



Conversion of 3D Movie to 5D with Aroma Diffusion

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ABSTRACT: This paper introduces a novel concept of 5 Dimension System, which can be used to convert a 3D movie to a 5D movie. In 5D movie, along with the 3D visual effect, special effects such as wind, rain, aroma etc. can be experienced. 5 Dimension System is an automated system that works with the aid of computer. It provides aroma at intervals as per user requirement. Different, required timings can be stored. It mainly have 3 parts, program in PC, PIC circuit and aroma diffusing mechanism. The program in PC provides pulses to have aroma at intervals defined by user. A USB to serial converter interconnects the computer with PIC circuit. Aroma spraying mechanism is done using solenoid valve. The system is highly user friendly, reliable, cost effective and easy to troubleshoot. It can be extended to obtain 6D, 7D, 8D etc.

KEYWORDS: 5Dimension, Visual Basic, PIC microcontroller, Aroma diffusion, Essential oil, Solenoid valve.

I.INTRODUCTION

The 3D movies usually stimulate the idea of objects looking like they are coming out of the screen. The effects always assault the eyes to create that feeling. Now what if some other more advanced sensory dimensions were added to this experience? That is the concept behind the 5D movies. In such movies the senses of smell, touch, sight and movement are incorporated into the set up. In 5D movie along with the 3D visual effect, special effects such as wind, rain, aroma etc. can be experienced. The concept of 5D is not new. 5D films were initially used only in theme parks and some tourist attraction sites, due to the complex theatre design to provide the above mentioned special effects.

The existing 5D systems are equipped with motion chairs having tiny nozzles which can mimic the splash in the ocean by spraying out a mist of water. These nozzles can also emit many types of smells including those of gunpowder, burning rubber, roses, and many others. These seats once equipped in the 5D movie theater have the ability to move giving the experience of crash landings and sways of car chases as if they are real. The existing systems face difficulty in the mechanism, for timely production and control of these special effects. The proposed system resolves the dilemma by a simple application, in PC. Also since the control of the system is done using PC the system is reliable and cost effective^[3].

This paper introduces a novel concept of 5 Dimension System, which can be used to convert a 3D movie to a 5D movie. 5 Dimension System is an automated system that works with the aid of computer. It mainly have 3 parts, program in PC, PIC circuit and aroma diffusing mechanism. The program in PC provides pulses to have special effects at intervals defined by user. In this paper only aroma effect is mentioned, for simplicity of hardware design. A USB to serial converter interconnects the computer with PIC circuit. Aroma spraying mechanism is done using solenoid valve. The system is highly user friendly, reliable, cost effective and easy to troubleshoot. It can be extended to obtain different multidimensional systems such as 6D, 7D, 8D etc.

II.AROMA DIFFUSING MECHANISM

An essential oil is a concentrated hydrophobic liquid containing volatile aroma compounds from plants^[5]. Essential oils are also known as volatile oils, ethereal oils, or simply as the oil of the plant from which they were extracted, such as oil of clove. An oil is "essential" in the sense that it contains the "essence of" the plant's fragrance—the characteristic fragrance of the plant from which it is derived. Hence essential oil is used as the source of aroma.



Now, the different mechanisms for the diffusion of aroma (essential oil) are discussed. The different techniques include Ultrasonic Aroma Diffusers, Fan Diffusers, Electric Aroma Diffusers and Essential Oil Nebulizers^[4]. Ultrasonic Aroma Diffusers uses water and ultrasonic technology to break aroma oils into microscopic particles. Fan Diffusers typically uses an aroma pad of cotton or compact-pressed paper material and a fan. You put 10-20 drops of oil on the pad, insert into the unit and let the fan pull air across the scent pad. Electric Aroma Diffusers mainly comprised of units known as aroma lamps - that is, the unit is warmed using a light bulb. It is typically made of glass or ceramic material that surrounds a 10-20 watt bulb that gets hot. As the bulb gets hot, it warms the container holding the oil. Once the oil warms, it begins to fill the air with the desired scent. Essential Oil Nebulizers, also known as Cold Air Diffusers. These diffusers are more like atomizers, dispersing an ultra fine mist of aroma particles into the air much like the ultrasonic's but without the added benefit of moisture. A specially designed glass piece disperses the mist into the air with the help of an aquarium style pump, it works quickly and fills the room evenly throughout, covering a large area.

