ISSN: 3107-6513

3D Holographic Fan

Mr. Sahil Santosh Joshi[1], Mr. Manan Bhikaji Ghogale[2], Mr. Akshay Hemant Kocharekar[3], Mr. Soham Santosh Anjarlekar[4], Ms. Vaishnavi Sanjay Sawant[5], Mr. S. N. Nirmalkar[6]
[1,2,3,4,5]Students, Yashwantrao Bhonsale Institute of Technology, Sawantwadi
[6]faculty, Yashwantrao Bhonsale Institute of Technology, Sawantwadi
[1]joshisahil801@gmail.com, [2]akshaykochrekar2609@gmail.com , [3]vaishnavisawant15052007@gmail.com

Abstract:
This paper presents the design and development of a 3D holographic fan system with enhanced features such as battery backup and an adjustable mounting structure. The system uses high-speed rotating LED blades to create floating threedimensional visual effects based on the persistence of vision (POV) principle. It is powered by a 12V battery that charges during normal power supply conditions and automatically provides backup during power failure, ensuring continuous and reliable operation [1].
An adjustable stand is incorporated to improve flexibility in positioning and viewing angle. The system is controlled using a mobile-based application, allowing users to wirelessly manage images and videos. Compared to conventional systems, the proposed model offers better portability, usability, and reliability, making it suitable for applications such as digital advertising, exhibitions, and educational demonstrations [2].

Keywords: holographic fan, LED display, battery backup, persistence of vision, portable system

I. INTRODUCTION
In the modern era, visual communication has become an essential part of daily life. From advertisements to educational tools, display systems play a crucial role in delivering information effectively. Conventional display technologies such as LED screens[5], LCD panels, and projectors are widely used, but they have certain limitations including high power consumption, lack of portability, and limited visual appeal.
With advancements in technology,[1] holographic display systems have emerged as an innovative solution. A 3D holographic fan is a device that creates floating images in the air using rapidly rotating LED blades. This system works on the principle of persistence of vision, where the human eye perceives a continuous image when light sources move at high speed.[2]
Despite their advantages, most commercially available holographic fans depend entirely on direct power supply. This makes them unsuitable for areas where electricity is unstable or unavailable. Additionally, many systems have fixed mounting structures, which restrict flexibility in positioning and viewing angles.
To overcome these limitations, this project proposes a modified 3D holographic fan system with battery backup and an adjustable stand. The system uses a 12V rechargeable battery that charges during power availability and provides backup during power failure.[4] This ensures continuous operation of the system.
The adjustable stand is designed to improve usability by allowing users to change the height and angle of the fan. This makes the system suitable for different environments such as shops, exhibitions, and classrooms.
Another important feature of the system is wireless control using a mobile application called 5D Displayer. The application allows users to upload and display images or videos easily, making the system user-friendly and efficient.
This project not only enhances the functionality of holographic display systems but also provides a practical and cost-effective solution for modern display needs. It also helps students understand concepts such as LED operation, power management, and real-time display systems.
Thus, the 3D holographic fan system represents a step forward in the field of display technology by combining innovation, portability, and efficiency.

II. LITERATURE REVIEW

In recent years, rapid advancements in display technology and energy systems have led to the development of innovative devices such as 3D holographic fans. Researchers have focused on improving visual communication methods using modern techniques like persistence of vision, which allows the creation of floating 3D images using rotating LED

ISSN: 3107-6513

systems. Along with display innovation, there has been equal emphasis on developing reliable power systems such as battery backup and hybrid supply to ensure continuous operation of electronic devices. The integration of wireless applications has further enhanced user control and flexibility, allowing easy content management. These developments collectively contribute to making holographic systems more efficient, portable, and suitable for real-world applications like advertising, education, and exhibitions.

1.Holographic Display Technology:
Researchers have explored holographic display systems that create 3D visual effects using high-speed rotating LED strips. These systems are widely used in advertising and digital displays due to their attractive floating image effect.[1]

2.Persistence of Vision (POV) Principle: The persistence of vision principle allows the human eye to perceive continuous images when displayed rapidly. This concept is the basic working principle behind holographic fans.[2]

3.Battery Backup Systems:
Rechargeable batteries, especially 12V systems, are used to provide uninterrupted power supply. They ensure the device works even when there is no main power.[3]

4.Hybrid Power Supply Systems:
Hybrid systems combine direct power supply and battery backup. The battery charges when power is available and supplies power during outages, ensuring continuous operation.[4]

5.Wireless Display Control Applications: Modern systems use applications like 5D Displayer to upload and control display content such as images and videos, making the system user-friendly.[5]

