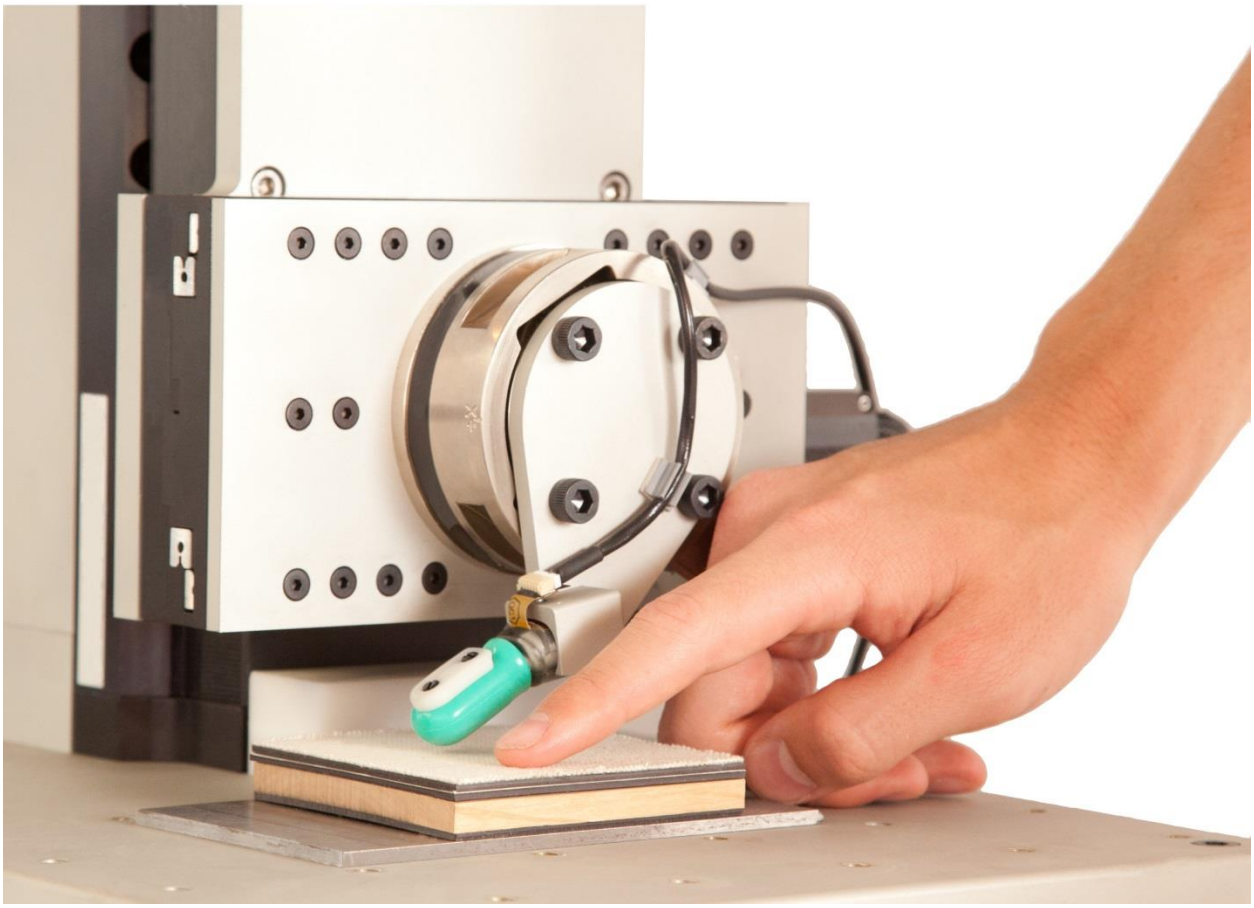

The look and feel of consumer products

By: Gerald E. Loeb

Posted: Aug. 27, 2013

Industrial designers know that consumer decisions are often based on sensory impressions – the so-called “look and feel” of the product. They spend a lot of money on focus groups to get their reactions to prototype designs and on quality control inspectors to make sure that the manufacturing process delivers the desired goods.

What is the basis for these opinions? I have the same reaction when I hear “rich-feeling texture” as when a wine-taster says “hint of cloves and cinnamon”. Is that all there is between accepting or rejecting a new design or a container-load of newly manufactured goods?

The problem is that human judgment is frustratingly subjective, personal and capricious. Obviously there are some common threads to human perception or there would never be blockbuster products. But can we really build billion dollar companies on the hope that we happen to have hired the next Steve Jobs to make design decisions?

Neuroscientists have unravelled much of the perception of light, sound, motion and taste. Such information enabled the first color television to be encoded in analog transmission bands that were apparently too narrow to send the necessary data. It underlies the digital compression schemes for transmitting audio and video files over the internet. It enables flight simulators and amusement park rides that trick the occupant into believing that they are soaring at high speeds through vast stretches even as they move less than three meters. It is used to develop prepared foods that are cost-effective and desirable (sometimes addictive).

Unfortunately, we know much less about the sense of touch. We don't understand how tactile signals are acquired, how they are encoded or how they are decoded in the nervous system to generate haptic perception. This is the frontier, full of obvious challenges and hidden opportunities.

Our strategy is to understand the sense of touch by embodying our hypotheses about biological functions such as object recognition and dexterous manipulation into machines – computers and robots. If those machines exhibit the same capabilities (and failings) as humans, this is at least suggestive that we are on the right track. As it happens, building such biomimetic machines for haptic functions such as object recognition and dexterous manipulation may now be easier than the biological experiments required to study those functions. Very few animal species are dexterous like humans and dexterous behaviors are particularly difficult to train and to study in any detail.

Even if we don't discover the true means by which these tasks are actually performed by biological systems, we shall have invented some rather useful machines for identifying and handling objects – a rather useful consolation prize.

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Image: A specialized robot that makes humanlike stroking movements with a biomimetic tactile sensor (blue BioTac®) in order to characterize and identify textures based on previous experience (provided courtesy of Jeremy Fishel, Director of Research, SynTouch LLC).