International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 04 Issue: 09 | Sept -2020 ISSN: 2582-3930

Smell Detector and Generator System

Future Technological Aspects of Smell Detection and Generation

Ashish Kumar D. Gupta
Students,
Department of MCA,
VESIT, Mumbai, India.

Chetan D. Patil
Students,
Department of MCA,
VESIT, Mumbai, India.

Prof. Dr. Ramesh Solanki,
Asst. Professor,
Department of MCA,
VESIT, Mumbai, India.

Abstract

This paper represents the future of Smell Detection and Generation Technology. It focuses on the areas and future possibilities of implementation of various aspects of smell technology. The paper gives a review of the need and application of smell technology in future.

Keywords: Digital Smell Technology, E-Nose, Smell Generating System, Olfactory.

1. Introduction

The sense of smell is powerful. Odours affect us on a physical, psychological and social level. For the most part, we breathe in the aromas which surround us without being consciously aware of their importance to us. It is only when the smell is impaired for some reason that we begin to realise the essential role of the smell plays in our sense of detecting smell. A survey conducted by Anthony Synott at Montreal's Concordia University asked participants to comment on how important smell is to them in their lives. It became apparent that smell can evoke emotional responses. A smell associated with a good experience can bring a sense of joy while bad odour or a smell associated with a bad memory can take you to the moments of that bad experience. Olfactory likes and dislikes are based on emotional associations. Odours are significant factors in social bonding. Even we can say that there is no true emotional bonding without touching or smelling our loved one or any favourable substance. Our noses are able to smell thousands of smells and are able to recognize odours which are present in our surroundings which heavily impact the thinking process and contradictory reactions of human beings. However, smell is a phenomenon which is highly difficult to express or explain. Unlike colours, smells cannot be expressed in many languages because there is lack of specific vocabulary to express these smells. Either smells cannot be digitally recorded or stored for future reference as of now. So this is an implication for olfactory research.

2. Related Work

In the late 1950s, Hans Laube invented the Smell-O-Vision, a system which released odor during the projection of a film so that the viewer could "smell" what was happening in the movie. The Smell-O-Vision faced competition with AromaRama, a similar system invented by Charles Weiss that emitted scents through the air-conditioning system of a theater. Variety dubbed the competition "the battle of the smellies".

Smell-O-Vision did not work as intended. According to a Variety review of the mystery comedy film Scent of Mystery (1960), which featured the one and only use of Smell-O-Vision, aromas were released with a distracting hissing noise and audience members in the balcony complained that the scents reached them several seconds after the action was shown on the screen. In other parts of the theater, the odors were too faint, causing audience members to sniff loudly in an attempt to catch the scent. These technical problems were mostly corrected after the first few showings, but the poor word of mouth, in conjunction with generally negative reviews of the film itself, led to the decline of Smell-O-Vision.

In 2003, Scent Dome, by TriSenx, could generate up to 60 different smells by releasing particles from one or more of 20 liquid-filled odors in.

In 2005, Researchers from Japan proclaimed that by the year 2020 3D television together by smell and touch would be available in business.

3. Need of the System

There is a drastic need for research and development in the area of smells and its associated aspects. There are several incidents in history like The Great Stink in London or Bhopal Gas Leakage Tragedy in India. The Great Stink was an event in Central London in July and August 1858 during which the hot weather exacerbated the smell of untreated human waste and industrial effluent that was present on the banks of the River Thames. The problem had been mounting for some years, with an ageing and inadequate sewer system that got emptied directly into the Thames. The miasma from the effluent was thought to transmit contagious diseases, and three outbreaks of cholera before the Great Stink were blamed on the ongoing problems with the river.

Another incident is The Bhopal disaster, also referred to as the Bhopal gas tragedy, was a gas leak incident on the night of 2–3 December 1984 at the Union Carbide India Limited (UCIL) pesticide plant in Bhopal, Madhya Pradesh, India. It is considered among the world's worst industrial disasters. Over 500,000 people were exposed to methyl isocyanate (MIC) gas. The highly toxic substance made its way into and around the small towns located near the plant.

Estimates vary on the death toll. The official immediate death toll was 2,259. A government affidavit in 2006 stated that the leak caused 558,125 injuries, including 38,478 temporary partial injuries and approximately 3,900 severely and permanently disabling injuries. Others estimate that 8,000 died within two weeks, and another 8,000 or more have since died from gas-related diseases.

