

AEMACOS – Aesthetic Emotions in Artificial COgnitive Systems

Special track along with COGNITIVE 2018, February 18-22, 2018– Barcelona, Spain
The Ninth International Conference on Advanced Cognitive Technologies and Applications
<http://www.aria.org/conferences2018/COGNITIVE18.html>

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Abstract— Aesthetic Emotions caused by the perception of an artworks (music, painting, literature, architecture, etc.) represent the enigma, since they are quite individual and caused by (generally) no rational reasons. However, the individual concept of Chef-D’oeuvre, that is the effect of ‘goose bumps’, is sincere and objective since could be measured by skin sensors. But why certain artwork is perceived as ingenious work and cause ‘goose bumps’ for the majority of the given society? The analysis and modeling the Aesthetic Emotions is the subject of a special session on Aesthetic Emotions in Artificial Cognitive Systems included in the Advanced Cognitive Technologies and Applications (COGNITIVE 2018) conference held in Barcelona, Spain. Three papers presented are focused on possible mechanisms and regularities underlying the perception and creation of an artwork and its social appreciation.

Keywords-emotions; artificial cognition; space imagination, associations; architecture; Chef-D’oeuvre.

I. INTRODUCTION

Simulation of cognitive process nowadays implies inherently incorporation of rational reasoning and emotions [1]. Modeling the emotions in an artificial cognitive system represents one of the most interesting challenges. This problem was widely discussed at the special track EMACOS along with COGNITIVE 2017 [2]. It was shown that so far as “pragmatic” emotions (associated with achieving a certain goal) are concerned, the task is complex, but doable. Indeed, these emotions have clear rational reasons: approaching the goal causes positive emotions and vice-versa. But, is it possible to simulate the Aesthetic Emotions (AEs), i.e., some feelings arising from perception of the art, Natural phenomena (sunset, rainbow, waterfall, etc.)? The special track AEMACOS is devoted to discussion of this problems.

The main problem here is that AEs have no apparent reasons and are quite individual. While perception of Art does depend on the cultural context, education, profession, etc., on this background AEs still are quite individual. Moreover, AEs are individually sincere: the feeling of

‘goose bumps’ is real and familiar to everyone, but the motive that causes this effect is quite personal.

A special-related dilemma arises for art appreciation in terms of what is a Chef-D’oeuvre (ChD)? Why certain pieces of art are perceived as ingenious work and cause ‘goose bumps’ for the majority of the given society members (within a given cultural context/level, obviously)? Even we might observe a strong influence of fashion and mass media, other undisclosed features should exist. There should be something in each ChD that makes it really ingenious artwork, something that positions Mozart (genius) versus Salieri (solid professional work). Complexity of the problem and its individual characteristics make modeling and analyzing the social aspects of the ChD an interesting and challenging problem.

Another problem related to AE is connected with the fact that different areas of art (painting, music, architecture) physiologically affect different and quite certain sense organs, which act according to well-defined laws. So, infrasound and ultrasound in principle can not cause positive emotions, because they are either harmful, or not perceived by the human body. Also, it is known that the human eye is best able to distinguish shades in the green part of spectrum, etc. Therefore, there is a temptation to look for laws of the ChD creation by in analogy with to physical laws of the sound- and video- impact (see, e.g., [3]). However, this approach leaves open the question of the impact of literature, which is not associated with any sense organs, but is based on imagination and the ability to empathize. Thus, it seems more fruitful to look for certain specific features of the very cognitive process that generate AE [4][5][6].

All these problems are to be discussed at AEMACOS.

II. SUMMARY OF CONTRIBUTIONS

Three contributions presented at AEMACOS refer to revealing certain phenomena in a cognitive system which could produce AE

The first contribution [7] continues the researches [6] on the architecture of an individual artificial cognitive system able to reproduce the sense of humor, AE and the effect of

“goose bumps” produced by ChD. In the previous papers, it was supposed that the main mechanism of individual AE appearance is connected with multiple associations produced by an artwork. It was shown that the individual perception of ChD could be connected with so-called “paradox of recognition”. This effect arises when certain artwork seems familiar and unusual at the same time. This presentation is devoted to social aspects of forming the concept of ChD. It is shown that apart from obvious influence of propaganda and mass media, there could be “natural” (not forced and in some sense, paradoxical) mechanism that results in public appreciation of a ChD. In analogy with personal feeling of ChD, there should be association of people, which are not directly connected with professional art corporations, as well as with each others. This very association could provide relevant appraisal of certain artwork and reveal a real ChD. The work is in progress.

