"Multicultural/Cross-Cultural Emotional Design:" The Usage of Pictographs to Design Emotional Interactive Environments

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Abstract. With the advancement of technology and communication, globalization is realized progressively as geographical barriers break. The idea of visual communication systems started developing under the cross-culture interaction and communication umbrella. The development of such a visual language serves as a universal form of communication bridging linguistic and cultural gaps. The proposed visual communication system cannot be considered a language, but rather a supplement to languages to create better and faster understanding. In this research, we ask two questions; 1. Would the existence of a universal visual language bridge cultural gaps? And 2. we study the effect of having a visual language on the emotional experience of the user, so we ask if the usage of pictographs as a universal language would make the experience of people a more emotional one? In this paper, we propose an augmented reality application that translates natural languages to pictographic symbols.

Keywords: multiculturalism, cross-culture, universal language, visual communication system, pictograph, emotional design, interactive environment.

1 Introduction

With the advancement of technology and communication, we start hearing more frequently of the term globalization. The term is realized more and more everyday as the geographical barriers gradually break. And as those distance limitations vanish, a pool of cultures come together giving rise to an astounding multicultural community. At that point, we are faced with the challenge of communication barriers.

This new reality consequently gave more room to scientists and researchers to think of further developments under the umbrella of cross-culture interaction and communication. Within those developments, we have recently witnessed the growth of the idea of visual communication systems "visual language".

Leibniz, a great mathematician, dreamt 300 years ago, that someday universal symbolism will be true; a simple system of pictorial symbols, readable without translation. It will contain simple symbolic logic and semantics. "Charlis K. Bliss"

Such a language would serve as a fully developed universal form of communication. Since language is the greatest barrier in a foreign country, thus, the existence of such a graphical language would bridge linguistic and cultural gaps. We can see that pictographic languages are functional to a certain mature degree within certain contexts as roads and airports. In this paper, we explore the idea of having such a visual language serving a multicultural society in certain domains.

In this research, we ask two questions; 1. Would the existence of a universal visual language bridge cultural gaps? And 2. we study the effect of having a visual language on the emotional experience of the user, so we ask if the usage of pictographs as a universal language would make the experience of people a more emotional one? Meaning; would their interaction experience in a foreign culture become?

Within our research we examined means of technological means that would best suit our research and convey the vital purpose of having a universal visual language.

In this paper, we propose an augmented reality (AR) application translating natural languages to pictographic symbols. By installing the application on a smart phone, together with the phone's camera, a person could get immediate translations to various graphical signs whether individual symbols or combinations of them.

There are two aspects within the idea introduced in this paper; one is investigating areas/domains that could accept more incorporation of pictographic language, which will thus facilitate more the integration into a multicultural global community. Second, and as a kickoff testing to the theory, is developing an augmented reality application that would serve as the person's translation tool in different contexts.

1.1   Organization of the Paper

We first give important definitions of significant terms to our topic; cultural identity, multiculturalism, where we investigate into elements of individualism for a better understanding of multicultural global communities. Then we clarify the meaning of pictographs, ideographs and logographs, which are the base of our introduced idea of a pictographic communication system. Afterwards, we give examples of previous attempts to create pictographic communication systems; some of which are Isotype, Blissymbolics, iConji, the Noun Project and most recent one Xu Bing's Book from the Ground. Then, we present two applications that triggered our interest namely; the Word Lens and the Project Glass. Those applications are good research grounds to start integrating a universal pictographic communication system into our lives. After that, we identify two domains that could benefit from the existence of a pictographic communication system; that is civil defense and dyslexic people. And finally, we conclude and talk about proposed future work to the research.

2   Related Work

2.1   Multiculturalism

Multiculturalism is an attractive notion that suggests a state of a broad collective experience of humans whose identities and loyalties transcend boundaries of nationalism and

are committed to a larger vision of the global community. A notion referred to by various terms such as international, intercultural, crosscultural, transcultural, multicultural…etc. Whatever the terminology used with varying degrees of explanatory or descriptive utility, the definitions and metaphors imply a state where individual cultural identities are inclusive of different patterns and multiple realities representing a larger body of individuals [Nawar, 2011].