Looking at such past incidents, there is a strong need for a system which can detect the presence and amount of harmful substances so that lives of thousands of victims can be saved.

There are lots of people in every city who are affected by nearby chemical plants, factories, crematoriums, dumping grounds, hospitals which led to bad smell to their day to day life and even can be harmful or their healthy lifestyle. There is an increasing number of people having allergies due to emission of harmful chemicals and odours.

Due to such scenarios, there is a need to develop systems which will be able to detect harmful and unwanted smells and immerse some likely smells to humans.

4. Proposed System

There can be a digital smell technology that can be able to sense, transmit and receive smell oriented digital information. A computerised system built up by a collaborative hardware of Olfactometer and electronic noses can be developed to get a sense of smells in the environment of its current or remote locations. The system should be able to track the level of harm which is supposed to be caused by the presence of harmful gases in the air so that the system can send precautionary messages and alerts to the respective authorities so that necessary preventive measures can be taken.
Adding with this, what if the system would be capable of emerging likely smells of humans. The likely smells can be of any type such as the smell of any natural place, climate, season, flower, fruit, food, fabric, etc. ?

What if we develop smell codes which can be stored digitally so that they can be used on any remote locations or can be used even after 100 years of time for recreations of such events ?

These things can get possible if we train our machines to detect, store, analyse, transmit, compile the smell codes.

A particular combination of smells is needed for the smells emission, smell can be stored in a computer database or cloud database. In this view, holding smell in a computer system is no longer just a dream but reality. To store smell in the computer it needs nothing but a database in a computer memory or cloud.

Different categorizations of primary odors have been proposed, including the following, which identifies seven primary odors such as Musky, Putrid, Pungent, Camphoraceous, Ethereal, Floral, Pepperminty.
If you want only basic smell of Musky then the percentage for the volume of Musky smell will be like this-

So, mathematically,
Musky(S1) + Putrid(S2) + Pungent(S3) + Camphoraceous(S4) + Ethereal(S5) + Floral(S6) + Pepperminty(S7) = 100%

100% + 0% + 0% + 0% + 0% + 0% + 0% = 100%

On the contrary, if you want compound smell, for example, it needs the aggregation of different basic smells. For example: if you would like to get a combination of all seven basic smells, so the percentage of the volume of the environment for compound smell will be like this-

Thus equation becomes,
10% + 10% + 10% + 10% + 10% + 20% + 30% = 100%

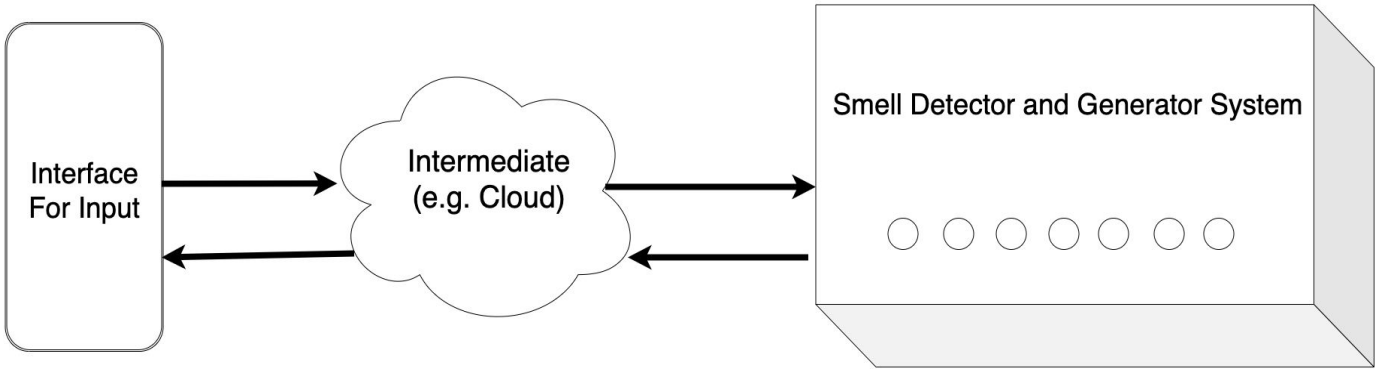

Fig. Smell Detector and Generator System

The above figure shows the basic design of Smell Detector and Generator System. The user can submit an input to the system through an intermediate medium, so that the system can generate a smell as per the given input. The hardware system can make a compound of various smells as per input given by the user.