In the proposed system the aroma is diffused by direct exposure of essential oil into the atmosphere. For better result a fan is provided. The fan provides forced diffusion of the oil and hence the aroma. Here the essential oil is filled in a PVC tube. A number of capillary tubes are arranged in the open end (orifice) of the tube to limit the diffusion of essential oil. Solenoid valve is also kept at the same end for controlled diffusion of essential oil as per requirement. A solenoid valve is an electromechanical controlled valve^[1]. The valve features a solenoid, which is an electric coil with a movable ferromagnetic core in its centre. This core is called the plunger. In rest position, the plunger closes off the orifice. An electric current through the coil creates a magnetic field. The magnetic field exerts a force on the plunger. As a result, the plunger is pulled toward the centre of the coil so that the orifice opens. This is the basic principle that is used to open and close solenoid valves. Here vibratory motion of the plunger is required for proper diffusion, hence AC supply is provided to the coil at specified timings. The above mentioned mechanism is simple as well as cheap, but it's efficiency is less. For better efficiency any of the early mentioned mechanism for aroma diffusion can be incorporated into the system.

III.SYSTEM MODEL AND WORKING

The system mainly consists of three parts. The block diagram of the system is shown in Fig1. The core of the proposed system is the 'Application in PC' and is developed using the software, Visual Basic 10^[2]. The application gives provision to load the movie which is to be converted to 5D. As the movie is loaded a timer runs, hence the timings for special effects can be noted and stored. Along with these timings corresponding effects can also be stored. In the proposed system, the application gives provision to have 4 different aromas, wind and rain. After storing all the timings the movie is stored as a new project in application. Hence the movie is converted to 5D. The application is programmed such a way that when the project (movie converted to 5D using the same application) is loaded according to stored timings a data is transmitted. In the proposed system the data transmitted corresponding to aroma1 is '1', aroma2 is '2', aroma3 is '3', aroma4 is '4', wind is 'w' and rain is 'r'. If in a movie the special effect of rain is to be generated after 4 seconds from the starting of the movie, the data 'w' is transmitted at the 4th second. The data is transmitted through a USB to serial converter to the receiver pin of PIC microcontroller. The application is self starting ie. the application automatically starts running as soon as the project is loaded. Also it is highly user friendly, since no professional assistance is required for the conversion and execution of the 5D movie. Any crash in the application can be resolved by reinstalling the application.

Port D of the PIC microcontroller is configured as output port. Actually the microcontroller acts as a serial to parallel converter. The PIC microcontroller is programmed to compare the received data with '1', '2', '3', '4', 'w', 'r'. If the received data is '1' a pulse of 5V is output to the pin1 of Port D similarly corresponding to the different received data output (5V pulse) is sent to the different pins of Port D. The output of Port D is taken to the hardware part for aroma, wind, rain etc. The V_{cc} for the microcontroller is given using a 9V battery through a voltage regulator (5V). External clock of 4MHz is provided to the microcontroller.