2.2   Cultural Identity

Cultural identity, in a sense is a functioning aspect of individual personality, and a fundamental symbol of a person's existence. It is the symbol of one's essential experience of oneself, as it incorporates individual perception of the world, value system, attitudes, and beliefs of a group with which such elements are shared.

Amin Maalouf defines elements of identity; "*Each individual's identity is made up of a number of elements, and these are clearly not restricted to the particulars set down in official records. Of course, for the great majority these factors include allegiance to a religious tradition; to a nationality sometimes too; to a profession, an institution, or a particular social milieu. But the list is much longer than that; it is virtually unlimited. A person may feel a more or less a strong attachment to a province, a village, a neighborhood, a clan, a professional team or one connected with a sport, a group of friends, a union, a company, a parish, a community of people with the same Passion, the same sexual preferences, the same physical handicaps, or who have a deal with the same kind of pollution or other nuisance*." (Maalouf 2000)

Cultural identity is neither monolithic nor static; it is a shifting composite of a huge number of different, sometimes even conflicting, allegiances and attachments. It is built up and changes throughout a person's lifetime. The boundary of cultural identity plays a large part in determining one's ability to relate to other cultural systems. While balancing two imperatives: the desire to preserve one's original identity and the need to be able to communicate with the other at all time and as freely as possible.

Paul Tillich suggests; "*To live on the edge of one's thinking, one's culture, or one's ego, is to live with tension and movement. It is in truth not standing still, but rather a crossing and return, a repetition of return and crossing, back-and-forth--the aim of which is to create a third area beyond the bounded territories, an area where one can stand for a time without being enclosed in something tightly bounded*." (Tillich 1966)

No one is cultural background free. Yet, the conditions of contemporary history imply that we may be witnessing the emergence of a new kind of person, one who is socially and psychologically a product of the interweaving of cultures in the twentieth century. A person to be described in this paper as "The Multicultural Person".

A multicultural person's identity can be described as far from being frozen in a social character, and more fluid and mobile, more open to variation, and more flexible to change. He is usually committed to the essential similarities between people everywhere, while paradoxically maintaining an equally strong commitment to differences. In other words he is neither totally a part of nor totally apart from his culture; instead, he sort of lives on the boundary, or the verge of multiculturalism. Fulfilling the "moral code" suggested by Maalouf describing the "common civilization".

Around the planet the streams of the world's cultures merge together to form new currents of human interaction. By mingling and melding of human cultures, communication and cultural exchange are the preeminent conditions of the twentieth century.

Surrounded by information omitting devices -like computers and cell phones- most going far beyond their immediate use, providing access to broad networks, serving as gateways and interpreters for worldwide interaction and universal dialogue.

Ironically accompanying the growth of human communication technology was the erosion of barriers that culturally separate people. Unlike previous barriers throughout history -geographically, tribal, racial…etc.- linguistic barriers form contemporary primer challenge for cultural exchange.

Hypothesis of this research suggest that a visual communication system can be universally accepted, based on shared human experience and common involvement with today's culture. As modern communication and informatory systems have led the way to visual integration of different individuals from diverse cultural background, that share the same semantic decoding and comprehension of worldwide used symbols and signs.

2.3   Emotional Design

Designing for usability has for long been the aim of many designers of all domains. However, the expectations of users are not satisfied anymore with only a functional product or a usable one. People now go for designs that make them feel happy. And that is the effect of designing emotionally. Emotional design tries to integrate emotions into a product, resulting in a human connection between the user and the product. Donald A. Norman, the pioneer in the field of Emotional Design, refers to the important role of our memories in growing an attachment to a certain product. "*Because past experiences are no longer recoverable except through recollection, we value objects by the emotions they provide rather than their intrinsic worth*." (Donald A. Norman, 2009).

