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Shoppers with impaired vision
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STAND 1L28

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We offer equipment for the production of:

P28 Plant based nutrition for senior citizens
Wageningen University researchers examine plant-based protein foods diets for the elderly.

P33 Metal contamination Part 2 (Part 1 in Baking Europe Autumn 2019)
Avoid a potentially damaging crisis by consulting the check list containing six ways to reduce the risk of a metal contamination food recall.

P38 Allergen risks in bakery manufacture
Allergen incidents are increasing – time to reduce the risks. From system design to cleaning, Baking Europe looks at how to spot risk areas and employ best practice.

P42 AI in bakeries
The robotics industry continues to be taken up by large bakery businesses. Intelligent dough mixing using complex algorithms is the latest innovation. Check out this joint project between industry and Campden BRI.

P46 NEW starting this issue
INDUSTRY RESEARCH
We go into the labs and research departments of manufacturers and reveal some of their developments.

We launch off by showcasing a revolutionary development – light, fluffy gluten-free bread! Has this holy grail finally been discovered?

P50 Plastic packaging waste
The subject needs no introduction. Make sure you are up to date with all the latest info.

INNOVATION PROFILES

P26 Mettler Toledo
Is your metal detection system in working order, installed correctly and working at its optimum sensitivity? If not, contaminants could get through.
Mettler Toledo describes their innovative technology.
GLOBAL BAKERY
PRE-PACKED BAKERY X40 SURVEYS | FRESH BAKERY X40 SURVEYS
RELEASED Q4 2019

SEVEN KEY AREAS:
1. SUSTAINABILITY
2. PLANT-BASED REVOLUTION
3. WAR ON SUGAR
4. RAW AND PURE
5. LABELLING ANALYSIS
6. INGREDIENT OPPORTUNITIES
7. TRUST & TRANSPARENCY

FMCG GURUS
Consumer Experts, Insight Driven
Welcome to the Winter 2019 issue of Baking Europe!

If food protein was a celebrity it would by now probably have its own private mansion a fleet of fast cars and its own chat show having risen from the back-street slums to fame and fortune in just a few years. Everyone seems to be talking about it from scientists, consumers and even publishers in magazines on Baking!

Is this yet another fad? As usual the jury appears to be out – possibly snacking on a protein enriched muesli bar (See our article on page 18) or sandwich during their discussion. From where that protein originates is now vitally important to consumers; animal or vegetable. The latter, of sudden it seems, is the preferred option. Whichever may be better for our health, our daily bread perhaps or planet earth, there has been an explosion of research on the applications of plant-based proteins for food items. Senior citizens (those over 65 years), it has been proven, need a higher degree of protein in their diet. Wageningen University have been in the labs again running experiments on protein and the results are causing much debate. This takes the form of our major feature in this issue.

Another major issue that does not want to go away (except that of plastic packaging and recycling – page 50) is that of allergens and contaminants. In fact, we had so many requests from you that we had to oblige – we listened and as a result on we feature a checklist to keep metal contamination to its minimum, (page 33) and a special report on allergen prevention.

Elsewhere we cover, sustainability, the life-cycle of your machinery and more on artificial intelligence.

Lastly, but by no means least, we spared a thought and more, for those vitally important shoppers who are either blind or who have impaired vision so we have an exciting feature on a futuristic piece of technology as well as a more traditional aid to the blind: Braille.

P.S. Don’t forget to check out our new regular section Industry Research where we feature white papers and scientific advancements from the manufacturers of machinery, ingredients and baked goods.

Graham Pendred
Publisher
Seeing is believing

By Cherie Winner, Ph.D.

How easy was your shopping trip today? The blind and visually impaired struggle to carry out this most basic essential activity without assistance. However, new technological aids may be soon available following the start of a recent exciting project entitled: The Visual Cortex on Silicon.

You’re in the mood for pasta, so on the way home from work you stop at the grocery store and pick up rotini, shaved Parmesan, and the organic tomato sauce you favour. You go into the store and you’re out within 15 minutes. Simple, right?

For those of us who can see, it is. For those of us who are visually impaired, a simple trip to the grocery store can be a major chore.

“You always have to find someone at the store to help you,” says Michelle McManus, an IT consultant with minimal vision. “Then you have to explain exactly what you want” and hope the person helping you is diligent about getting it right.