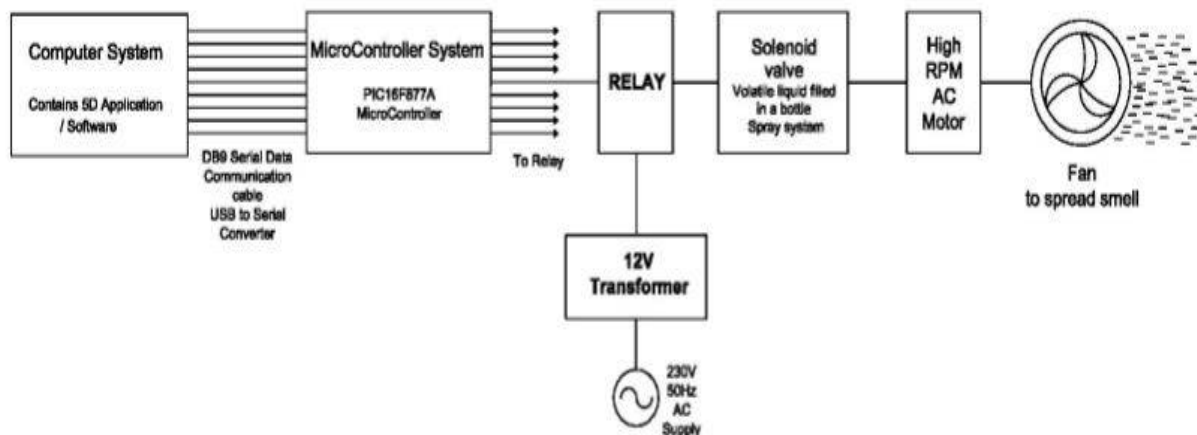


Fig 1: System Model

The aroma diffusing hardware part mainly consists of relays, transformer, motor, tubes containing essential coil and solenoid valve. Output from the 4 pins of Port D of microcontroller is given to the 4 DC relays. The 230/12V transformer output is given to 4 motors (12V) and 4 solenoid valves through AC relays. When pulse is output to the pin of microcontroller, corresponding relay closes and 12V AC supply is made available to the corresponding motor and solenoid valve. The motor and solenoid are connected in parallel. To the shaft of the motor wings of fan are connected. Hence according to the timings provided in the application, corresponding valve and motor operates diffusing the required aroma.

IV.RESULT AND DISCUSSION

A sample video is loaded to the '5 Dimension application'. The panel where the video is loaded in the application is shown in Fig 2. Different times for special effects are noted using the timer provided in the application. And the same are stored in the application. Special effects provided in the application are wind, rain and 4 different aromas. The application was successfully executed. The application is programmed to have serial communication. The USB to serial converter, DB9 is used for taking output from PC. The output of the USB to serial converter is verified using the software hyper terminal. The user friendly, front panel of the application is shown in Fig 3.

Program in PIC microcontroller was successfully executed. Successful diffusion of aroma was obtained. The essential oils used in the proposed system are Jasmine, Rose, Biriyani spices and Sandal. No time delay was observed. It was found that the diffused aroma persists for several more, unwanted time. In order to prevent this a high speed motor is added to the hardware. This motor comes into operation after diffusing fan turns off, hence diffused aroma is made to vanish after the required time. The hardware assembly for aroma diffusion is shown in Fig 3. Fig 3(a) shows circuit for aroma diffusing and Fig 3(b) shows front view of aroma diffusing mechanism. Hence successful implementation and execution of the proposed system was achieved.

