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EMBEDDED BASED STUDENT MONITORING SYSTEM

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***Abstract*—** As we all know, students in the class with the absence of a staff is a dreaded nightmare for the neighbouring classes, where an important chapter is being taught. So, in order to prevent this from happening, we have the smart class monitoring system. The device built with a sound sensor and audio board, which detects the levels of decibels produced from the class without a staff. If the decibel reaches the limit set in the device, it automatically triggers the voice message asking the students to keep silence and also will send the notification to the concerned Head of the department informing that the class is in the absence of a staff. This device notifies us whenever it detects loud conversation (the sound level above 120dB to 140dB) and it also records the conversation and saves in a file. These devices are used in silent zones like hospitals, libraries, labs, and also in schools and colleges to maintain decorum. This helps us to maintain silence and also to identify noisy people so that necessary action can be against them.

***Keywords*—** LCD - Liquid Crystal Display RTOS - Real Time Operating System GPS - Global Positioning System GSM - Global System for Mobile SMS - Short message service.

I. INTRODUCTION

As we know that speaking loudly is an annoying thing. Having such a co-worker in the office environment will influence our work and productivity. When it comes to schools and colleges pedagogue or a praepostor can't monitor every last one all the time. It is very difficult to identify a noisy person. So it becomes obligatory to control students and monitor the situation. This project is set to overcome these problems. So whenever sound crosses the certain sound limit it will notify us and makes a small beep sound and also it records the sound which is above the set limits. So that we can identify the noisy people and we can take the necessary actions. It is not just noise generated by students that are of concern but electronic devices and other equipment can also make a loud noise which may disturb the students and faculty. Through this device, we can also detect them and take necessary steps.

II. EMBEDDED SYSTEM

It's a combination of hardware and software to perform a specific application. Embedded systems are commonly found in consumer, industrial, automotive, medical, commercial and military applications.

An embedded system is a microcontroller or microprocessor based system which is designed to perform a specific task. An embedded system has three components It has hardware.
It has application software. It has Real Time Operating system (RTOS) that supervises the application software and provide mechanism to let the processor run a process as per scheduling by following a plan to control the latencies.

RTOS defines the way the system works. It sets the rules during the execution of application program. A small scale embedded system may not have RTOS.

