MAHENDRA INSTITUTE OF ENGINEERING AND TECHONOLGY

NOISE POLLUTION MONITORING

IMPLEMENTATION:

Patient cohorts and unnecessary alarms

The coronary intensive care unit has two nursing team stations. Interventions were customised based on patients' clinical status. For example, routine labs for non-critical patients were scheduled after quiet time to reduce noise, but this was not tried with patients in critical condition. This helped to ensure that patient care was not affected by interventions. Unnecessary alarms were removed from the monitors and individualised alarm thresholds, volumes and visual alerts were tested. A monitoring tool (**Chambrin, 2001**; **Schmid et al, 2013**) was used to identify sources of false alarms and the compliance of staff in determining the type of alarms used based on the patient's clinical condition, based on the consultant's advice.

Quiet time implementation

Dedicated quiet times were allocated in the coronary intensive care unit. Several time slots were tried for over a month but were unsuccessful, as it was difficult to find a period of time that was free from noisy activities, such as visiting hours, medication times, physician rounds, housekeeping rounds and mealtimes. Multidisciplinary meetings were conducted with the supervisors of security and housekeeping, the catering team, physical therapists and physicians to decide on the best period for the quiet times. After several plan-do-study-act cycles, two blocks of time (15:00–16:00 and 2:00–4:00) were designated as quiet times and implemented in May 2018. These hours were chosen based on patients' natural circadian cycles and the relatively low flow of work during these periods compared to other times in the early morning and afternoon.
A checklist was created and tested, listing tasks to be performed before quiet times, such as taking vital signs and blood samples, administering routine medications, dimming the lights, closing the curtains and turning off televisions. The housekeeping staff rescheduled some of their tasks, such as emptying domestic waste bins, to avoid disturbing patients during the quiet times. Nursing aide duties were adjusted to allow toilet activities and repositioning of patients, ensuring a period of uninterrupted rest. At the beginning of a quiet time period, each patient was reminded verbally and signs were placed at the entrance of the unit stating: 'quiet time in progress.' Patient handovers were conducted outside patients' rooms during quiet times.

Visual devices to prompt noise reduction

The audio-visual aid Yacker Tracker (AGI Attention Getters Inc., Chico (CA), United States) was used to give alerts if sound levels in the coronary intensive care unit went above a set level of 35 dB. The Yacker Tracker

resembles a traffic light; the green light signifies an acceptable sound level; the yellow light shows that noise levels are rising; and the red light indicates that the volume has exceeded the limit. Before requesting that this device be purchased, the authors borrowed a device for 1 month from a different facility. The initial results were positive, with the device helping raise awareness of noise levels on the unit. After this, Yacker Tracker devices were placed on each of the two nurses' stations. Posters and signs were also placed in and at the entrance of the unit to raise awareness of noise levels among other staff and visitors.

REVIEW:

Noise monitoring

It should be carried out on routine basis or to address the public complaints. The objective is to monitor the noise level at a particular site or as mentioned in the complaints. The weakest sound pressure disturbance that can be detected by an "average" person at 1,000Hz has been found to be 20μN/m2 and the largest 107 $\mu N/m^2$. The noise monitoring should be based on the following steps ;

(1) Site selection criteria
(2) Selection of noise level meter
(3) Calibration
(4) Monitoring time
(5) Monitoring parameters
(6) Monitoring protocols
(7) Monitoring records
(8) Monitoring data submission
(9) Monitoring Inferences

Effects of noise pollution on human health

Health effects related to environmental noise result in a cost for society. Presently, the European Commission (EC) is committed to meeting demanding targets on noise reduction through the 7^{th} Environment Action Programme (EAP) . The World Health Organization (W.H.O.) is revising the Community Noise Guidelines for the region . Exposure to noise may lead to changes in the normal way the body functions. The body reacts to acute noise exposure by releasing stress hormones, such as adrenaline ·The severe effects occur not only at high sound levels in workplace settings, but also at relatively low environmental noise levels when concentration, relaxation, or sleep is disturbed Night-time noise may have more of an impact on cardiovascular health than day-time noise, because sleep is disturbed. The W.H.O. considers night-time noise levels of less than 55 dB(A) to be necessary to prevent adverse health effects from noise in the short term, although the long-term goal is 40 dB(A). The most common effects of noise pollution on the vulnerable identified by the research are as follows :