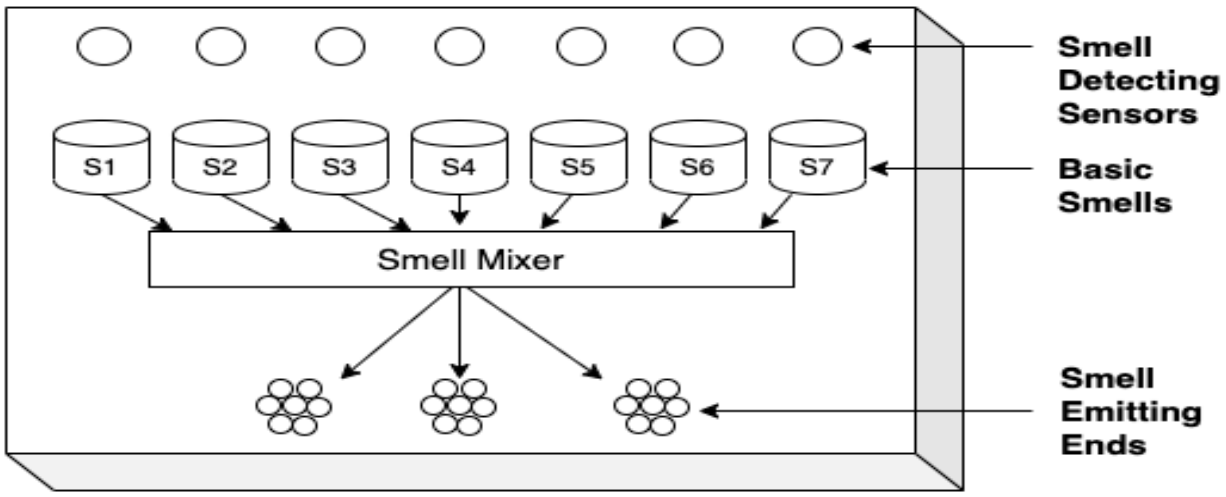

Fig. shows basic internal structure of Proposed system

5. Future of Proposed System

Proposed System can help many product and service based sectors to promote their brands to enhance customer experience through scent & smell-based technologies. More study can be done to investigate scent, digital scent technology and chemical sensing of smells that will impact industries, services and lives. In case of electric vehicle manufacturers can use this technology to provide another level of protection in predictive maintenance for electric systems. Although humans can smell burning electrical parts, sensors can detect issues with electrical parts well before a human could, providing alerts before any serious issues. In cars, the manufacturers can enable a feature of having smell detection if in case there is any technical fault in a wagon, moreover for passenger's luxury smell generation feature can be provided so that the passenger can feel smells.

In hotels and resorts, the user can have the option of having the smell of his/her own choice as a part of luxury and hospitality management.
While ordering flowers, people tend to smell the flowers before purchasing, so it would be a better experience for the consumers if they get exposure to the actual smell of flowers which they're wishing to buy. Similarly while ordering food online, the customer can smell the dish before ordering food.

Even smells of perfumes/deodorants/room freshners can be tested by customers before its online ordering. Psychological impact of scent on people/ Aromatherapy for stress relief is also appreciable. More help can be done in various sectors using the proposed system.

Conclusion:

Smell Detection and Generation Technology is no longer a dream but a reality. Though there is a need to develop algorithms and modules for physical implementation of the system. The system would provide detection and generation for the welfare of society.

The aspect of detection would provide initial alert if there is any hazardous possibility whereas the aspect of generation would provide luxury to the user as freshness and comfort. Without any doubt, the system will be economical for the user.

References:

https://www.nbcnews.com/mach/science/digital-smell-technology-could-let-us-transmit-odors-online-chats-ncna940121

https://kwasi.com/scent-technology/

https://www.futureofsmell.com/

https://siliconangle.com/2020/07/10/digital-olfaction-startup-aryballe-raises-7-89m-build-smell-technology/

http://www.choleraandthethames.co.uk/cholera-in-london/the-great-stink/

https://www.business-standard.com/about/what-is-bhopal-gas-tragedy