6.Applications of 3D Holographic Fans:
These fans are widely used in advertising, exhibitions, retail stores, and education due to their ability to display eyecatching 3D visuals.[6]

III. OBJECTIVE

The main objectives of the project are:

- To design and develop a 3D holographic fan system
- To provide battery backup using a 12V rechargeable battery
- To ensure continuous operation during power failure
- To design an adjustable stand for flexible positioning
- To enable wireless content control using mobile application
- To develop a portable and energy-efficient system

IV. METHODOLOGY

The methodology of the **3D Holographic Fan** project focuses on the systematic design, integration, and implementation of a holographic display system with a hybrid power supply and adjustable support structure. The aim is to ensure continuous operation, improved usability, and effective visual display.[1]
Initially, the system is designed by identifying all major components such as the holographic fan unit, 12V rechargeable battery, power supply circuit, charging module, and adjustable stand. The design ensures proper arrangement of components to achieve stability, safety, and efficient functioning. A block diagram is prepared to represent the overall working of the system, showing the connection between power supply, battery, control unit, and display module.[5]
The mechanical structure is developed by fabricating an adjustable stand to support the holographic fan. This stand allows variation in height and angle, which improves the visibility of the projected 3D images from different viewing positions. The design also ensures that the fan remains stable during high-speed rotation.[3]
A hybrid power supply system is implemented to enhance reliability. The system operates on direct electrical supply when available, while simultaneously charging the 12V battery through a regulated charging circuit. During power failure, the battery automatically supplies power to the fan, ensuring uninterrupted operation. Proper voltage regulation and protection mechanisms are used to avoid overcharging and damage to the battery.[3]
Electrical connections are made carefully using insulated wires and proper terminals to ensure safety and reduce power loss. All components are securely connected to maintain consistent performance.[5]
The holographic fan is then installed on the stand and connected to the power system. The device uses high-speed rotating LED strips to display images based on the persistence of vision principle. A flowchart is used to represent the stepby-step working process of the system.[2]
For content control, a mobile-based application such as 5D Displayer is used. This application allows users to upload and manage images, videos, and animations wirelessly, making the system user-friendly and flexible.[4]
Finally, the entire system is tested under different conditions, including direct power mode and battery mode, to verify its

ISSN: 3107-6513

performance, stability, and efficiency.[3]

