Department of Electronics and Communication Engineering
Government Polytechnic
Jamnagar

Resonance

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ABOUT THE DEPARTMENT

In June 2007, Diploma Programme namely Electronics & Communication Engineering has been started at Government Polytechnic, Jamnagar. The Department of Electronics and Communication Engineering envisions upliftment of students especially living in rural areas, through an effective teaching learning process and quality teaching, to make them competent globally with sound technical, interpersonal, analytical, managerial skills and professional ethics. The department possess a well-equipped Labs which provides practical learning of actual environment of industry. The department has highly qualified faculties to ensure qualitative education. At present, the department has student intake of 30.

VISION

To produce creative, innovative and ethical EC engineers that will serve to societal and industrial needs

MISSION

- M1. To impart excellent technical education from fundamentals to application level, with ethics, to EC engineering students so that they can provide solution to industrial or social problems.
- M.2 Provide creative teaching-learning environment to students for achieving excellence in technical education.
- M3. To develop state of art laboratories with latest instruments and equipment's to develop psychomotor skills in students.
- M4. To establish department library with latest books, magazines, eBooks, video tutorials-lectures and other learning resources to promote reading attitude in students.
- M5. To make students entrepreneur or employable in industries.

Mr. A K Zala
Principal Government Polytechnic Jamnagar

From the Desk of principal

I am glad to see the second issue of 'Resonance' released by the Electronics and Communication Engineering Department. Despite ongoing challenges, the department has continued to engage students through academic and co-curricular initiatives. I appreciate the efforts of the team and congratulate them on maintaining continuity with this publication.

Message from the HOD

I'm happy to present Vol-1, Issue-2 of 'Resonance'. This edition showcases how our department continued progressing through online learning, webinars, and student initiatives. I appreciate the efforts of all contributors and encourage everyone to keep moving forward with the same enthusiasm.

Mr. A M Bhatt
HOD ECE Department
Government Polytechnic Jamnagar

Women's Day Celebration – 2021

The **Government Polytechnic, Jamnagar** celebrated **International Women's Day** with enthusiasm and respect on **8th March 2021**. The event aimed to honor the achievements, strength, and contributions of women in all spheres of life—academic, professional, and personal.

The celebration included motivational talks, student speeches, and a small felicitation ceremony for female faculty and staff members. The event emphasized the importance of gender equality, women empowerment, and the role of education in shaping confident and capable individuals.

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Azadi Ka Amrit Mahotsav Celebration

To commemorate 75 years of India's independence, Government Polytechnic, Jamnagar actively participated in the Azadi Ka Amrit Mahotsav celebrations—an initiative by the Government of India to honour the spirit of freedom and the contributions of our national heroes.

As part of the celebration, the department organized a Cycle Rally to promote awareness on national unity and environmental consciousness. Students and faculty enthusiastically participated in the rally, which spread patriotic messages across key areas of Jamnagar city.

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Webinar on SSIP Grant – Basic Idea Generation & Application Process

The SSIP Cell of Government Polytechnic, Jamnagar organized an informative webinar on "SSIP Grant: Basic Idea Generation & Application Process" on 17th June 2021, aimed at creating awareness among students about the importance of innovation and startup opportunities under the Student Startup and Innovation Policy (SSIP).

Webinar Agenda Included:

1. Introduction to SSIP
2. Concepts of Innovative Startups
3. Who and Why of Startups?
4. Startup Journey: Pros and Cons
5. Idea Generation Techniques
6. SSIP Procedures for PoC/IPR Applications

The session provided students with practical knowledge on how to take their innovative ideas forward, build startup models, and apply for funding or incubation support through SSIP. The event was well-received and saw active participation from budding student innovators.

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Student Contribution

By: Shobha Joshi
Enrolment No.: 196250311008

How Automatic Street Lights Work

Automatic streetlights operate using a combination of light-dependent sensors and control circuitry. The most common approach involves a Light Dependent Resistor (LDR), also known as a photoresistor, which changes its resistance based on the intensity of light falling on it. During the daytime, when sunlight is abundant, the LDR's resistance drops significantly, preventing the streetlight from turning on. As dusk falls and ambient light decreases, the LDR's resistance rises, triggering the control circuit to power the streetlight.

