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Opinion Article

Digital technologies implemented in sensory science

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ABOUT THE STUDY

In sensory science, new and developing digital technologies have been used to reduce subjectivity and biases in data collecting and interpretation as compared to older approaches. Through reliable and impartial information from various sensor technologies, these technologies have enabled the inclusion of physiological and emotional reactions of panelists evoked by food, beverage, and packaging stimuli.

Sensory science digital technologies include:

• Sensory science software

• Biometrics integration to assess physiological and emotional responses of panelists

• Virtual, augmented, and mixed reality integration

• Sensor technology (electronic noses and tongues) for sensory analysis

Rapid data collection and interpretation might pave the path for automation and AI deployment in the food and beverage sectors, revolutionizing the industry. It also proposes a framework for integrating and applying digital technology across the food chain, from farm/manufacturing facilities to the palate. In sensory and consumer science, visual processing is a key cognitive component. Consumers visually attend to food varieties, packaging, label design, commercials, supermarket shelves, food menus, and other visible information. Eye tracking has been utilized in sensory and consumer research to explicate consumer visual processing throughout the last decade. Sensory science has progressed rapidly in the last decade, and it is gradually becoming a vital tool for forecasting the success of food products in the marketplace. Sensory data approaches are increasingly focusing on more dynamic elements of sensory perception, taking into account the different stages of user-product interactions. Recent advances in virtual reality and augmented reality have opened the possibility for new immersive and interactive technologies that may be used to capture and analyze the complexity of human sensory perception. Recent advances in virtual and augmented reality technology are discussed, as well as their prospective applications in the field of sensory science. The potential benefits for the food business, as well as the major hurdles that widespread adoption will face. These technologies have the potential to change the research landscape in sensory science by supporting prospective advances in five key areas: consuming context, biometrics, food shape and texture, sensory marketing, and enhancing sensory perception, according to the findings. Although the emergence of augmented and virtual reality in sensory science brings new and exciting advancements, its use is still in its early stages, and future study will focus on how these technologies can be completely integrated with food and human reactions. Food and beverage sensory testing has been done for as long as people have been evaluating product quality. However, the invention of the electronic tongue (etongue) as a biomimetic was driven by obstacles connected with sensory testing, such as participant involvement and resource limits. It examines the usage of the etongue in sensory science and highlights recent advances in etongue research. The use of the etongue as a functional counterpart to sensory testing is discussed in terms of human taste perception over sensor perception. Sensory quality has traditionally been overlooked in fruit and vegetable breeding initiatives, which have focused on creating high-yielding, disease-resistant varieties. In recent years, the industry has shifted away from commodity-based products and toward more value-added and branded products. New cultivar introductions are increasingly requiring good sensory qualities to be competitive, leading in the integration of sensory and consumer research into many fruit and vegetable breeding initiatives. When evaluating produce, high natural variability, maturity, freshness, and postharvest management issues must all be taken into account. Increased interest in addressing customer needs to avoid food waste by marketing defective product has resulted from a greater focus on value-added marketing. This is just one example of novel sensory

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and consumer science prospects in the produce industry, a field of study that is likely to develop in the future years. Due to accessibility concerns, learners who are blind may have diminished learning effectiveness, motivation, and engagement in science-related courses. To build an accessible biology learning experience for fully blind students by integrating the multi-sensory scaffolding gamification teaching approach with mobile technologies and card games. The auditory sense is used by mobile technology to offer cognitive scaffolding. Furthermore, the card games highlight the collaborative process of learners, resulting in more in-depth peer interaction.