Researchers at eight U.S. universities have teamed up for “Visual Cortex on Silicon,” a massive endeavour aimed at creating machines that can interpret a complex visual scene much as the human brain does. They’re making machines that could soon help visually-impaired people shop independently.

Led by computer scientist Vijay Narayanan at Penn State, they aim to create a digital, silicon-based electronic system that performs like the human visual cortex, the part of our brain that processes and interprets visual information. As you might guess from one look at a fully-stocked grocery shelf, one of their biggest challenges is to create a system that will know what to pay attention to.

Electronic image systems can already pinpoint faces and chunks of text in a scene, unless the scene is too cluttered. Then the systems get confused. What any such system needs is the ability to direct its attention to significant objects amid a hotchpotch of irrelevant items, as the human visual system does.

WHAT ABOUT BARCODES?

Any such system will have to be able to identify, in very specific terms, those objects the user deems important. When the task at hand is grocery shopping, an obvious way to do that is to use barcodes. The technology for reading them is already well-established and shopper-assistance devices using it are already being tried.

But that approach is far from perfect. Michelle McManus has
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“A visually-impaired shopper carrying a scanner would have to take an item from the shelf and keep turning it around until the scanner finds and reads the barcode.”

Little good to say about barcode-based recognition. The scanners work, she says, “but you have to find the barcode!” Probably every shopper has had the experience of waiting while a cashier struggles to find the barcode on a package so the scanner can read it. A visually-impaired shopper carrying a scanner would have to take an item from the shelf and keep turning it around until the scanner finds and reads the barcode.

“If the box you show it is not the right thing, you have to try another and keep trying until you get the right one,” says McManus. Multiply the frustration of that process by however many items you’re shopping for, and a simple trip to the store becomes a maddening ordeal.

In her view, a better solution is what the team is working on; a device that can actually read the labels using recognition skills such as interpreting text and identifying logos and images.
So far, the group has taught the system to recognise hundreds of grocery items and it recognises them very precisely. Precision is necessary if the system is to be useful, says Narayanan; most shoppers have strong preferences as to brand and variety.

“If it just says ‘cereal’ or ‘dairy,’ it’s not going to help anyone,” he says. “If you want tomato sauce, we need to know if it’s Prego tomato sauce. Is it organic Prego tomato sauce? That’s the fine level of detail we need and that’s part of the challenge we face.”

Narayanan says that eventually the system will be so good at recognising products that shoppers will be able to fine-tune the degree of match between an object it sees on the shelf and an object in the system’s memory. With a low degree of match, it might consider Corn Flakes and Sugar Frosted Flakes similar enough to be the same; with greater stringency, the system would not make that mistake, or it might offer them as a potential match the shopper might want to consider.

**INPUT FROM PROSPECTIVE USERS**
Devising a system that can recognise a useful number of objects within a cluttered visual field is only half the problem. The other half is making sure the system actually helps the people it is meant to help.

For computer scientist Jack Carroll, co-leader of the shopper assistance project, also at Penn State, that means asking prospective users about their experience of shopping and taking their answers seriously.

“We’re studying shopping with visually-impaired people: how they organise the task and how they think about it,” he says. “What’s difficult about it, what’s rewarding about it, what’s meaningful about it? Because what you don’t want to do in supporting an activity technologically is make it less rewarding, less meaningful, or more challenging.”

He and his research group have been working with McManus and other members of the local chapter of the National Federation of the Blind (USA) and with visually-impaired high-school students who visited campus for a three-week crash course on independent living. They learned that shopping is a key activity for visually-impaired people.

“It’s a kind of validation that they are like us and that they can go into the stores, which are built for us, not for them and they can cope,” says Carroll. More than that, they enjoy it. “Even the visually-impaired kids we talked to said that shopping was right at the top of their list of things they like to do and value being able to do.”

**GETTING THE RIGHT ITEMS IN THE SHOPPER’S HAND**
The visually-impaired students helped them answer the basic question: What’s the best way for a machine system to guide a visually impaired person toward items the shopper might want?

The human visual cortex has two general modes of attention, says Narayanan. In “bottom-up” mode, we browse without looking for a particular item, until something catches our eye in some way. In “top-down” mode, we’re looking for a specific item and our eyes are drawn to qualities (size, colour, shape etc.) that we know resemble that item.

To find out which mode would be most helpful in their device, Carroll’s lab group had the students wear a chest-mounted
iPad that would transmit images of grocery items on shelves to a nearby control room, where a researcher would then give the student verbal instructions on how to find the items he or she wanted.

