

TECH OFFER

High Speed and Sensitive Artificial Olfactory Sensor



KEY INFORMATION

TECHNOLOGY CATEGORY:

Electronics - Sensors & Instrumentation

Foods - Quality & Safety

Environment, Clean Air & Water - Sensor, Network,
Monitoring & Quality Control Systems

Infocomm - Artificial Intelligence

Healthcare - Diagnostics

TECHNOLOGY READINESS LEVEL (TRL): **TRL7**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO174793**

OVERVIEW

The human nose has 400 different types of odour receptors yet has the ability to recognise about 10000 different smells. Currently, there are different artificial methods that can be used to sense various odours by detecting volatile organic compounds (VOCs). However, many of these methods detect a single type of VOC at any one time or detect the whole VOCs without identification, are often expensive, time-consuming, or require skilled laboratory personnel to perform the procedure.

This technology offer is a novel Artificial Olfactory Sensor (AOS) system with pattern recognition using artificial intelligence (AI). This system can simultaneously detect multiple VOCs, and is able to classify the odours through AI techniques. The sensor can detect at concentration as low as 1ppb (parts per billion) and provides a fast sensing speed at 10 second/cycle. The patented

technology can be used in food quality evaluation, air quality evaluation or human healthcare diagnostics.

TECHNOLOGY FEATURES & SPECIFICATIONS

The sensor consists of 16 elements and each of them have different receptors that response to various odour molecules. This will allow the sensor system to classify and identify more than 100 VOCs through machine learning. The system is customisable to include more sensor elements for further application development.

The sensors can be placed in multiple areas. The high sensitivity allows it to detect odours accurately even in wide spaces. Hence, it can be used to monitor and detect odours in public spaces, hotel rooms, public transportation, etc. The high-speed detection system allows it to operate in real time, and in a non-destruction manner; sample pre-treatment is not required.

POTENTIAL APPLICATIONS

The technology offer can be implemented in the following applications:

- Healthcare diagnostics by detection of VOCs from the body
- Health/ well-being monitoring by detection of VOCs from the body
- Non-invasive food quality control during manufacturing or distribution
- Real-time alcoholic fermentation monitoring
- Air quality control e.g., in restaurants, schools or offices
- Ripeness/maturity check for fruits (e.g., avocado, strawberry)
- Detection of meat spoilage
- Reactor monitoring in chemical industry

UNIQUE VALUE PROPOSITION

- This AOS has broad applications. It can be further developed for specific applications through sensor customisation and machine learning techniques
- High speed and sensitive detection
- No sample pre-treatment required
- Real time, non-invasive and cost effective method, which can be used to classify large groups of VOCs

The technology owner is interested to do R&D collaboration with companies working in odour detection from various industries, e.g., food industry, smart buildings, healthcare, energy and environment, etc.