Another advanced variation incorporates motion sensor (PIR sensors) or infrared (IR) sensors, which detect movement in the vicinity. In such systems, the streetlights remain dimmed or turned off when no activity is detected, but they brighten immediately when a vehicle or pedestrian passes by. This dual-sensor approach maximizes energy savings while ensuring safety in low-traffic areas. control voltage pin can be used to modulate the timing characteristics externally.

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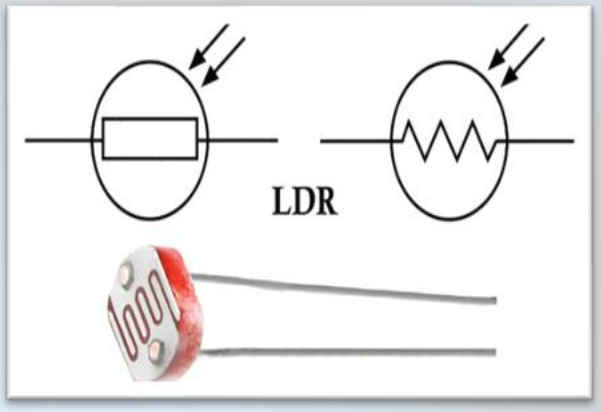
Automatic Street Light System

In today's rapidly urbanizing world, energy efficiency and smart infrastructure have become critical components of sustainable city planning. One of the most effective ways to reduce energy consumption while maintaining public safety is through the implementation of automatic street light systems. These systems eliminate the need for manual operation by using sensors to detect ambient light levels or motion, ensuring that streetlights only activate when necessary. This not only conserves electricity but also reduces maintenance costs and enhances reliability. In this article, we will explore the working principles, key components, advantages, and future trends of automatic street lighting systems in detail.

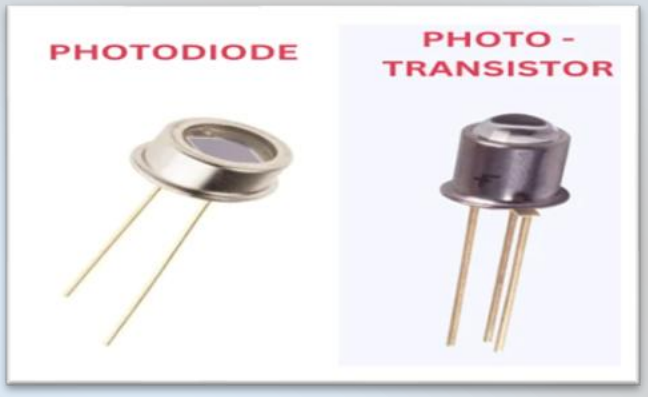
Key Components of an Automatic Street Light System

1. **Light Dependent Resistor (LDR)**



The LDR is the primary sensor in basic automatic street light systems. It is made of a high-resistance semiconductor material that becomes more conductive when exposed to light. When darkness falls, the resistance increases, allowing the control circuit to activate the light.

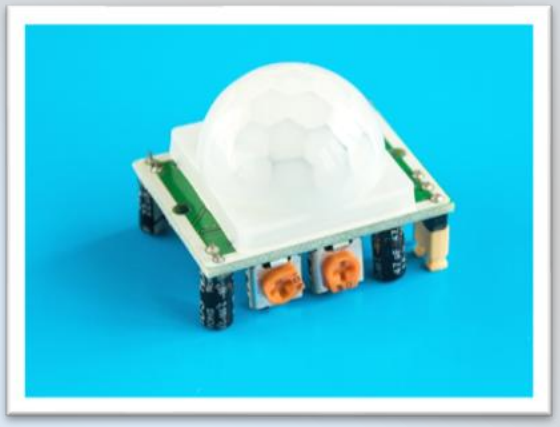
2. **Photodiodes and Phototransistors**



In more sophisticated systems, photodiodes or phototransistors may be used instead of LDRs due to their faster response times and higher sensitivity. These components convert light into electrical signals, providing more precise control over streetlight activation.