Similarly, Norman shows in his book "Emotional Design", the importance of emotions to humans in helping them understand the world and learn new things. Norman shows that if an object appeals to the user, an emotional bond is created to the object, imprinting a feeling of more effectiveness.

The field of Emotional Design triggered our interest, since it relates greatly with this research. This is because we wanted to find a solution to the emotional gap produced by natural languages based on alphabetic writing systems. This is because symbols or pictures are able to communicate certain emotions directly to the human that cannot be equally communicated through words. Thus, we believe that the idea of developing a visual communication system would somehow increase the emotional aspect within human interaction.

2.4   Pictographs, Ideographs, Logographs

There are different writing systems; namely; pictographic scripts (pictures that resemble what they signify), and ideographic scripts (pictures that represent ideas).

Pictographs, expression and communication by means of pictures and drawings having a communicative aim. These pictures and drawings (called pictographs) are usually considered to be a forerunner of true writing and are characterized by stereotyped execution and by omission of all details not necessary for the expression of the communication. (Pictographs that are drawn or painted on rocks are known as petrograms; those that are incised or carved on rocks are called petroglyphs.) A pictograph that stands for an individual idea or meaning may be called an ideogram; if a pictograph stands for an individual word, it is called a logogram. Pictographs are also used as memory aids.

2.5   Methods of Pictographic Communication Systems as a Universal Language

It is important to point out that this method of visual communication is not meant to be a substitution to any of the existing languages, but rather some kind of a supplement. Otto Neurath realized that it could never be a fully developed language, and therefore he called it a 'language-like technique' (Neurath [1936] 1998).
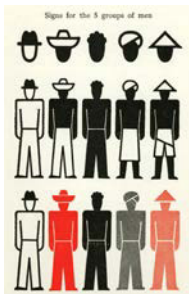

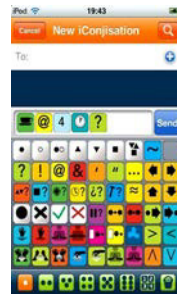**Fig. 1.** Some signs of the isotype project

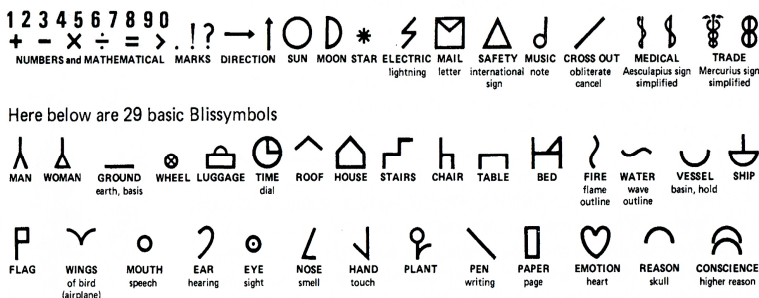**Fig. 2.** A collection of iConji symbols

Fig. 3. A collection of blissymbolics

One way of always enhancing the language is to make use of the new concept of "crowdsourcing". That is to seek the help of the crowd to not only improve the existing symbols within the language, but to enrich it as well with more symbols entirely created by the people. The advantage of using crowdsourcing is that we propose the task of developing and enriching the language to a wide pool of educational and cultural backgrounds, diverse knowledge, expertise, age and gender, as well as having a combination of amateurs and professionals. This means designers as well as people from other disciplines will contribute in the maturation of the language, making the project a multidisciplinary one.

Most writing systems were derived from ideographic languages, but recently we witnessed the flourishing of pictographic languages. Some of which are; the International System of Typographic Picture Education (Isotype) (Neurath [1936] 1998), Blissymbolics (Bliss 1965), iConji, a pictographic communication system (Staats 2010), Nobel Universal Graphical Language (Randic 2010) and The Noun Project (Boatman 2011). In the figures below, you can see some signs from each of the above-mentioned projects.