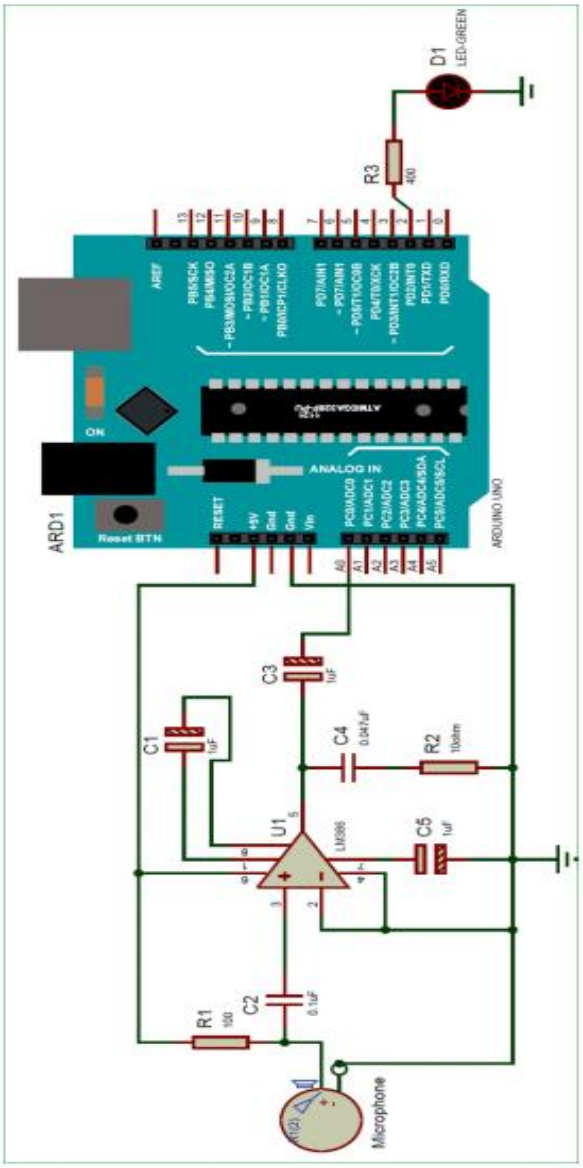
III. EXISTING METHOD

The research aims to know the noise level by using the Arduino Uno as data processing input from sensors and called as Sound Noise Level (SNL). The working principle of the instrument is as noise detector with the show notifications the noise level on the LCD indicator and in the audiovisual form. Noise detection using the sensor is a condenser microphone and LM 567 as IC op-amps, which are assembled so that it can detect the noise, which sounds are captured by the sensor will turn the tide of sinusoidal voice became sine wave energy electricity (altering sinusoidal electric current) that is able to responded to complaints by the Arduino Uno. The tool is equipped with a detector consists of a set indicator LED and sound well as the notification from the text on LCD 16*2. The data acquisition system consists of an analog sound sensor V2, Arduino Uno, display LED, and display seven segment. Sound sensor serves to convert sound into electrical quantities. The microphone converts the sound pressure (Pa) to audio voltage (Volt). Noise detection using the sensor is a electric condenser microphone with sensitivity of -56 dB relative to 1 V/µbar.

IV. PROPOSED SYSTEM

To overcome the problem that occurs in the existing system, we have proposed a methodology using embedded system.. In this project we will use a normal Electret Condenser microphone with Arduino and try measuring the sound or noise pollution level in dB as close as possible to the actual value.

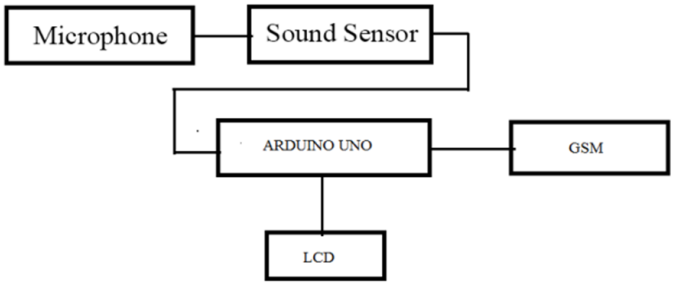
We will use a normal amplifier circuit to amplify the sound signals and feed it to Arduino in which we will use regression method to calculate the sound signals in dB. To check if the values obtained are correct we can use the "Sound Meter" android application, if you have a better meter you can use that for calibration. Do note that this project does not aim to measure dB accurately and will just give values as close as possible to the actual value.



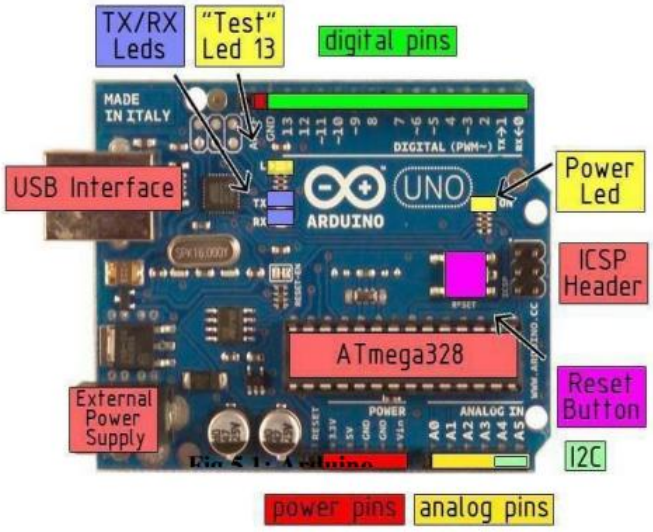
The block diagram of GSM based monitoring system is shown in block diagram Waste bin is built on ARDIUNO board platform. It is interfaced with a GSM modem (SIM 900A) and the bin is equipped with Sound Sensor. Microcontroller is used to interface the sensor system with GSM system.

