



# The scent of food freshness

Food waste reduction and safer food consumption for refrigeration applications



STRATUSCENT

## Modern-day homes

Our homes are becoming increasingly connected and smarter – whether it is smart locks, lighting, appliances, or home security. At the heart of this connectivity are an increasing number of Internet-of-Things (IoT) devices that connect to our Wi-Fi networks to provide the eyes, ears, touch, hands, and legs to our devices. These devices have enhanced our perception of the world around us and augmented our senses in unprecedented ways, consequently they are helping us live safer and helping us make smarter choices.

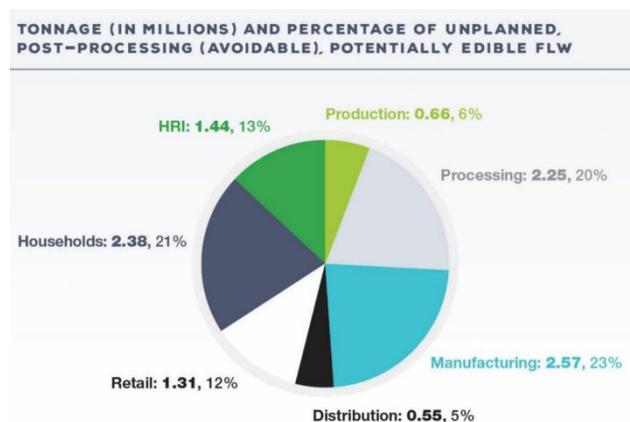
In our continued pursuit of improving our everyday experience, there is one more human sense that has yet to be integrated into our connected devices – the sense of **smell**.

## The cost of food waste and spoilage

The attached graph shows the distribution, in Canada, of the *avoidable* food loss and waste (FLW). A whopping **21%** or **2.4 million tons** of food worth more than **\$10 billion** is lost at the consumer level. This waste can be easily reduced.

Two ways in which we can prevent food wastage at the consumer level are:

- A) Ensuring proper refrigeration to prevent spoilage
- B) Establishing a standardized way to confirm when food should be consumed promptly or processed immediately (ex. cooked and frozen) for later consumption. This is where **scent digitization** is changing the landscape.



Source: Gooch et al (2019). *The Avoidable Crisis of Food Waste: Technical Report; Value Chain Management International and Second Harvest; Ontario, Canada.*

## AI-driven food freshness and safety

Stratuscent's electronic nose (eNose) technology, when integrated into modern smart refrigerators, enables us **to verify that the food we are consuming is fresh and safe**. Additionally, the eNose can smartly regulate the air cycles in the refrigerator to provide the right balance between food freshness and energy savings. This ensures that we and our families are consuming food in the safest way possible.

Taking this a step further, our eNose makes the age-old saying "one bad apple spoils the bunch" exactly that – age old. Through its predictive artificial intelligence (AI) algorithms, the eNose can identify precursors to food spoilage and alert us at the first sign of spoilage, so that we can throw away that one bad apple and save the rest of the bunch.



Stratuscent's eNose is paving the way to food waste reduction

### Food spoilage

Stratuscent's eNose can detect food spoilage because at its heart is a proprietary chemiresistive array that can sense all the volatile organic compounds (VOCs) that are associated with food deterioration. Specifically, when specific types of food spoil, the following volatile chemicals are released:

Spoiled fish: amines

Spoiled meat: sulfides

Over-ripe fruits: ethylene

Spoiled dairy: butyric acid

Since our eNose can detect these (and more) VOCs in trace amounts, it can easily detect the initial signs of food spoilage. With its 32-element sensing array that is designed to be sensitive to the various chemical functional groups combined with AI algorithms, our eNose can track and trace the evolution of complex scents and VOCs. This allows the eNose to detect how fresh, pure, or ripe certain foods are in a continuous manner.

