Shopping Experience by Emotion Tracking Technology

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***Abstract*—**This article is about analyzing the shopping experience of the customer by their facial expressions. In the day today scenario retailers find it hard to get the real experience of the customers during their shopping. This new technology helps the retailers the experience of the users gained from their shopping and make the transformation in their shops in order to make the customers happy. There are many factors that can determine whether a particular product attracts shoppers' attention, such as the shape and color of the packaging, location on the shelf, price, and brand. We have used eye-tracking glasses and Emotive EEG to record participants gaze and emotions during the process of shopping. The usage of EEG enabled us to analyze basic emotions, i.e. to find factors that were frustrating for participants and could be improved in real life shops.

INTRODUCTION

We can explain the shopping process clearly by the following quote: "The odds of going to the store for a loaf of bread and coming out with only a loaf of bread are three billion to one."

Shopping brings happiness to all. That too in today's scenario people fond of shopping is found to be higher than earlier days. A retailer's business is based only on the customer's happiness. Thus retailers must think forward to make the customer's shopping a healthy one with a joyful mood. Only a few customers express their feedback of shopping orally. Others judge the shop's shopping experience and decide to quit from there rather than buying something. Considering this situation, every retailer must look on to the needs of all his customers visiting the shop. Consumption is an important factor in society, producers do anything they can to convince a customer to buy their product. Even during groceries shopping, there are many factors that affect customer decision, besides the price, such as the location on the shelf, package color, size, illustrations, brand name etc. This study presents how in-store factors influence visual attention of customers. However, to get a better perspective on customers' visual attention a device called eye tracker can be used. Eye tracking is a method which allows recording where exactly a person is looking[2]. It is performed typically by using a device equipped with an infrared camera that identifies the center of the pupil and the corneal reflection and measures the vector between them. The device enables to pinpoint the location of person gaze and record it. Eye tracking is mostly used in user interfaces evaluation of interactive systems. However, there are also other applications, for example, evaluation of graphical designs. Furthermore, the introduction of an eye tracker, built as glasses that participants can wear on their heads and move around, enabled to perform such studies outside of a laboratory, also in shops.

A. Abbreviations and Acronyms

Electroencephalography(EEG) fig.1 is an electrophysiological monitoring method which is used to record the electrical activity of the brain. Everyday vision is an effective process that involves making several saccades per second. In contrast, most EEG data is recorded during outstretched visual fixation. An alternative approach to signal analysis is to time-lock the EEG not to passive stimulus presentations, but to the on- or offsets of saccadic eye movements in more natural viewing situations. However, recording realistic eye movements together with the EEG is also useful for many other purposes. These include controlling fixation, measuring saccadic reaction times, and so on[2].

Fig. 1 ***the Encephalography glasses***

Eye tracking is the process of measuring either the point of stare (where one is looking) or the motion of an eye relative to the head. An eye tracker is a stratagem for measuring eye positions and eye movement[2]. Eye trackers are used in research on the visual system, in psychology, marketing, as an input device for human-computer interaction[1], and in product design. There are a number of techniques for measuring eye movement.

B. *Existing technology*

In the present, as the smartphones are ruling the world, the customers shopping experience is got by popping up a cookie to rate their shopping during their payment[4]. With their rating, a producer or a retailer will be able to know their experience in shopping[4]. But they will not be able to identify the exact reason behind it. Without knowing the reason, they will not be able to transform anything in the shop which makes them lose a valuable customer. Some more work has to be taken by the producers to make them meet their satisfaction during the shopping.

C. New technology

Emotion tracking of customers can help retailers across the Globe feed their customers with a great degree of exclusivity and personalization. By properly interpreting their facial reactions and monitoring the wearable readings, retailers can make the necessary real-time adaptations within the store in order to attend to their needs in the best possible way. Let's analyze a few instances. The emotional data of customers can help retailers unravel whether they are entering the store stressed, happy, sad, etc. The retailers can also understand what objects or entities in the store bring about a changed measure in mood among the customers. The upgrading speed of technology innovation are catapulting the retail industry forward into an exciting new future. The retail sector is that it syndicates four areas: business, psychology, human behavior and of course the technology.