Fig. 4. A collection of the Noun Project Symbols

Fig. 5. A collection of Xu Bing's symbols from the Book of the Ground

Word Lens. For example, the augmented reality translating application 'Word lens' (Figure 6) translates printed words from one language to another with smartphone video camera, in real time. No network connection is needed. It is considered a 'transmitted reality/translated reality', defined as AR. Ronald Azuma offered a definition in 1997: "*AR is about augmenting the real-world environment with virtual information by improving people's senses and skills. AR mixes virtual characters with the actual world*" (Azuma 1997). Figure 6 shows the Word Lens application in use. A card written in

Fig. 6. Word Lens application in use

Spanish is subjected to a smart phone within which the word lens application is installed. The application recognizes the written text, recognizes the language, and

translates the text into another language as specified by the user. The word lens triggered our interest in this research and we propose a similar application to it. The difference between the two is that the word lens project gives real time translation from one natural language to another. Our application would rather give a real time translation from natural language to pictographic symbols.

2.6   Project Glass

Another interesting project is the Project Glass. The Project Glass is one of Google's products developed under the umbrella of augmented reality research. Google's project glass is a head-mounted display (HMD) able to provide different services to its bearer. The glass can recognize objects and places and accordingly display augmented information of different aspects to its owner. It is able to connect to the internet via voice commands, allows music, google maps, organizing calendar, video conferencing and many more. The glass makes it possible to share one's life moments in real time with others. With the huge variety of possible everyday assistance that the glass could offer, it marks a turn point in mankind's future.

The project is interesting to our research since we can add another service to this technological tool that can translate to and from the pictographic communication system. This will allow more integration of the application in our everyday life. As the user is on the move around the city, an by wearing the glasses he is able to get a direct translation from natural language to pictographic symbols and vice versa aiding him with the information he needs.
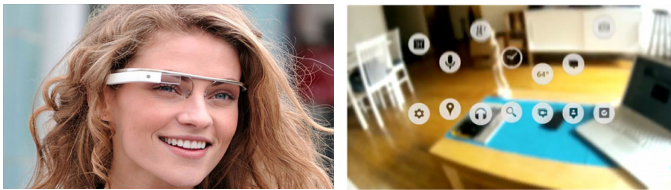

Fig. 7. Google's Project Glass

3   Domains

In this research, we propose a couple of domains for application, where the use of a visual communication language would prove to be far more efficient than the usual natural language.

3.1   Civil Defense

Civil Defense is the process of protecting the civilians from foreign attack, natural disasters as well as taking care of post-disaster recovery operations. Some civil defense agencies produce booklets to offer advice to people at times of a crisis or an

emergency. An example of the civil defense index booklet used in 1942 during World War 2 is show in the figure 8 below. It offers advice useful to civilians on the home-front. Information is given for air raids, blackouts, bombs, poison gas, as well as first aid situations. The domain of civil defense is very interesting to our research. In times of crisis or emergencies, and within the context of distributing similar handouts or booklets with lists of advice and precautions to civilians, visuals should serve us very well if compared to normal natural language. This is because visuals are a quick and a smooth way of communication allowing fast comprehension from civilians. It is a fact that during such difficult circumstances, time and easiness of communication become a necessity not a luxury. Figure 9 below shows some symbols used within the 2012 Civil Defense Syria (hemaya project)
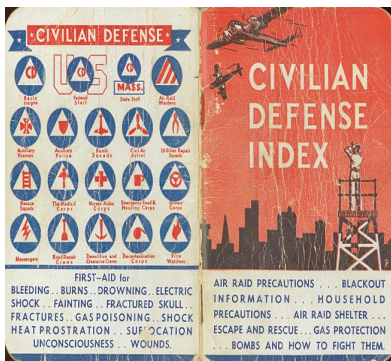

Fig. 8. 1942 Civil Defense Index booklet offers advice useful to civilians on the homefront

Fig.9. Some symbols used within the 2012 Civil Defense Syria (hemaya project)