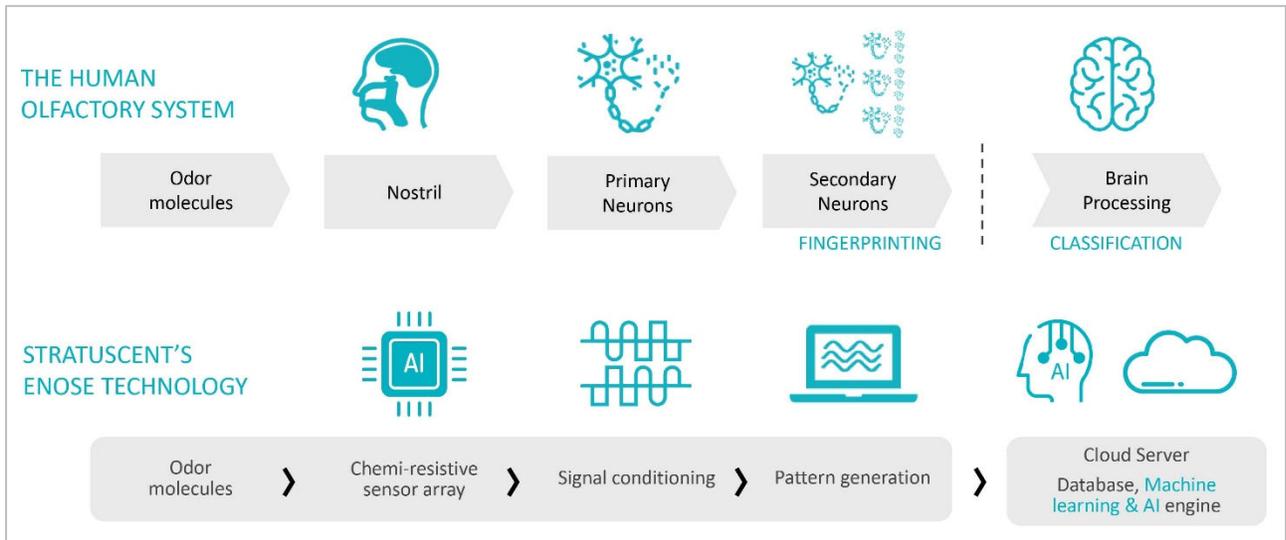


Stratuscent's eNose installed inside a refrigerator

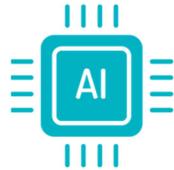
## Energy savings

Furthermore, by combining the digitized “smell” of the air quality inside the refrigerator and the readings from its own onboard temperature and humidity sensors, our eNose can also optimize the air and refrigerant cycling of the refrigerator to find the right balance between food freshness and energy savings.

## Bio-inspired groundbreaking technology



Stratuscent's eNose is based on technology that was developed at NASA's Jet Propulsion Lab (JPL) and installed in the International Space Station. After obtaining perpetual worldwide licensing rights to patents, Stratuscent has improved and optimized the end-to-end system to provide real-time environmental intelligence.



### Proprietary Chemo-scent Receptors

At the core of Stratuscent's eNose is a 32-sensing-element chemiresistive array targeted towards the various functional groups of Volatile Organic Compounds (VoCs). As the scent flows over this array, the impedance of the sensing elements changes to create a *scentprint* unique to each scent. This *scentprint* is continuously captured and relayed to the cloud for interpretation. Thus, Stratuscent's proprietary chemo-scent receptors respond holistically to a scent.



### Bio-inspired Artificial Intelligence (AI)

Much like how our olfactory system works, the signal from the sensor (the "nose") is sent to the AI-enabled cloud (the "brain") for processing. Using proprietary machine learning techniques, the AI engine is able to not only detect the differences between different *scentprints* (e.g. orange versus garlic) but also able to detect changes in the *scentprints* over time (e.g. during fruit ripening) in various humidity and temperature conditions and in the presence of complex background scents.



Leveraging the capabilities of our cloud-based centralized AI architecture, the eNose unit can be remotely software-upgraded with improved capabilities or additional target aromas. Moreover, Stratuscent's eNoses have the capability to cross-learn from all the other eNoses.

## Contact Stratuscent to learn more

Email: [info@stratuscent.com](mailto:info@stratuscent.com)

[www.stratuscent.com](http://www.stratuscent.com)

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### ABOUT

## Stratuscent Inc.

Stratuscent's breakthrough portable, real-time, and low-cost electronic nose leverages chemical sensing and artificial intelligence (AI) to detect, digitize, and catalog simple and complex everyday scents thereby enhancing brand identification, quality control, yield, and safety. Incorporated in 2016 with offices in Montreal, Stratuscent Inc. was incubated at TandemLaunch, is a graduate of Creative Destruction Lab 2018 and a winner of the 2019 C.L.I.C. Challenge. [www.stratuscent.com](http://www.stratuscent.com)