

Electronic noses hold out¹ the promise of sniffing out² criminals

THE OBSERVER,
Sunday 29 March 2009
By Tracy McVeigh

There has been CCTV³, finger printing⁴ and eye recognition⁵. Now comes⁶ body odour profiling⁷. In its ongoing⁸ efforts to nail⁹ the bad guys¹⁰, the US Department of Homeland Security¹¹ is investing heavily in the sniff test: "odourprint¹²".

Plans have quietly appeared on the American government website to announce some serious funding¹³ of a study looking at the potential of using people's individual smell¹⁴ to identify criminals and to uncover¹⁵ when they are lying¹⁶.

There are scientists who claim¹⁷ our smell is just as unique as our DNA, and the work to be funded will look into¹⁸ the chemical nature of the human scent¹⁹ as utilised by crime fighters in the form of the bloodhound²⁰. Dogs have clued²¹ the scientists into the possibilities of smell technology although their accuracy has been shown to be as low as 85%, with an untrained²² dog doing no better pure chance.


But now efforts and research is under way to make the scrutiny²³ of smell more exact. Tests have shown that mothers can pick out²⁴ their babies by smell alone, while humans can be shown to recognise each other through the tang²⁵ of their armpit²⁶ BO²⁷. The smell of a human has also been shown to vary by gender²⁸ and by age - one recent study claimed that men smell like cheese while women smell of grapefruit or onions.


There may even be racial differences: Asians, for example, have fewer apocrine sweat glands²⁹ than black or white people. In a new book about scent called Headspace, Amber Marks reports that in the 1990s a British electronic-nose company was approached by the South African police and asked for the "odour signature³⁰" of black people. The company refused.


The electronic nose is being developed widely and last year biological engineers found a way to mass-produce smell receptors in the laboratory, an advance that paves the way³¹ for "artificial noses".


"Smell is perhaps one of the oldest and most primitive senses, but nobody really understands how it works. It still remains a tantalising³² enigma," said Shuguang Zhang of MIT³³, author of a paper on the work in the Proceedings of the National Academy of Sciences³⁴.

Artificial noses could one day replace drug- and explosive-sniffing dogs, and could have numerous medical applications, according to Zhang and his colleagues. The US Defence Advanced Research Projects Agency recently approved funding for the team's Real Nose project.

Before now, efforts to understand the molecular basis of smell have been held up³⁵ by problems in working with the proteins that detect odours, known as olfactory receptors. 

Smell is one of the most complex and least understood senses. Humans have a vast olfactory system that includes close to³⁶ 400 functional genes³⁷, more than are dedicated to any other function. Animals such as dogs and mice³⁸ have about 1,000. 

That variety of receptors allows humans and animals to discern tens of thousands of distinct stinks³⁹. Each smell activates multiple receptors and this pattern⁴⁰ of activation creates a pattern that the brain⁴¹ can recognise. 

But the ongoing studies could throw up⁴² a whole new worry about "odour privacy". For one thing, a body smell may convey⁴³ private medical information: disease⁴⁴ could well have signature smells, as could mental illness⁴⁵. 



Exercise: Write in the plural form of the following nouns

flight

city

day

country

potato

watch

donkey

bass

tooth

person

woman

mouse

horseman

loaf

sheaf

species

esophagus

pimento

¹ **Hold out** [to hold, held, held, holding holds]: qui: *hold out the promise*: mantenere la promessa.

² **Sniffing out** [to sniff, sniffed, sniffing, sniffs]: *recognize or detect by or as if by smelling, uncover*: fiutare, scoprire, smascherare.

³ **CCTV**: *closed-circuit television*.

⁴ **Finger printing** [fingerprinting]: rilevamento delle impronte digitali.

⁵ **Eye recognition**: riconoscimento visivo.

⁶ **Now comes body odour profiling**: si noti l'inversione soggetto-verbo, tipica di certe forme dello stile giornalistico il cui scopo è di dare enfasi stilistica all'elemento tematico della frase.

⁷ **Profiling**: anche: *profile: an analysis (often in graphical form) representing the extent to which something exhibits various characteristics*: tracciare un profilo.

⁸ **Ongoing**: *having been developing or in progress for some time and continuing to do so*: in corso, continuo.

⁹ **To nail** [nailed, nailing, nails]: qui: *to catch somebody who is guilty of an offence, prove the person's guilt, or have the person convicted*: colloquiale: acchiappare, inchiodare, beccare. Viene dal sostantivo *nail* che significa chiodo, ma anche unghia.

¹⁰ **Bad guys** [guy]: *villain, criminal*.

¹¹ **US Department of Homeland Security**: Dipartimento per la Sicurezza Interna degli Stati Uniti. È un dipartimento del Gabinetto del Governo federale che ha il compito di proteggere il territorio degli Stati Uniti da attacchi terroristici e di intervenire in caso di disastri naturali. Mentre il Dipartimento della Difesa (*Department of Defense*) si occupa delle azioni militari all'estero, il Dipartimento della Sicurezza Interna lavora per proteggere gli Stati Uniti all'interno e all'esterno dei confini. L'obiettivo dichiarato è quello di prevenire e far fronte alle emergenze interne, in particolare quelle legate al terrorismo. È stato costituito in seguito agli attacchi terroristici dell'11 settembre 2001. Nel marzo 2003 ha assorbito il vecchio Servizio di Immigrazione e Naturalizzazione (*Immigration and Naturalization Service*), di cui ha assunto i compiti.

¹² **Odourprint**: impronta olfattiva.

¹³ **Funding**: finanziamento.