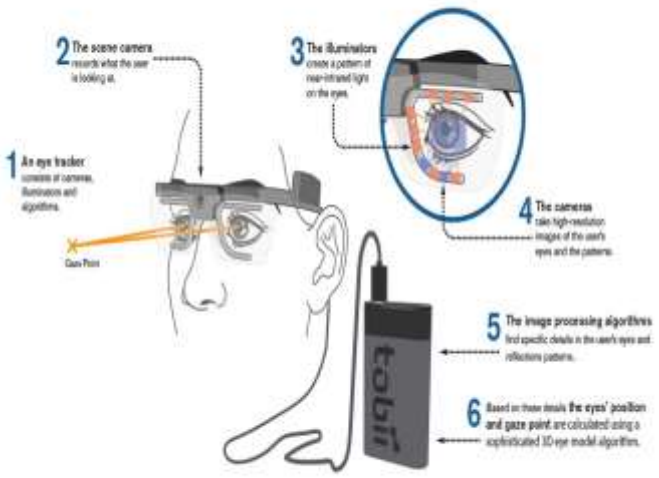

Fig 2. The above image indicates the process of the eye tracking that is been performed using an Electroencephalography.

According to statistics, in next months the emotion-tracking meets retail, the emotion captures on your facial expressions, the face's emotions can turn that data into actionable items for a retailer.

Eye tracking reveals the following:
• which visual elements attract instant attention
• which visual elements attract above-average attention
• if some visual elements are being disregarded or overlooked
• in which sequence the visual elements are noticed
• how the visual material analogize to other material

Eye trackers available on the market utilize near-infrared technology along with a high-resolution camera to track the movement of the eyes. The underlying concept, commonly referred to as pupil center corneal reflection (PCCR), is rather straightforward. Near-infrared light is directed towards the center of the eyes (pupil), causing apparent reflections in the cornea (outer-most optical element of the eye). These reflections are tracked by a camera. The camera's generally used are infrared cameras. The process is as follows:

i. An eye tracker consists of cameras, illuminations, and algorithms.
ii. The scene camera records what the user is looking at.
iii. Illuminators create a pattern of near-infrared light on the eyes.
iv. the camera's take high-resolution images of the user's eyes and the patterns.
v. The image processing algorithm finds specific details in the user's eyes and reflection patterns.
vi. Based on these details, the eyes position and gaze point are calculated using a sophisticated 3-D eye model algorithm.

Consider for instance if the customer goes to the coffee section and the reaction suggests unhappiness, it might mean that the product he is looking for is unavailable. An attendant can then be quickly sent to suggest him with the list of options. Similarly, if the retailer can deduce the factors that make the customer happy, then the merchandising of the store and product placements can be done in a particular way that is in accordance with the needs of respective customers.

Using the latest innovations as AI technology, machine learning, cognitive services, mixed reality, you can put your customers at the center of your business.AI is a field of study and a mixed bag of different technology, and in the future of Shopping is going to look a lot more well-grounded and a game changer it will be the cognitive services[3]. Some cognitive computing capabilities as the computer vision and the face recognition are able to trace emotions and engagement of your customer[1]. In the future, AI systems can be trained in such a way they analyze and

understand the emotions of the customer shopping and generate a report to the customer based on learning. Thus reduces the workload of the producer to monitor themselves rather the system generates the report and corresponding actions are carried out.

We could use the Emotion API to take a facial expression in an image as an input, and returns the confidence across a set of emotions for each face in the image. The emotions detected are outrage, contempt, aversion, fear, happiness, neutral, sadness, and surprise. These emotions are inferred to be cross-culturally and universally communicated with particular facial expressions. The next industrial revolution will be powered by artificial intelligence, cognitive services, cloud computing, robotics, and the retails and visual merchandising will modify deeply. The power of AI in retail comes in the ability to apply this intelligent technology throughout the customer's shopping journey and your organization, helping tap into even greater potential and transform what's possible[3]. The future of shopping is going to look a more well founded in the near future. Thus, this technology benefits the producer to retaintheir customers of the shop and also the customer would have a peaceful experience during their shopping.

D. ***Future implementation***

Further AI algorithms can be implemented in order to recognize the expressions much quicker and the system can recommend products preferences to the customers based on their previous shopping history to improvise their personalization in shopping.

E. ***References***

[1]. Human System Interactions (HSI), 2016 9th International Conference - PiotrChynał,Wroclaw University of Science and Technology, Poland.JanuszSobecki,Wroclaw University of Science and Technology, Poland.MichałRymarz, Wroclaw University of Science and Technology, Poland.

[2].http://ieeexplore.ieee.org/document/7529674

[3].https://spectrum.ieee.org/automaton/robotics/artificial-intelligence/study-shows-that-humans-attribute-morals-and-emotions-to-robots

[4].http://ieeexplore.ieee.org/abstract/document/6681530/