International Journal of Advanced Information Science and Technology (IJAIST) ISSN: 2319:2682
Vol.6, No.6, June 2017 **DOI:10.15693/ijaist/2017.v6i6.33-37**

Specialized Biometric Authentication on Detection of Human Body Scent

G.Gokul [1], Dr.V.D.Ambeth Kumar[2], D.Elangovan[3], T K Mohana Priya[4], V.D.Ashok Kumar[5], V. Rani [6]
[1, 4] Department of ECE, Panimalar Engineering College,
[2, 3] Department of CSE, Panimalar Engineering College,
[5]Department of CSE, St.Peter's University,
[6] National Institutes for Research in Tuberculosis (ICMR),
Chennai,India- 600031
***Email*: ambeth_20in@yahoo.co.in, gokul.gk96@gmail.com, elangovan.durai@yahoo.com, moshini96@gmail.com, akumar2879@gmail.com,**

***Abstract*— To the date there is a lots of biometric security systems available in the market but has some limitations in it. Most of the security systems are used to distinguish between the people and its persistence. In most of the biometric system user is directly involved such as carrying the related stuff, exposing the physical contact, typing some password, signing etc. Such things can be avoided by using the *odour scent* as the biometric technique for the security expectation. The objective of this design is to use the odour as the main authentication system tool. This method will show the capability of detecting the human odour and also help to distinguish accordingly, as the scent of a person is unique. Most of the neuroscience has also given the thought of human olfaction and also the sensor systems. As from the survey the odour scent is the combination of the volatile organic component such as the composition of aldehyde, hydrocarbons, ketones etc. Using the mass spectrometry and the electronic nose sensor, the scents are distinguished based on the volatile components and the data are sampled and differentiated on each people in the security system and also it is matched based on the threshold produced by the sensory system. Which give the high profile identification of the potential, user independent security system with biometric scent authentication?**

Index terms - scent, biometric, neuroscience, composition

I. INTRODUCTION

As there are lots of biometric authentication systems which is reaching everyone and gaining popularity based on the output given by the entity. As there are lots of biometric system such as hand and finger geometry, facial recognition, iris scanner, voice biometry, fingerprint verification etc. these systems are depended on the user interface structure. [1]As the user is completely involved in these system which are based on uncommon combination such as exposing the part of the body, typing the password or pin, signature scribe etc. the PIN numbers are the most used technique but it has a burden to make the human beings to memorize the passwords, as to reduce the user interaction to the security system , new Biometric authentication system is used, which is the odour scent. Which has the vital advantage, because it is much faster?

And independent to the user.[3] User can use this technology without any involvement to it, which gives the strongest validation on the recent times of the other biometric system. This research gives the complete vital information about the chemical component on the odour scent. As the odour scent is the volatile organic component which is the composition of several acids and aldehydes etc. [2]To detect the odour of a person there are lots of technologies and sensor, peculiarly we have to use the unique technology to make way to get the idea about the composition of the volatile scent. Using the odour as the authentication security tool can be used in any institution, any complex problems related to authentication of the user can be easily solved.

HUMAN SCENT

It is the biological component which is the composition of several organic compounds which are induced from the skin. The scent of a person is decided by their genetics, as that each person has each unique scent. This paper gives the design to classify the scent and to distinguish the person accordingly. As the scent is generated from the epidermis of the skin, which are specialized in millions of glands such as the eccrine, apocrine and sebaceous glands, as our body holds the sweat glands in the human axillary regions in the body which are capable of secreting two to four liters of fluid in each hour. It can be distinguished as pleasant and unpleasant.[4] To detect the odour scent of the human beings there are several techniques available but the best one is the electronic nose(e-nose). It is designed in such a way that it can capture the human odour in the minimum distance and sent the data to the authentication system and analyses the data based on it.[5]

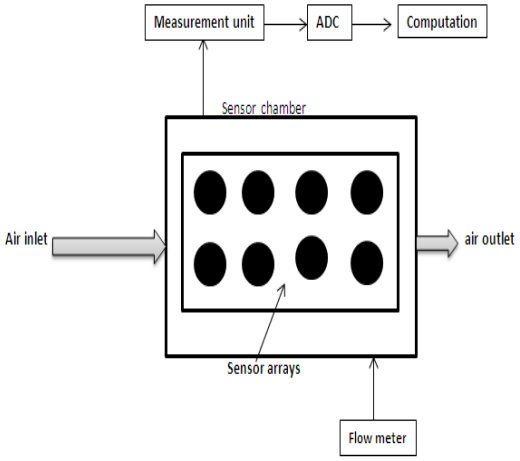


Fig: 1 schematic of E-nose

The E-nose is made of array of metal oxide sensors used for detecting volatile organic composition, it is equipped with some additional hardware and the software to detect and classify the human odour . This security measures able to recognize the people even after the application of the deodorant by the correction of the external noise such as the humidity of the environment. Each human odour has some characteristics and the properties which can be classified on the basis on primary odour, secondary odour, tertiary odour. [6]The human scent is a chemically stable and has a low vapor pressure and also it is persistent. The e-nose is the electronic nose that gives the same response of the mammalian nose which has pattern of sensor that can respond to the olfactory scents in the environment. The volatile odour composition are drawn by the pattern of sensor, the metal oxide will induce chemical and physical reactions, [7] [17] the transducer associated with the sensor will induce the electricity based on the various response of the characteristics of the odour.