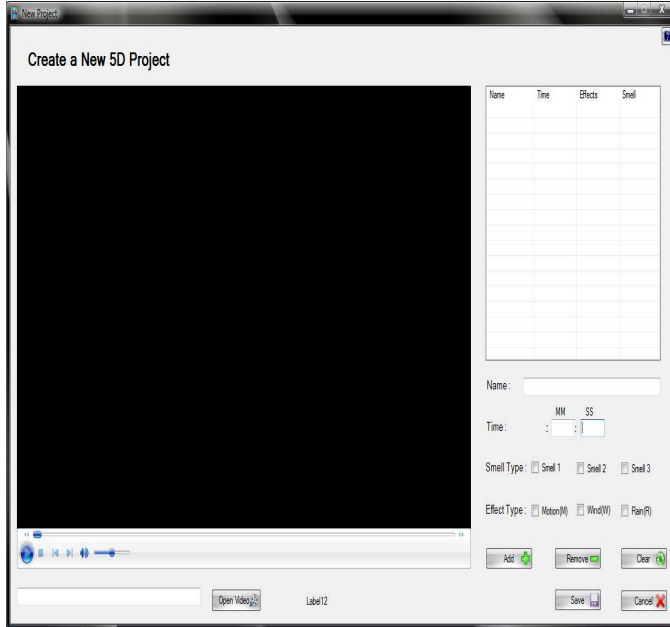


Fig 2: Panel for video loading

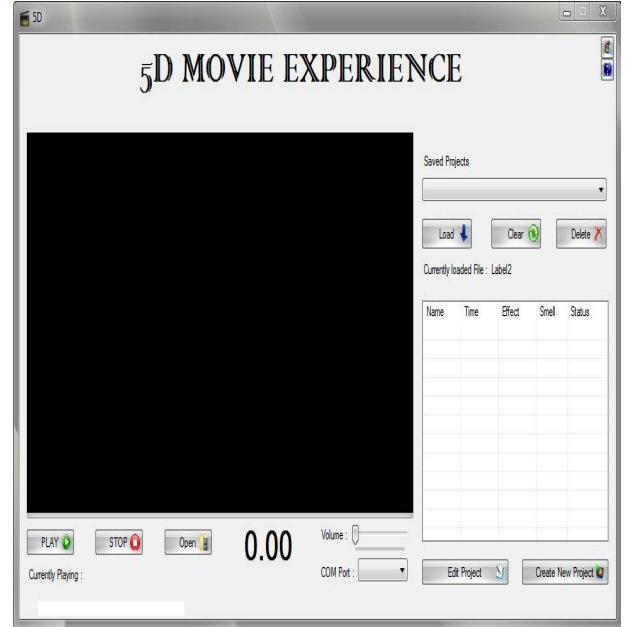


Fig 3: Front Panel



Fig 3(a): Circuit for Aroma diffusing

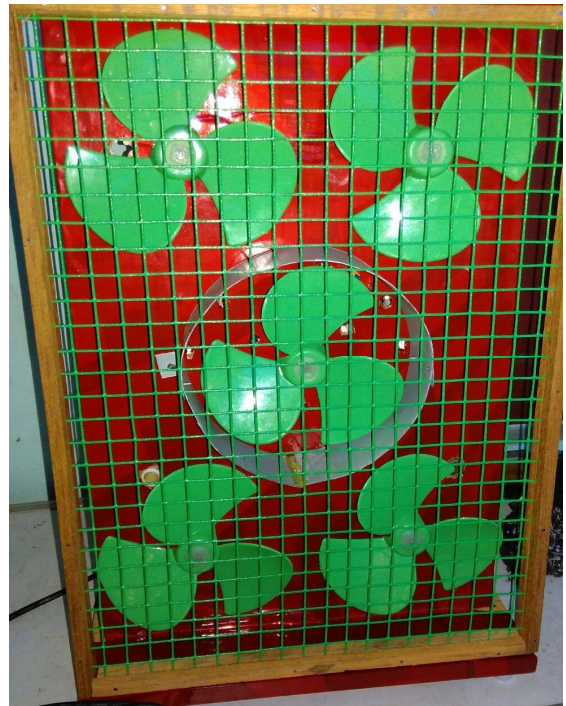


Fig 3(b): Front view of Aroma diffusing mechanism



V. CONCLUSION

The paper introduced 5 Dimension system, that can be used to get multi dimensional movies. It also dealt with the aroma diffusing mechanism and 5D application (program on PC), for converting 3D movie to multidimensional movie. 5 Dimension System is an automated system that works with the aid of computer. It provides aroma at intervals as per user requirement. Different, required timings can be stored. It mainly has 3 parts, program in PC, PIC circuit and aroma diffusing mechanism. The program in PC provides pulses to have aroma at intervals defined by user. The proposed system use direct atmospheric exposure for aroma diffusion, which is not much efficient. It can be replaced by any of the aroma diffusing mechanism discussed in Section II. The proposed system resolves the dilemma with the existing systems for timely production and control of these special effects by a simple application, in PC. The proposed system is cheap compared to the existing 5D systems. Since the control mechanism is done using PC system complexity is reduced. Hence it introduces a new era of entertainment. The system can be extended to get different dimensions, like 6D,7D, 9D etc.

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