How AI and brain science are helping perfumiers create fragrances

Publication Date: 2023-10-01

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Section: Technology

Tags: Artificial intelligence (AI), The Observer, Fragrance, Beauty, Health & wellbeing, Neuroscience, Consciousness, news

Article URL: https://www.theguardian.com/technology/2023/oct/01/how-ai-and-brain-science-are-helping-perfumiers-create-fragrances

Making perfume is an art that can be traced back to ancient Greece but now modern-day perfumiers are beginning to look beyond their noses to develop the scents most likely to appeal to us. They are, instead, turning to AI. Perfumes can now be designed to trigger emotional responses using ingredients known as neuroscents – odours shown by biometric measures to arouse different positive feelings such as calm, euphoria or sleepiness. Hugo Ferreira, a researcher at the Institute of Biophysics and Biomedical Engineering in Lisbon, is mapping brain activity and response to perfumes to build a database of neuroscents. He says the sense of smell is fascinating. “With sight and hearing, you can imagine the face of a loved one or favourite tune. It’s hard to imagine a smell even though [it] can provoke a torrent of emotions and memories.” Ferreira says this is due to the structure of the olfactory system. Messages from scent receptors are sent via the olfactory bulb to different brain areas that control everything from memory or thirst to stress reactions. “Olfaction is the most diverse sense with many different receptors. It’s estimated that there are about 400 different olfactory receptor gene families. Among other things these various connections may explain how we can ‘smell fear’, or the smell of victory.” Many beauty brands have invested in neuroscent research and technology, as the possibilities of creating fragrances proven to make consumers feel good are obviously big. L’Oréal has partnered with neurotechnology company Emotiv to create a scent choice “experience”. During 2023, shoppers at certain Yves Saint Laurent stores worldwide have used a headset to create an electroencephalogram – EEG – to discover which scents appealed to them. Results so far show that 95% of customers who used the headset found the right perfume. Fashion and fragrance business Puig says it took 45 million brain readings from men aged 18-35 to finesse the cologne Phantom by Paco Rabanne, adding lavender and lemon to the formula as a result of its research. Givenchy Irresistible eau de parfum – the latest iteration of the Very Irresistible range that has been a bestseller for 20 years – includes a rose extract dubbed “anti-morose”, chosen after biometric research. While mass-market scents can only make so much use of this technology – any scent for sale across five continents has to appeal to a broad audience – niche perfumiers are creating ultra-personal formulas. South Korean company Amorepacific’s personalised bath bomb, created using real-time biodata by a “bathbot” is, sadly, not available internationally, but EveryHuman – an algorithmic perfumery based in the Netherlands – makes unique scents in a matter of minutes using a questionnaire and algorithms. This month, the company diversified into room fragrance and now visitors to Moooi furniture store in London can watch their Willy Wonka-esque machine in action. Anahita Mekanik is co-founder of EveryHuman and previously worked at major

fragrance houses for 20 years in scent development and marketing. She says: “My interest in algorithmic perfumery is the access it provides to people to engage with scent directly. As a scent developer, what I found most fascinating was that for every scent that was launched, thousands of iterations would be made and discarded. “Evaluating all those ‘imperfect’ trials that never made it to consumers – some of which they would’ve loved – was the core of the development process.” Scientific perfume is not for everyone. Broadcaster and perfume writer Katie Puckrik says she’d like to “design her own perfume as much as crush the grapes for her own wine”. “Leave the magic to the artists,” she says. “Why do we need a computer to tell us what our nose already knows? The serendipity of stumbling on to a new favourite fragrance is a rare moment of grace we should allow ourselves.” For Ferreira, the magic comes from the very nature of scent. “We are all familiar with the use of fragrances in cosmetics and aromatherapy which positively impacts our sense of self, but these applications could be just scratching the surface of odorant molecules’ therapeutic benefits. How scent can be modulated for health or other purposes is a study for several lifetimes.”