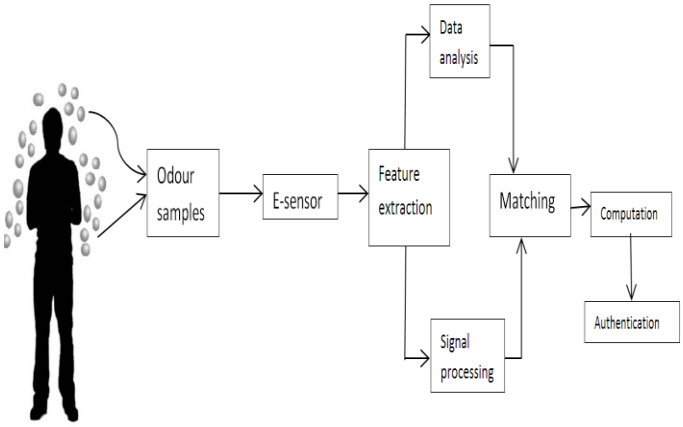


Fig 2 primary detection and analysis

The physical changes are associated with the various other sensor which are predominantly with the e-nose such as conductivity sensor, piezoelectric sensor, optical sensor and the MOSFET sensor. Each shows various physical changes according to the composition of the odour. The human identification is one of the important tool in the forensic science which also builds the link between the crime and the crime scene.[8]

II. Proposed Model

The array of sensor (e-nose) in the system will track the odour in the environment, this system senses the composition of complicate mixtures of the volatile odour scent.[15] Each odour produces appropriate pattern The E-nose is adhered with the metal oxide semiconductor, when it originate in contact with the volatile odour composition, there will be some internal chemical reactions takes place which in turn generate electricity in the transducer, each volatile component shows different variations in the electrical properties. Each voltage variations are mapped and analyzed, frequency and percentage of occurrence is also drawn. Experimentally the odour scent varies from male to female dramatically, using this design the samples are correlated and can be found whether the sample is the male or a female lead. [9]The E-nose builds a system that can give a unique classification of the odorants and its extracted features.

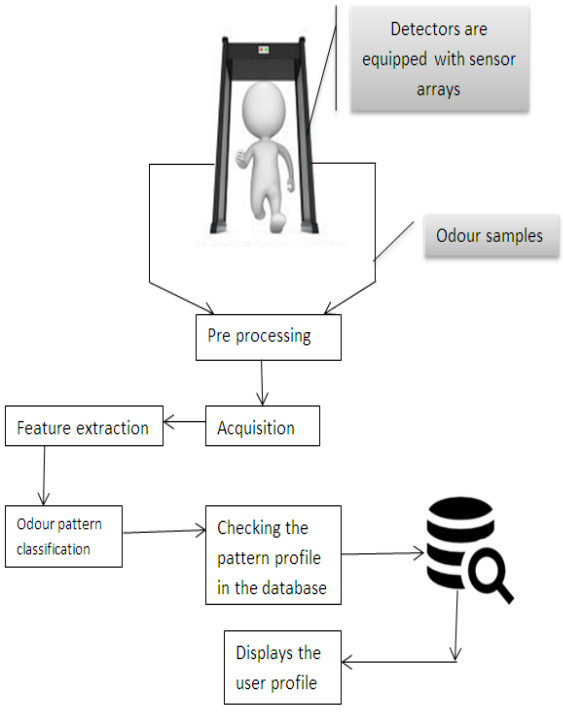


Fig 3 odour system identification architecture

Extraction and Analysis Of Each Odour Composition

Most of the volatile odours are extracted at the room temperature, which are determined to be the extracted optimal time based combination. The humidity of the environment is neglected and the prior backgrounds are eliminated. [10]These samples that pass to the sensor array are correlated and the comparison matching is ranked according to the peak integrated areas. Each sample are confined and are stored in the database as a profile with an optimal extraction time. Here some of the few extracted odour components are shown below