¹⁴ **Smell**: *any property detected by the olfactory system*. I cinque sensi in inglese sono: *sight, hearing, touch, taste, smell*.

-
- ¹⁵ **To uncover** [*uncovered, uncovering, uncovers*]: discover (something previously secret or unknown).
- ¹⁶ **Lying** [*to lie, lied, lying, lies*]: to say something that is not true in a conscious effort to deceive somebody: mentire. Attenzione a non confondere questo verbo con *to lie* [*lay, lain, lying, lies*] che significa: stendersi, sdraiarsi, giacere, essere situato.
- ¹⁷ **Claim** [*claimed, claiming, claims*]: to assert or maintain: asserire, affermare, sostenere.
- ¹⁸ **Look into** [*to look, looked, looking, looks*]: to see into, investigate.
- ¹⁹ **Scent**: an odour left in passing by which a person or animal can be traced: odore, profumo.
- ²⁰ **Bloodhound**: bracco, segugio.
- ²¹ **Clued** [*to clue, clued, cluing, clues*]: to provide somebody with useful information. Il sostantivo *clue* significa indizio, traccia.
- ²² **Untrained**: lacking training, not having been instructed in something: non addestrato, non allenato.
- ²³ **Scrutiny**: careful inspection.
- ²⁴ **Pick out** [*picked, picking, picks*]: qui: to recognize or distinguish somebody or something from among others or against a background that makes this difficult: individuare, riconoscere, distinguere.
- ²⁵ **Tang**: pungent smell, a smell that has a sharp biting quality: odore pungente.
- ²⁶ **Armpit**: the hollow beneath the spot where the arm and shoulder join (cfr. Ebac scheda Human Body).
- ²⁷ **BO**: body odour.
- ²⁸ **Gender**: sex.
- ²⁹ **Apocrine sweat glands**: ghiandole sudoripare apocrine.
- ³⁰ **“Odour signature”** [AE odor]: “firma odorosa”.

³¹ **Paves the way (for something)** [*to pave, paved, paving, paves*]: si tratta di una locuzione idiomatica che significa spianare la strada a qualcosa. In generale, il verbo *to pave* si traduce con: lastricare, pavimentare (anche in senso figurato), ed è seguito dalla preposizione *with*: *the road to Hell is paved with good intentions*: la via che conduce all'inferno è lastricata di buone intenzioni.

³² **Tantalising** [*AE: tantalizing*] [*to tantalise, tantalised, tantalising, tantalises*]: *teasing*: allettante, provocante, stuzzicante. Una curiosità: questo aggettivo e il relativo verbo *to tantalise* derivano dal personaggio della mitologia greca Tantalo, figlio di Zeus, cui gli dei inflissero, per punirlo della sua superbia, il famoso supplizio che consisteva nel soffrire in eterno la fame e la sete stando immerso in un lago e sotto un albero di frutta senza poter mai raggiungere né l'acqua né la frutta che al suo protendersi si allontanavano.

³³ **MIT: Massachusetts Institute of Technology**. È una delle più importanti università di ricerca del mondo, con sede a Cambridge, nel Massachusetts. Aperto a Boston nel 1865 dal geologo William Barton Rogers, che ne fu il primo rettore, il MIT, in un primo momento dedicato alla ricerca applicata all'industria, si è sviluppato in cinque scuole (Scienze, Ingegneria, Architettura e Urbanistica, Management, Discipline umanistiche, Arte e Scienze sociali), organizzando corsi di laurea e di specializzazione post-laurea.

³⁴ **Proceedings of the National Academy of Sciences**: meglio conosciuto come *PNAS*, è il periodico ufficiale della *United States National Academy of Sciences*. Quest'autorevole rivista scientifica, pubblicata per la prima volta nel 1915, raccoglie articoli molto accreditati nell'ambito della comunità scientifica, in particolare nei settori della biomedicina, della biologia, della fisica, della matematica e delle scienze sociali. La versione stampata del *PNAS* esce con cadenza settimanale, mentre l'edizione online "*PNAS Early Edition*" è aggiornata quotidianamente.

³⁵ **Held up** [*hold, held, held, holding, holds*]: *delayed, obstructed*: rallentare, ostacolare.

³⁶ **Close to**: *almost*.

³⁷ **Genes** [*gene*]: *the basic unit capable of transmitting characteristics from one generation to the next. It consists of a specific sequence of DNA (deoxyribonucleic acid) or RNA (ribonucleic acid)*.

³⁸ **Mice** [*mouse*]: *a small rodent that has a brown or greyish brown coat and a long, mostly hairless tail* (vedi scheda Ebac sui plurali irregolari).

³⁹ **Stinks** [*stink*]: *a strong unpleasant odour*.

⁴⁰ **Pattern**: *qui: a customary way of operation or behaviour*.

⁴¹ **Brain:** *the controlling centre of the nervous system in vertebrates, connected to the spinal cord and enclosed in the cranium. It is the centre of thought and emotions, and regulates bodily activities: cervello (vedi la scheda Ebac "Human body").*

⁴² **Throw up** [*to throw, threw, thrown, throwing, throws*]: *to reveal: creare, tirare fuori.*

⁴³ **Convey** [*to convey, conveyed, conveying, conveys*]: *transmit, pass on information: trasmettere, comunicare.*

⁴⁴ **Disease:** *illness, a condition in humans, plants, or animals that results in pathological symptoms and is not the direct result of physical injury: malattia.*

⁴⁵ **Mental illness:** *malattia mentale. Illness è un sinonimo di disease, sickness.*