The second presentation [8] is devoted to AE produced by architectural ChD. It is interesting and original work. The author employs in some sense synthetic approach, combining cognitive principles and objective psychophysiological foundations for creation and perception of the spatial environment by humans. This paper is aimed to reveal the interrelation between psychophysiology and geometric semantics of architectural form. It is shown that this interrelation represents the basis for the spatial imagination and the corresponding dominant activity of the neural network. An interesting analogy is shown in the principles of constructing popular multi-level cognitive architectures and the hierarchy of properties of architectural compositions. An original list of necessary experiments on personal emotional reactions on architecture objects is proposed. Possible ways for improving architectural education are discussed.

In the third presentation [9], the role of indirect associations in creativity and imagination is discussed. It is shown that within the symbol-image cognitive architecture, the transformation and synthesis of new images could proceed via the tunnel (sub-barrier) transition between existing images. It is shown that proposed original characteristics of artificial neural networks (“degree of fusibility”) could help to reveal and analyze possible mechanisms of creativity in numerical experiments.

III. CONCLUSION

It is shown that the analysis and modeling AE and the perception of ChD (in particular, “goose bumps” effect), being seemingly not-scientific (rather humanitarian)

problem, actually helps to reveal possible hidden mechanisms of the human cognitive process. It concerns an individual cognitive system, as well as formation of public (social) opinion. Apart from purely scientific (academic) relevance, interested output could be applied (pragmatically) to improve people’s quality of life, architectural education, human emotion imitation by robots, and many other fields.

REFERENCES

- [1] A. Samsonovich, “Emotional biologically inspired cognitive architecture”, *Biologically Inspired Cognitive Architectures*, vol. 6, pp. 109–125, 2013.
- [2] COGNITIVE 2017, The Ninth International Conference on Advanced Cognitive Technologies and Applications, February 19–23, Athens, Greece.
<http://www.ijaria.org/conferences2017/COGNITIVE17.html>
- [3] M. Korsakova-Kreyn and W. J. Dowling, “Emotional Processing in Music: Study in Affective Responses to Tonal Modulation in Controlled Harmonic Progressions and Real Music”, *Psychomusicology: Music, Mind and Brain*, vol. 24(1), pp. 4–20, 2014.
- [4] D. Huron, *Sweet Anticipation: music and physiology of Expectation*. MIT Press, 2006.
- [5] J. Schmidhuber, “Simple algorithmic theory of subjective beauty: novelty, surprise, interestingness, attention, curiosity, creativity, science, music, jokes”. *Journal of Science*, vol. 48(1), pp. 21–32, 2009.
- [6] O. Chernavskaya and Ya. Rozhylo, “On the Possibility to Interpret Aesthetic Emotions and the Concept of Chef-D’oeuvre in an Artificial Cognitive System”, *Proceedings of the Ninth International Conference on Advanced Cognitive Technologies and Applications (COGNITIVE 2017) February 19–23, Athens, Greece*, pp. 24–31, 2017.
- [7] O. Chernavskaya and Ya. Rozhylo, “On the Social Aspects of Forming the Concept of “Chef-D’oeuvre”, *The Tens International Conference on Advanced Cognitive Technologies and Applications (COGNITIVE 2017) February 18–22, Barcelona, Spain*, <http://www.thinkmind.org/>
- [8] O. Chebereva, “Problems of the System Approach to the Study of Psychophysiology of Aesthetic Emotions Concerning an Architecture”, “”, *The Tens International Conference on Advanced Cognitive Technologies and Applications (COGNITIVE 2017) February 18–22, Barcelona, Spain*, <http://www.thinkmind.org/>
- [9] E. Kazimirova, “Image Transformation in a Cognitive System”, *The Tens International Conference on Advanced Cognitive Technologies and Applications (COGNITIVE 2017) February 18–22, Barcelona, Spain*, <http://www.thinkmind.org/>