Table:1 odour composition

Extracted odour compounds

s.no.	Compound	Proportion	Existence	Frequency	Vapor pressure	Molecular weight
1	Benzaldehyde	21.01	15.00	9	6.11	106.12
2	Nonanol	3.32	3.32	2	3.33	142.24
3	Dodecane	25.47	40.76	20	7.203	170.34
4	Phenol	100	100	62	2.199	94.11
5	Octanal	12.89	17.99	10	4.911	130.23
6	Undecanal	46,65	34.03	23	2.583	156.31
7	Tridecanal	3.22	6.78	3	4.323	196.35
8	Benzyl alcohol	19.23	43.45	7	6.379	108.14
9	Octane	5.34	3.23	1	1.037	113.32
10	Hexanal	4.34	1.22	1	5.310	100.16
11	Heptanal	6.65	2.33	8	1.839	114.90

As there are primary similarities in the components which detected at the peak levels, the frequency that are emulated is in the headspace of the listed components above, these are components that are identified and compared with the group of composition that are occurred. Most of the components thatare occur due to some deodorant, body lotions etc. are not listed above which are eliminated in the data correlation process and the characteristics are finely listed based on the occurrences. Each profile in the computation process have a human scent which have all other factors and ratios. [11]The correlation factor determines every case components required with parameter and non-parameter which are assigned with the every sample which are measured in the sensor.

Processing and Analyzing

Processing is based on the reconstruction form of the matrix were taken as the multiple comparisons. The contrast part with the random analyses were calculated in the computing process of the microcontroller, the sensory system represents every form as the individual matrix coordinates which gives the greater control of the odour discrimination. [13]The basic sample test is conducted with the contrast of the significant odour regions of the samples. The higher order of the task is compared with the paired images of the odour discriminations. From the feature extracted data the measurements and the voltage variations are taken as the initial component for the identification process. The odour measured in the sensor will attain a classification stages, each scent will have its types and composition. The pattern recognition gives the complete estimate of the unknown odour sample, such as the threshold will provide the reduction of the errors in the characteristics pattern.[12]

III. Future Extension Work

To the date the mobile phones are maximized in this era, this design can be implemented in the mobile phone on making the use of Nano technology. This design can be simplified and reduced can be implemented in the cellphones for the security lock purposes. The user don't want to use any physical interactions to the model, as the cellphone processor is highly faster can be used for the n-number of applications. [16]The sensor system can be included in the cellphone with the appropriate measuring unit to get the best ever authentication in it. This biometric will enhance new era in the mobile technologies.

IV. Conclusion

On analyzing the volatile organic components are collected with the sensor arrays on taking the low-molecular weight of the compounds the correspondent correlation was taken. The body odour is detected and being processed. The signal generated will undergo several signals processing technique which will gives the complete characteristics of the each scent. These scents are patterned and recognized with what type of scent it is. These classifications tell about the user which is connected to the database cluster. Each scent are characteristered with the detailed pattern, if the match is found on the database server and the user is distinguished in the display.

V. References

[1] Yuwono and P. S. Lammers, Odor Pollution in the Environment and the DetectionInstrumentation,

Agricultural Engineering International: the CIGR Journal of ScientificResearch and Development VI (2004).

[2] Hardiman O, Burke T, Phillips J, Murphy S, O'Moore B, Staunton H, et al. Microdysgenesis in resected temporal neocortex: incidence and clinical significance in focal epilepsy. Neurology 1988; 38: 1041–7.

[3] J. W. Gardner and P. N. Bartlett, Electronic Noses
a. Principles and Applications Oxford University Press,
b. Oxford, UK, 1999.

[4] A.M. Curran, S. I. Rabin and K. G. Furton, Analysis of the Uniqueness and Persistenceof Human Scent, Forensic Science Communications 7 (2005) 2.

[5] S. Munk, P. Münch, L. Stahnke, J. Adler-Nissen, P. Schieberle, Primary odorantsof laundry soiled with sweat/sebum: influence of lipase on the odor profile,Journal of Surfactants and Detergents 3 (2000) 505–515.

[6] Gunderson V, Gale K, Dubach M. A model of complex-partial seizures and status epilepticus in the infant monkey [abstract]. SocNeurosciAbstr 1996; 22: 2083.

[7] A.G. Singer, G.K. Beauchamp, K. Yamazaki, Proceedings of the National Academyof Sciences of the United States of America 94 (1997) 2210–2214.

[8] Henkin RI, Comiter H, Fedio P, O'Doherty D. Defects in taste and smell recognition following temporal lobectomy. Trans Am NeurolAssoc 1977; 102: 146–50.

[9] Dudchenko, P. A., Wood, E. R., &Eichenbaum, H. (2000). Neurotoxic hippocampal lesions have no effect on odor span and little effect on odor recognition memory but produce significant impairments on spatial span, recognition, and alternation. Journal of Neuroscience, 20, 2964–2977.

[10] F. Kanda, E. Yagi, M. Fukuda, K. Nakajima, T.
a. Ohta, O. Nakata, Elucidation ofchemical
b. compounds responsible for foot malodour, British
c. Journal of Derma-tology 122 (1990) 771–776.