A) Annoyance
b) Sleep disturbance
c) Heart and circulation problem
d) Quality of life
e) Cognitive processes

f) Hearing loss

Exposure to continuous noise of 85–90 dB(A), particularly over a lifetime in industrial settings, can lead to a progressive loss of hearing, with an increase in the threshold of hearing sensitivity. Hearing impairments due to noise are a direct consequence of the effects of sound energy on the inner ear. Hearing impairment has been defined as an increase in the threshold of hearing. The affected person is unable to understand speech in day-to-day life. Noise-induced hearing impairment mainly occurs in the frequency range of 3kHz-6kHz, and with increased exposure, at lower frequencies. Speech intelligibility can be reduced even at 10 dB, averaged over 2kHz-4kHz, over both ears . Above 30 dB hearing impairment (averaged over 2 kHz -4 kHz, over both ears) a social hearing handicap is noticeable. Significant hearing impairment occurs on extended exposure to noise levels of 70-85 dB . Noise may influence health directly and not through annoyance. The response to noise may depend on of the sound, including intensity, frequency, complexity of sound and duration .

(i) Selected code books on noise pollution by BIS characteristics

A range of code books for sampling, analysis and guidelines for control of noise pollution from domestic and industrial sources, are published by Bureau of Indian Standards (BIS).

APPLICATION:

Appliances:

Items, such as air conditioning units, heaters, fans, and other appliances, can contribute to overall noise levels in the home. Try turning them off more often or setting a timer, so they only switch on at certain times.

Media devices:

Consider the volume and duration of noise from music, televisions, radios, and video games. Avoid having unnecessary noise playing in the background for long periods, or listening to sounds at too high a volume. It may be useful to set aside dedicated time for watching TV or listening to music.

Repair or replace old machinery:

Old appliances, vehicles, and other items can be louder than newer models. Consider upgrading or replacing noisy household items.

Soundproofing:

Adding insulation strategically around the home can help muffle sounds from other rooms, neighbors, or outside. Rugs, carpets, and curtains may also help.

Create more quiet time:

Try to regularly set aside time for quiet activities, such as reading, puzzles, or creative hobbies. Avoid playing music or having background noise during this time.

Ear protection:

If loud noise is unavoidable, use ear protection, such as earplugs or earmuffs, to reduce its impact.