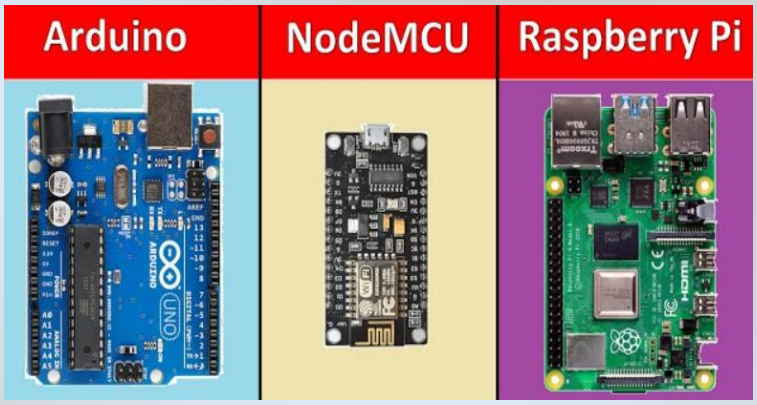
3. **Motion Sensors (PIR Sensors)**

Passive Infrared (PIR) sensors detect heat signatures from moving objects, such as vehicles or pedestrians. When integrated into street lighting, these sensors ensure that lights only operate when needed, significantly reducing power consumption in areas with sporadic activity.

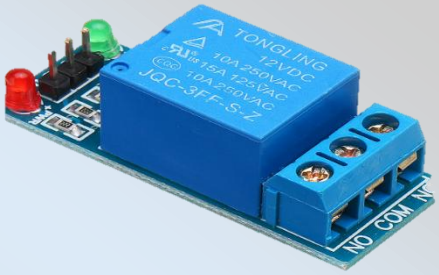


4. Microcontroller (Arduino, ESP8266, or Raspberry Pi)

Modern smart street lighting systems often incorporate microcontrollers for advanced automation. These devices can process data from multiple sensors, adjust brightness levels dynamically, and even connect to a central management system via **IoT (Internet of Things)** for remote monitoring and control.



5. Relay or Transistor Switching Circuit



A relay or MOSFET-based switching circuit is used to control the high-power streetlights based on signals from the sensors. This ensures that the low-voltage control circuit can safely operate the high-voltage lighting system.

6. LED Lights

Traditional incandescent or halogen streetlights are being rapidly replaced by **LEDs (Light Emitting Diodes)** due to their superior energy efficiency, longer lifespan, and brighter illumination. LEDs also allow for dimming control, making them ideal for adaptive lighting systems.

Advantages of Automatic Street Light Systems

1. Energy Efficiency

- By ensuring that streetlights are only active when needed, automatic systems drastically reduce electricity consumption. Studies have shown that smart street lighting can cut energy usage by 40-60% compared to conventional always-on systems.

2. Reduced Maintenance Costs

- Since LEDs have a much longer lifespan than traditional bulbs and the system minimizes unnecessary usage, the frequency of replacements and repairs decreases, lowering operational expenses for municipalities

3. Environmental Benefits

- Lower energy consumption translates to reduced carbon emissions from power plants. Additionally, the shift to LED lighting further minimizes environmental impact due to their mercury-free construction and lower heat dissipation.

4.Smart City Integration

With IoT-enabled streetlights, city administrators can monitor and control lighting remotely, gather traffic data, and even integrate with other smart infrastructure like traffic signals and surveillance cameras.

Automatic street light systems represent a significant leap forward in urban infrastructure, combining energy efficiency, cost savings, and enhanced safety. From basic LDR-based circuits to advanced IoT-enabled smart lighting, these systems are transforming how cities illuminate their streets. As renewable energy integration, AI-driven automation, and wireless connectivity continue to evolve, the future of street lighting promises even greater efficiency and intelligence. Governments and urban planners worldwide must prioritize the adoption of these technologies to build sustainable, smart cities for future generations.

By embracing automatic street lighting, we not only reduce energy waste but also create safer, more responsive urban environments proving that smart technology can indeed light the way to a brighter future.

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