3.2 Dyslexia

Another domain where such a visual communication system could be beneficial is with dyslexic people. The word dyslexia comes from two Greek words: dys, which means abnormal or impaired, and lexis, which refers to language or words. The World Federation of Neurology defines dyslexia as "a disorder manifested by difficulty in learning to read despite conventional instruction, adequate intelligence and sociocultural opportunity". If a person is diagnosed with dyslexia, this means that his brain's has a disability to translate "written" images received from the eyes (i.e. letters, words or sentences) into meaningful language. This kind of dyslexic people would thus have difficulty processing words but have a great gift with visuals. People with dyslexia develop this visual ability from early childhood. They are so good at visualizing that it becomes a natural process for them and they do it subconsciously as they grow up. In short, dyslexic people can think using pictures not words. It is done uncontrollably, but it helps them solve problems and look at things from different angles. It is a fact that pictures are used as one mean of overcoming dyslexia. Therefore, we think that having a universal visual language will also serve dyslexic people well. It shall ease their understanding and communication with other people.

3.3   Miscellaneous Domains

A universal graphical language would also serve well in touristic contexts. A tourist will go through a smoother experience if universally known graphical symbols exist all around the country he's visiting. The tourist will be able to understand signs, follow directions, know his way around, and integrate better in a foreign society. The proposed AR application could also serve the tourist well to provide him with real time translation of the pictographic symbols in case he's in need. Other target groups that could benefit from the graphical pictographic communication system are the elderly and children in contexts of newspapers or written books (like the how-to books). Both target groups would prefer images to text for a faster communication tool. In case of children, images represent a more exciting medium for them. In the same manner, the elderly –for reasons of weak eyesight- having a pictographic book or newspaper would make the eye more comfortable than when reading many lines of small-sized text.

4   Proposed Application

Fig. 10. Civilian defense index pictographic symbols USA 1942/Syria Hemaya civil defense project 2012

At this stage of the research, we propose an augmented reality application similar to the word lens that acts as a real time translational tool from natural language to pictographic symbols and vice versa. The tool could be integrated as an additional service in the Google project glass as explained earlier for a quicker accessibility of the needed translation. Since image recognition is not a mature research field as that of text recognition. So for this stage of the application we will have a one-way translation process only depending on text recognition, translating from natural language to pictographic symbols. This translation tool could fit for some of the above-mentioned domains like tourism or books, but wouldn't fit for example in the context of civil defense. The application is just an example to manifest the idea behind a universal graphical communication system. The potential behind is massive with many other technological tools than AR. In figure 10, you can see a sample of the pictographic symbols with pixelated style in the Art domain.

5   Conclusion and Future Work

It is under consideration that the proposition of a new communication system be yet another language, for it is not really a language at all. Rather it is a supplement to all

languages to help create better and faster understanding in specific areas. Symbols have already evolved to the point of universal acceptance in such areas as music and mathematics. The project is an effort to bring that concept up to a level of satisfaction. It would be bold to imply that standardized pictographically (visual) symbols will result in perfect intercommunication, the first faltering step in being convinced that it is vital for humans to be able to communicate on a universal scale.

Bearing in mind that every culture or system has its own internal coherence, integrity and logic, and that all cultural systems should be equally valid as variations on the human experience, a proposed multicultural communication system or language should seek those similarities, avoiding cultural differences and conflicts.

Thus, the experiment will examine technological possibilities through a method of finding solutions in voice recognition from verbal (including emotion) or gestural languages, it is a reasoning process in semantic search engines with the possibility of self-improving. Furthermore, translating/transmitting into a visual language with artificial intelligence and finding an interface for the interaction process.

Through experimentation in visual means of communication: a search for solutions that might solve the cultural integration problem visually. A visual-based language can lead to a more universal form of communication, or provide a more coherent approach, thus creating greater chances and facilitating easier integration for individuals in various domains.

Future work includes adding within the proposed augmented reality translation tool the functionality of translating from pictographic symbols to natural language.

Another important aspect we came across during our research is the aspect of time within a pictographic symbol. Motion in general as opposed to still life has the ability to reach the viewer on another plane of reality. And thus, has a stronger impact on the human side. Therefore, it is an interesting line of thought for possible integration of motion within the pictographs of our communication system.

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