor is an electronic device which measures the temperature of its surrounding and converts the input signal into electronic signal to record temperature

changes. There are different types of temperature sensors such as contact temperature sensors (temperature sensors which require direct contact with the object which is being monitored) while other is IR sensors which indirectly measure the temperature of an object (non-contact temperature sensors). In this proposed system an IR sensor is used. These IR sensors remotely detect the IR energy emitted by an object and send a signal to a particular electronic circuit which determines the object's temperature.

**IC 555: Almost** every electronic circuit uses 555 timer now-a-days. A particular set of configurations are there for a 555 timer to work as flip flop or as a multi-vibrator. One of the major features of the 555 timer would be, it operates from a wide range of power supply ranging from about +5 Volts to +18 Volts supply voltage. IC 555 timer is used widely because of its robust and stable properties. It is used to provide time delay in circuits. The 555 timer IC used in this system has been configured in A stable mode so that the Buzzer/Alarm can produce an oscillating sound.

### 3.5 Garden watering system

With the help of a smart garden watering system, the watering of plants is done at the exact time base on soil moisture condition which increases the growth of the plant and with help of a soil moisture sensor and Arduino Uno. The soli sensor detects the water moisture levels in the soil and provides a signal according to it to the Arduino microcontroller. According to the sensor output, Arduino controls the water pump and maintains the water level in the
soil. also with some modification, we can supply Nutrition with specific intervals through the water.

***Key Words*:** Soil Moisture Sensor, Arduino Uno, Water Pump

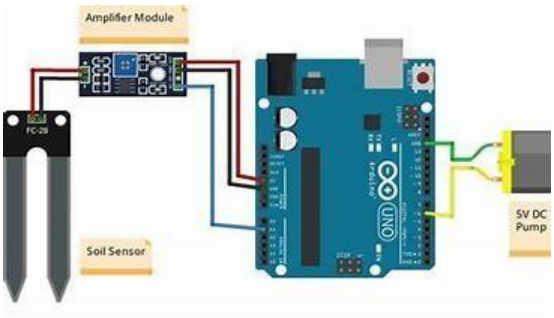


FIGURE: Solar Tracking System

**Soil Moisture Sensor:** Soil moisture sensor FC-28 sensor measures the volumetric content of water inside the soil and gives us the moisture levelas output. Thesens or is equipped with both analog and digital output, so it can be used in both analog and digital mode.

### 3.6 Car parking system

Car Parking System project aims at providing confusion-free and easy parking. This project helps the drivers of cars to park their vehicles with the least wastage of time with detailed information of the availability of the space to park. it includes a microcontroller (Arduino Uno) unit to which the servo motors, Liquid Crystal

Display (LCD), ultrasonic

Sensors are interfaced. The display shows the availability of the area, the ultrasonic sensors keep control of the number of car centering and exiting the parking area. The ultrasonic sensors identify the availability of the parking area.

***Key Words*:** Arduino Uno, Servos Motors, LCD Display, Ultrasonic Sensors

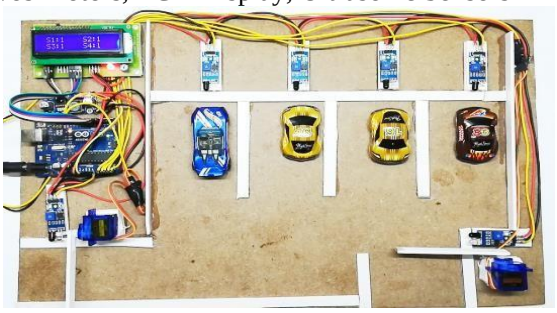

FIGURE : Car Parking System

**Servos Motors**: A servomotor is rotary or linear actuator that allows for accurate control of angular or linear position, velocity and acceleration. It consists of a suitable motor linked to a sensor for position feedback. It also requires are relatively modern controller, usually dedicated module chosen specifically for use with servo motors.

**LCD Display:** An Liquid Crystal Display is a display device used to display information. A dot matrix controller converts instructions from a process or into signals which turn on or off light sin the matrix so that the required display is produced. The display consists of a dot matrix of lights arranged in a rectangular arrangement such that by switching on or off chosen lights, text or graphics can be displayed.

**Ultrasonic Sensors:** An Ultrasonic sensors emit ting or receives ultrasonic c waves. Car parking sensors are built with this type of sensor. The sensor emits ultrasonic wave pulses, with a control unit measuring the return of each reflected signal and recognizing object presence.

### 3.7 Solar energy system

The project involves the design and implementation of an automatic microcontroller-based solar tracker system expected to be used in photovoltaic conversion panels. The proposed single-axis solar tracker device functions to ensure the optimization of the photovoltaic panel by following the real position of the sun. This is the more efficient system by using this system we can produce more energy as compared to a steady axis solar system. Sun movement is track by using LDR (light-dependent-resistor) which works as an input device for IC L293.by using ICL293 rotational movement of solar panels.

**Key Words:** IC L293, LDR, Solar Panels, Solar Energy

FIGURE: Solar Energy system

**Solar Energy:** Solar energy is radiant light and heat from the Sun that is harnessed using a range of ever-evolving technologies such as solar heating, photo voltaics, solar thermal energy, solar architecture, molten salt power plants and artificial photosynthesis.

**IC L293:** This L293D IC works on the basic principle of H-bridge, this motor control circuit allows the voltage to be flowing in any direction. As we know that the voltage must be change the direction of being able to rotate the DC motor in both the directions.

**LDR:** The working principle of an LDR is photo conductivity, which is nothing but an optical phenomenon. When the light is absorbed by the material then the conductivity of the material enhances. When the light falls on the LDR, then the electrons in the valence band of the material are eager to the conduction band.

**Solar panels:** A solar panel, or photo-voltaic(PV) module, is an assembly of photo-voltaic cells mounted in a framework for installation. Solar panels use sunlight as a source of energy and generate direct current electricity.

## 4. Conclusion

SMART Society Management Systems (SSMS/BACS) are becoming commonplace, embedded into today and the future built environment and its facilities. The technology and connectivity of SSMS extend well beyond just the large or high -rise commercial building, now adopted by all facility types, sizes and functions. The SSMS is increased functionality and flow of information across the organization to reduce operating and Maintenance costs. In extension, it provides a facility that is more time responsive, reliable and safer. SSMS is spread throughout all parts of a facility and across all levels of its communication networks. Different departments, groups and people within an organization use or rely on SSMS. For example, the function of security

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