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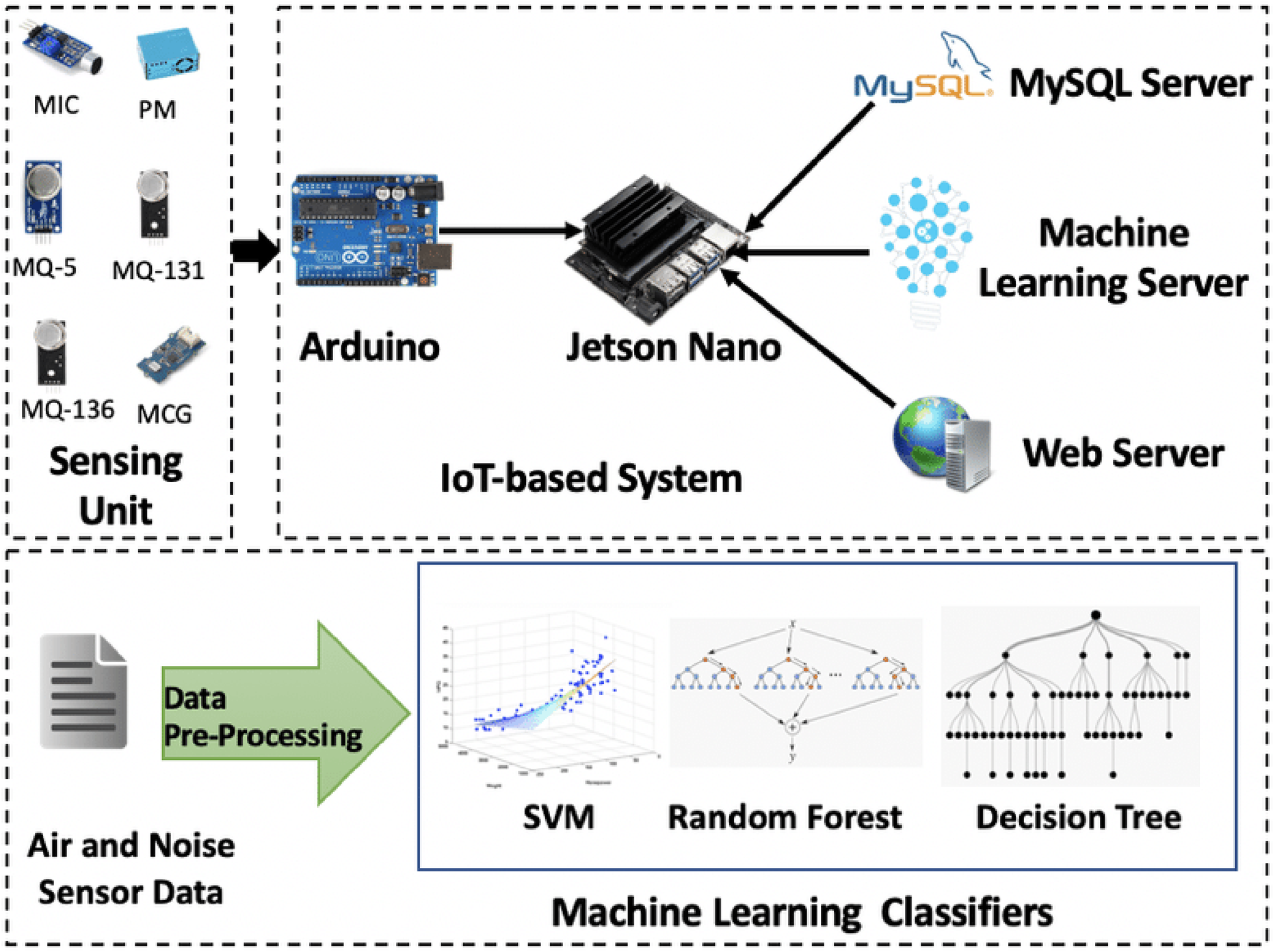

CODING:

```
import java.util.Scanner;



public class NoisePollutionChecker {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);
```

```
System.out.println("Enter the noise level in decibels: ");

double noiseLevel = scanner.nextDouble();



if (noiseLevel < 70.0) {

    System.out.println("The noise level is acceptable.");

} else if (noiseLevel >= 70.0 && noiseLevel < 85.0) {

        System.out.println("The noise level is moderate. It may cause annoyance.");

    } else {

        System.out.println("The noise level is high. It can be harmful to health.");

    }



    scanner.close();

  }

}
```

OUTPUT:

Enter the noise level in decibels:60

The noise level is acceptable.

CONCLUSION:

Now days, every one of us are adding to noise pollution as most of our routine activities generate some noise. Noise pollution damagingly affects the human being leading to loss of hearing as well as mental stress. Efforts are made through this review article to make the person aware about the preliminaries of noise pollution and its hazardous effect. The statutory bodies have defined the noise level exposure limits for human being. It is desirable that suitable noise control measures be taken and reduces the interference of statutory bodies. The technical terminology is useful to analyze and understand the noise pollution in the form of data. In the last, a brief discussion is made on the control of noise pollution.

Noise pollution means any unwanted or excessive sound that can have deleterious effects on human health and environmental quality. Noise pollution, also known as environmental noise, is commonly generated inside many industrial facilities and some other workplaces, but it also comes from highway, railway, and airplane traffic and from outdoor construction activities. Noise pollution or sound pollution, is the propagation of noise with harmful impact on the activity of human or animal life. The source of outdoor noise worldwide is mainly caused by machines, transport, and propagation systems.

Unwanted sound (noise) can damage physiological health. Noise pollution can cause hypertension, high stress levels, tinnitus, hearing loss, sleep disturbances, and other harmful and disturbing effects. Noise is any disturbing or unwanted sound, and noise pollution affects people's health and quality of life. Prolonged high levels of noise can cause hearing loss and stress-related illnesses. Noise often affects children more than adults, and noise pollution also affects general well-being.

We can Reduce Noise pollution by turning off appliances when not in use, use of earplugs, lowering the volume, planting more trees, regular maintenance of vehicles and machines etc. By controlling noise we can control negative health effects that noise pollution has on everyone.

THANK YOU... ...