[11] Eichenbaum, H., Morton, T. H., Potter, H.,
a. &Corkin, S. (1983). Selective olfactory deficits in
b. case H. M. Brain, 106, 459–472.

[12] Neurology, Neurosurgery, and Psychiatry, 53, 161–165.

[13] Eskenazi, B., Cain, W. S., Novelly, R. A., & Friend, K. B. (1983). Olfactory functioning in temporal lobectomy patients. Neuropsychologia, 21, 365–374.

[14] Esiri, M. M., Pearson, R. C., Steele, J. E., Bowen, D. M., &Powell, T. P. (1990). A quantitative study of the neurofibrillary tangles and the choline acetyltransferase activity in the cerebral cortex and the amygdala in Alzheimer's diseasejournal of Neurology, Neurosurgery, and Psychiatry, 53, 161–165.

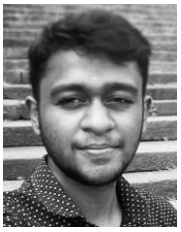
[15] Eskenazi, B., Cain, W. S., Novelly, R. A., & Mattson, R. (1986). Odor perception in temporal lobe epilepsy patients with and without temporal lobectomy. Neuropsychologia, 24, 553–562.

[16] Yousem, D. M., Williams, S. C., Howard, R. O.,
a. Andrew, C., Simmons, A., Allin, M., et al. (1997). Functional MR imaging during odor stimulation: Preliminary data. Radiology, 204, 833–838.

[17] F. Kanda, E. Yagi, M. Fukuda, K. Nakajima, T. Ohta, O. Nakata, Elucidation ofchemical compounds responsible for foot malodour, British Journal of Derma-tology 122 (1990) 771–776.

[18] Ms.N.Geethapriya and Dr. S. Mary Praveena, " Evaluation Of Fruit Ripeness Using Electronic Nose", International Journal of Advanced Information Science and Technology (IJAIST) , Vol.6, No.5, PP: 1-5, May 2017 .

Authors Profile



G.Gokul is currently pursing B.E degree in Electronics and Communication Engineering at Panimalar Engineering College, Chennai, India. His current research interest includes image processing, robotics, android programming, big data analyst and wireless communication.

Dr.V.D.Ambeth Kumar received my Ph.D (Computer Science Engineering) from Sathyabama University, India in 2013, having pursued my M.E (Computer Science Engineering) degree in Annamalai

University, Chidambaram and B.E (Computer Science Engineering) in Madurai Kamaraj University, Madurai, Tamil Nadu, India in the year 2006 and 2004. Having a rich experience in the field of Computer Science for close to a decade, I currently work as an Associate Professor at Panimalar Engineering College, Chennai, India. Besides having contributed in Technology initiatives and published books on Theory of Computation, Design and Analysis of Algorithms and Advanced Computer Architectures, my articles have also been published in 25 International Journals, 6 National Journals. Additionally, I have presented papers in more than 41 National and International conferences. Being a recognized supervisor of Anna University, I also guide research scholars for Ph.D programme. I am the recipient of the Best Teacher award of PEC in 2011, with my work having been profiled broadly such as in Image Processing, pattern Recognition, Neural Network and Network. My research interests include Computational Model, Compiler design, Data Structure and Microprocessors. Not only am I a Reviewer and Editor of many reputed Journals, but I am also a Life Member of ISTE, IAENG and ACEEE.

D. Elangovan is presently working as an Associate Professor in Panimalar Engineering College and has 16 years of teaching experience in Computer Science engineering. He completed his B.E. (ECE) from Madras University and M.E. (S.E&O.R) from Anna University, Chennai, India. He is pursing Ph.D (CSE) in Sathyabama University, India. He has published papers in various National and International conferences and Journals. His areas of interests are data mining, computer networks, Wireless networks, Machine Learning and Image Processing.

T.K.Mohana Priya is currently pursing B.E degree in Electronics and Communication Engineering at Panimalar Engineering College, Chennai, India. Her current research interest include data processing, compiler design, vlsi design.

V.D. Ashok Kumar is presently working as an Assistant Professor and has 6 years of teaching experience in Computer Science engineering. He completed his B.E. (CSE) from Madras University and M.E. (CSE) from Annamalai University, India. He is pursing Ph.D(CSE) in St.Peter's University, India. He has published papers in various National and International conferences and Journals. His areas of interests are Image Processing, data Structure, Computer Network, Theory of computation and Compiler design.

V.Rani is presently working as a Technical Assistant in NATIONAL INSTITUTE OF RESEARCH IN TUBERCULOSIS (ICMR) and she has 4 years of experience in research field. She had completed her B.P.T .From The Tamilnadu Dr.MGR Medical University and M.Sc. (Psychology) from TNOU. India.