Then it sends the message to the concern person using GSM system.16x2 LCD which shows Warning Message. Specification consists of ARDUINO Uno board which has Atmega328 IC, Sound sensor module and GSM . Circuit for this Arduino Sound Level Meter is a very simple in which we have used the LM386 Audio amplifier circuit to amplify the signals from a condenser microphone and supply it to the Analog port of Arduino.

We have already used this LM386 IC to build a low voltage audio amplifier Circuit and the circuit more or less remains the same.



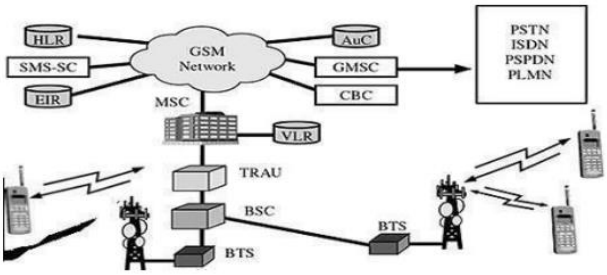
V. ARDUINO UNO



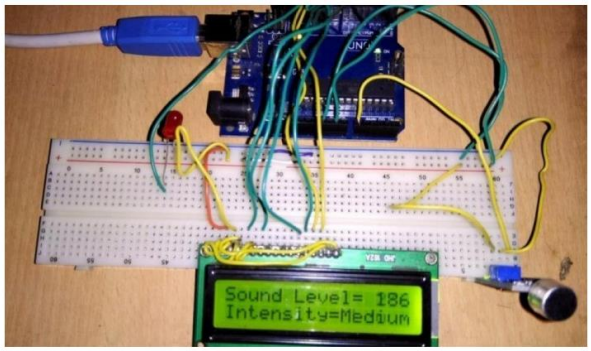
VI. HARDWARES : SOUND SENSORS

The LM386 is an integrated circuit containing a low voltage audio power amplifier. [1] It is suitable for battery-powered devices such as radios, guitar amplifiers, and hobby electronics projects. The IC consists of an 8 pin dual in-line package (DIP-8) and can output 0.25 to 1 watts of power depending on the model using a 9-volt power supply.

U-Sound is an autonomous and wireless acoustic sensor designed to measure noise in the city. It makes continuous measurements and every minute, it sends a new equivalent continuous sound level value (LAeq1') through the communication network. The sound sensor module is an easy way to detect the sound and its intensity. These modules are used in several cases like for security, speech recognition technology, as a switch, and also for monitoring the intensity of sound. It consists of microphone which is given as an input to amplifier and peak detector. When the sensor detects the sound it sends the output voltage signal to the microcontroller then performs necessary actions. When sound is detected through a microphone and fed into an LM386 op amp. When the sound level exceeds the setpoint (sound level which is set by the Onboard potentiometer), the output signal is set to low.



VII. OUTPUT



VIII. CONCLUSION

Thus the above project is an efficient noise detection with an automatic recording system that can be used in schools and offices to identify noisy peoples. There are two aspects of the sound heard by the human ear. This aspect is loudness and altitude. Loudness is related to energy in sound waves. The pitch of the sound states whether the sound is high like the sound of a flute and a violin, or whether the sound is low as the sound of a bass and a drum. Physical quantity that determines altitude is frequency. Human ear hearing range is between 20 Hz to 20,000 Hz. A tendency that the more aged a person, then the person is increasingly unable to hear sounds with high frequency. In direct testing as a whole, the device using a comparison scale obtained the results with the accuracy value of 99.93% and an error percentage of 0.067%. The next research is that it can be done to improve system design so that the results of 100% accuracy can be obtained when measured.

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