“We looked at whether it’s more desirable to give shoppers more directive feedback with respect to what the items were, where the items were located and where they should be directing their attention, or whether it would be good to give them more open-ended feedback,” says Carroll. “There was a clear preference for the browsing dialogue.”

He says the shopper-assist system could eventually do both, giving the shopper general information about what it ‘sees’ while browsing and then, at the shopper’s request, providing guidance to pick up a wanted item.

Verbal feedback is a good way to go in browsing mode, but for selecting specific products it seems clunky: “Move your hand two inches to the right and six inches forward.” So, the team developed a more subtle, elegant and private form of direction: a haptic, or touch-based, glove with a small webcam attached at the base of the palm. When the hand reaches out, the “eye” sees what’s in front of the hand and guides the user toward the chosen item by vibrating at different strengths and in different positions on the hand. The glove also tracks the hand’s movement to provide better feedback.

So far, people who have tried the glove have learned quickly; “within five minutes,” said one, to respond smoothly and accurately to the vibrations.

NEXT STEPS
The team’s first thought about how the device could be made available to the people it’s designed to help was that businesses would buy a few of the gloves for their visually-impaired customers to use, just as many stores now have motorised scooter-carts for their customers who have trouble walking. They could keep the devices updated with sale prices and locations of items.

However, even though they liked the glove, many of the test shoppers said they would prefer to have a device of their own to help with their shopping. At the same time, they don’t want to have to buy and carry around a separate accessory just for shopping. That drove the researchers to begin developing an iPhone app that will help visually-impaired shoppers navigate a store and find desired items. Work is ongoing to enable it to guide the user with sound and haptic feedback. The app could also be adapted for use with a body camera so the shopper
“The team developed a more subtle, elegant and private form of direction: a haptic, or touch-based, glove with a small webcam attached at the base of the palm.”

would have both hands free to carry groceries or push a trolley.

The glove has a much richer interface than the phone model, since it provides vibrations at specific points on the fingers and palm and is more organically linked to the person’s movement.

The team is studying whether vibrations in a phone can be as effective as the glove. The goal, says Narayanan, is a device with the functional dexterity of the glove but the ubiquity and ease of access of the phone.

FOR MORE INFORMATION

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PUBLISHER’S COMMENT

A recent observation in my local supermarket during my weekly shop, revealed the size of the problem experience by visually impaired shoppers. Picking one product up after another and peering at their labels intensely with a combined look of confusion and frustration, such a shopper was having enormous difficulty in identifying the product he required. Fortunately, before I could venture to offer guidance, a supermarket assistant was on hand to help.

Whilst the ongoing project described above offers a truly revolutionary solution to blind or partially sighted persons that could transform their shopping experience, the burning question of whether the system will work in all grocery stores or supermarkets is how many such outlets even have WiFi? Many retail outlets, indeed, require a sign-in, adding to the shopper’s frustration and then still may need to sign up for a paid subscription.

I put this question of WiFi availability to the writer for Research/Penn State magazine Cherie Winner who in turn asked project leader Vijay Narayanan also at Penn State University PA USA. “Our current full system uses a WiFi connection to back-end processing” says Narayanan. “We are working on a system that works with no external connectivity. Some aspects already work with no connectivity”.

On a positive note, and whilst still in its experimental stage, innovative projects like this demonstrate creative, lateral thinking and should be championed and Baking Europe very much looks forward to covering the project as it progresses and overcomes more inevitable challenges.

Baking Europe is about innovation – our question to all innovators is as many know:

“If you are you thinking outside the box then great. But what on earth made you get in there the first place?”

Graham Pendred, publisher
PHARMACEUTICAL LABELLING
For sighted persons and those with low vision, text in braille very seldom pops up in their everyday activities and lives. They see and use printed information in ordinary or enlarged fonts. However, following an EU directive of 2004, it became mandatory to label all medicinal packages and containers with braille. This included the name of the product and basic indications such as the strength of active substances. This has led to Braille being featured on nearly all medicinal products.

This has had several positive implications. Firstly, those who are able to use or read braille can now make distinctions between various medicinal products without having to ask for help and without inventing various ways to remember what each package contains, such as rubber bands, clips or pieces of tape to make tactile distinctions.

Secondly, it has led to increased security, safety and independence. A braille user can now identify the desired product on their own.