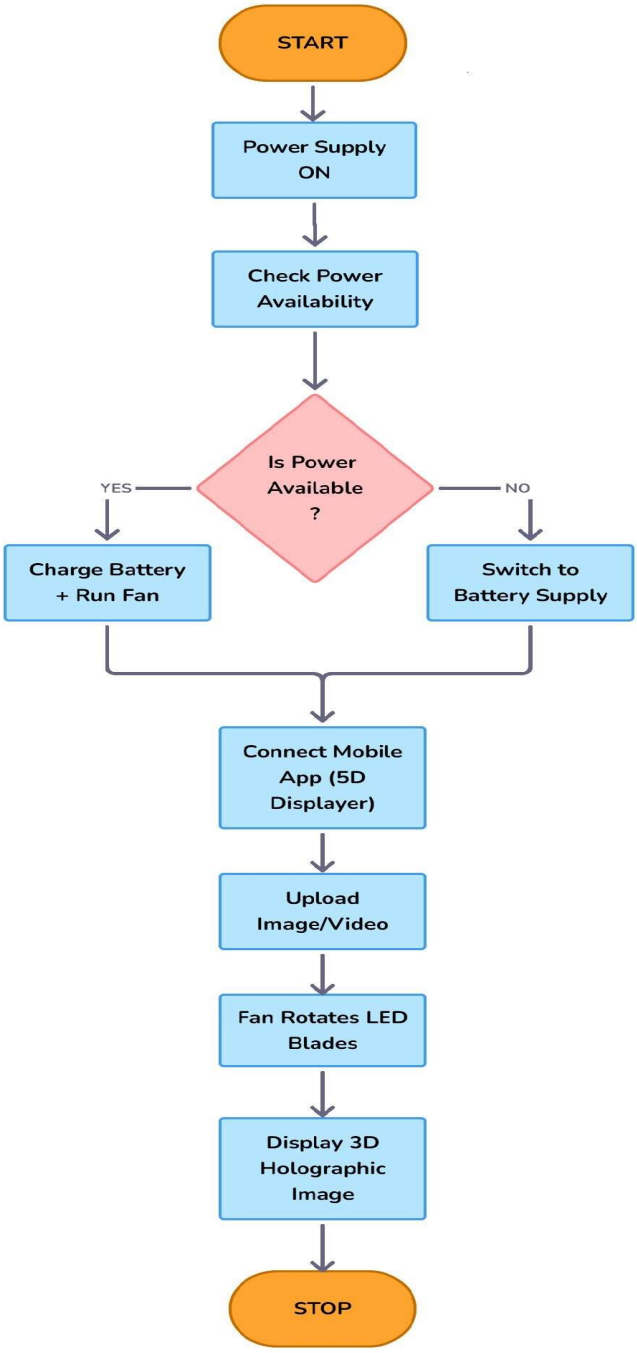

Fig. 1: Flowchart of 3D Holographic Fan

Fig. 2: 3D Holographic Fan model

➢Components Used

1) 3D holographic fan
2) 12V rechargeable battery
3) Power supply unit
4) Battery charging circuit
5) Adjustable stand

V. DISCUSSION

The developed **3D Holographic Fan** system demonstrates a successful integration of display technology, power management, and mechanical design. The project not only achieves its primary objective of creating a visually appealing holographic display but also introduces practical improvements such as battery backup and an adjustable stand, making it more flexibleand reliable for real-world applications.[1]

ISSN: 3107-6513

One of the key aspects observed during the implementation is the effective functioning of the hybrid power supply system. The system operates smoothly on direct electrical supply while simultaneously charging the 12V battery through a regulated circuit. During power interruptions, the automatic switching mechanism ensures that the system continues to operate without any delay or interruption. This uninterrupted operation is particularly important in applications such as advertising displays or presentations. The seamless transition between power sources indicates proper coordination between the charging circuit and supply system.[3]

The performance of the holographic display is primarily dependent on the persistence of vision principle. The highspeed rotation of LED blades, combined with accurate timing of light emission, results in the formation of stable and clear 3D images. It was observed that maintaining a consistent rotational speed is crucial for achieving better image quality. Any fluctuation in speed may lead to distortion or flickering of the displayed content.[2]

The use of the mobile-based application 5D Displayer enhances the overall functionality of the system. It allows easy uploading and customization of images, videos, and animations. This feature makes the system highly adaptable for different purposes such as product promotion, educational visualization, and digital signage.[4]

Another important improvement in this project is the inclusion of an adjustable stand. Unlike traditional fixed holographic fans, the adjustable stand allows the user to modify the height and angle of the display. This significantly improves visibility and ensures that the holographic image can be viewed clearly from different positions.[3]

From an energy efficiency perspective, the system performs well for low-power applications. The use of LED technology ensures minimal power consumption while providing sufficient brightness. The battery backup further enhances energy utilization by storing power during availability and using it during outages.[5]

In terms of practical implementation, the system is found to be compact, portable, and easy to install. The use of simple components and straightforward design makes it costeffective and suitable for student-level projects as well as small-scale applications.[5]

However, certain limitations are identified during testing and operation. The battery backup duration is limited and depends on the capacity of the battery used. Additionally, the size of the holographic display is limited by the physical dimensions of the fan blades, which restricts the viewing area.[3]

Safety is another important consideration due to the highspeed rotation of the fan blades. Proper enclosure or protective covering may be required in future designs to prevent accidental contact. The display quality is also affected by external lighting conditions, where very bright environments may reduce visibility.[2]

Despite these challenges, the overall system performance is satisfactory and meets the intended objectives. The project successfully demonstrates how existing technology can be enhanced with simple yet effective modifications to improve functionality and usability. Future improvements can focus on increasing battery efficiency, enhancing display resolution, and adding protective features for better performance.[1]

VI. CONCLUSION

The 3D Holographic Fan project successfully demonstrates the use of modern display technology combined with an efficient power management system. By integrating a 12V battery with a direct power supply, the system ensures continuous and reliable operation even during power interruptions. The use of the persistence of vision (POV) principle enables the creation of clear and attractive 3D visual images, making the system suitable for applications such as advertising, education, and presentations.

Overall, the project provides a cost-effective, portable, and energy-efficient solution for holographic display systems. The inclusion of an adjustable stand improves usability and flexibility. This project also highlights the importance of combining mechanical design, electrical components, and digital control to develop innovative engineering solutions. Future improvements can include higher resolution displays, longer battery backup, and the integration of advanced technologies for better performance.

REFERENCES

[1] A. Sharma et al., “Holographic Display Technology,” IEEE, 2020.
[2] R. Patel et al., “LED POV Displays,” IJERT, 2019.
[3] S. Kumar et al., “Portable Display Systems,” IRJET, 2021. [4] P. Singh et al., “Wireless Control Systems,” IJARCET, 2022.
[5] M. Brown, “Modern Display Systems,” Elsevier, 2018.