Thirdly, it is one way to prove how great and useful braille marking is. The idea that where there is braille there is an obvious reason to use it, becomes clear. The more braille that is present, the more reasons there are to get to know and use it to enhance independence, which in turn leads to a sense of satisfaction. The medicinal and packaging industry did not initially consider the EU requirements about braille as a way of becoming braille crusaders, but over time, they have become increasingly aware of the independence and security issues that drove the fundamental reasons behind the directive’s provisions.

WHO IS CONCERNED?
It is worth considering that an estimated 1 in 30 Europeans have a visual impairment, taking the varying definitions of blindness into account. With assessments rather than hard statistics available, there are approximately 30 million blind or partially sighted Europeans of which one eighth or 3.75 million are blind, meaning that these people have a visual deficiency implying that sight for reading is excluded.

Today, the picture of how this group acquires information is very different from the situation 20 years’ ago. Internet, audio media, information recorded on tapes, disc and other digitised media adapted to the so-called DAISY format, is preferred by many blind persons who have become blind later in life. The prevalence of blind computer users that are able to access...
LABELLING

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However, this way of storing and offering information to the blind requires technology and is not readily accessible. This information is also not directly attached to the product it is meant to describe. This is different for braille, which, when written or produced, is right there at one’s fingertips and is directly associated with the product.

The ability to read braille by sense of touch and transfer the information through the fingers to create understanding, recollection or simple factual recognition, requires the braille to be fully legible, that the user/reader knows the braille characters and that the tactile sense of the blind user is intact so they are able to sense what is written on the product.

“Could a good and even a “poor” braille user read the braille signs and feel comfortable that what they sensed was correct?”
BRAILLE – A BRIEF HISTORY AND LINGUISTIC DIFFERENCES

Braille itself, which was developed to its full extent in 1825 by a young Frenchman Louis Braille, consists of a base set-up of 2 dots positioned horizontally and 3 vertically. This gives a total of 2 x 3 namely 6 dots which from a simple calculation gives 26 (2 to the power of 6) dot combinations; 64 in all. As one of the 64 combinations is represented entirely by zeros or no dots, this is considered as a space rather than a real braille character.

Across Europe, the variety of representations within the literary braille system of the percentage sign, how to write micro in microgram, the slash etc. is vast and national braille authorities are generally very protective of their countries’ braille tables.

Another aspect or peculiarity is to be found when writing numbers. Most countries around the World and in Europe use the number sign (dot 3456) to indicate that the braille signs to follow, the letters ‘a’ through ‘j’, should be interpreted as digits 1 through 0. As for the Francophone countries, however, and with French legislation underpinning this, it has been decided to apply a particular and very different number system when writing literary braille: Dot 6 followed by the first letters in the alphabet with a dot 6 added, zero being a very special case. So, a French digit 1, dot 6 followed by dots 16, would be the same braille sign as the Scandinavian braille symbol for a ring. In the UK and Denmark, digit 1 would be written as dots 3456 followed by dot 1, a. This French system is called Antoine and as peculiar as it might seem, it is bound to cause headaches amongst many producers that prefer a universal system.

CONCLUSION

To conclude, let us provide an analogy to the experience blind people have when confronted with poor, low quality, faint braille. Imagine yourself using spectacles and settling on the sofa with a long-expected letter. You have poured an appropriate drink to accompany the reading. Sitting down you tear open the envelope to indulge the contents, and then you experience this irritating phenomenon that your glasses are sticky, covered with some milky substance that makes your vision unclear. You keep on wiping and drying your spectacles, but you can barely sense the meaning and only decipher a few words. You get angry and end up spilling your drink.

Of course, the comparison is not fully valid, however, the point demonstrates the frustration blind people encounter when being confronted with faint braille due to insufficient dot height.

From the launch of the directive and until a technical standard was agreed upon, several years passed with regular meetings between standardisation bodies, EBU and representatives from the pharmaceutical and packaging industries. It was an interesting and educative process, where those from the blindness movement became aware of many technical issues that had never been considered, including the aspects of harmonisation of useful braille signs. During the process there arose a need to determine standards on minimum height of the braille dots, both from a readability and a safety perspective: Could a good and even a "poor" braille user read the braille signs and feel comfortable that what they sensed was correct? How low could the dots be without losing a sense of security? What was the margin of error for faulty...
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