Review
of the PhD dissertation entitled

„EEG analysis of naturalistic viewing: From connectivity analysis to reliable extraction of neural components”
submitted by

Iffah Syafiqah Suhaili

First and foremost, I would like to thank the Doctoral School of Information Science and Technology at Pannon University for the honor of being invited to serve as a reviewer for the dissertation of Iffah Syafiqah Suhaili, a full-time doctoral student. It was a pleasure to see that, following the successful in-house defense—in which I had already participated as a reviewer—the work had changed significantly. The doctoral candidate implemented the suggested changes, and in its current form, I received a more complete and, in many respects, more accurate thesis. Thank you for highlighting the changes; this made the process of reviewing the thesis a second time much simpler for me.

For the sake of documentation, I will repeat part of my previous review. At the same time, I will also make a few comments that may lead to the further continuation of scholarly dialogue.

I have read the submitted dissertation with interest and attention. Before elaborating on my opinion in greater detail, I would like to note that the work meets the requirements of the Doctoral School of Information Science and Technology at the University of Pannonia in terms of both form and content. It is a thorough and carefully compiled piece of work. The choice of topic is timely and up-to-date; the questions posed are mostly clear, and the data collection and processing carried out to answer them reflect a high degree of attention to detail.

Neuroaesthetics is an interdisciplinary field that uses neuroscience to explain and understand the aesthetic experience at a neurological level. It bridges the gap between art, psychology, and biology. Essentially, it seeks to answer the question: "What happens in our brains when we experience art or beauty?"

In her dissertation, Iffah Syafiqah Suhaili reports on her research findings, which are both interesting and promise to offer numerous perspectives. According to her approach neuroaesthetics seeks to answer the question of what measurable brain electric processes underlie subjective judgment. In that case, participants had to make decisions about figurative and abstract works of art on a binary scale, where the choice was between “like” and “dislike.” The images were displayed for 8 second on a computer screen, meaning participants had to form an opinion based on first impressions, while cortical electrical activity and eye movements were monitored using a 128-channel EEG.

The first set of questions focused on whether the brain regions activated during visual categorization can be described using traditionally employed EEG frequency bands, how they can be characterized, and how the transient functional connections form and dissipate. Furthermore, whether it is possible to distinguish between abstract and figurative works of art based on these findings.

The second part deals with the analysis of lambda waves (positive EEG potential changes that occur over the occipital cortex) triggered by the shift of a visual image across the retina following a saccade (a rapid eye movement). When the eye stops to focus on a point (fixation), the brain processes the new visual input, which generates the lambda wave during visual fixation when a person is scanning a structured image or reading.

The research questions are mostly clear. Measurements and data collection were conducted with due care. The processing algorithms are state-of-the-art and suitable for answering the questions posed.

The work was carried out in a research laboratory with a long tradition, where significant emphasis is placed on interdisciplinary approaches. This dissertation is a good example of this, as the thorough engineering and computer science work is aimed at uncovering and understanding important neurophysiological processes.

General characterization of the dissertation: a thesis reflecting thorough, careful work.

The two papers forming the basis of the dissertation were accepted for publication in highly prestigious international journals following a rigorous peer-review process. Experts in the field deemed them scientifically novel and meticulously executed. Thus, I myself accept the results published there as original observations.

The reviewer's task at this stage is to assess the formal and substantive coherence of the submitted dissertation. First and foremost, it must be stated that the PhD candidate has submitted a very carefully compiled work. It is evident that she has endeavored to thoroughly explore the theoretical background of the given issues and has also effectively conveyed the complexity of the signal processing problems.

The dissertation thus builds on these two works, yet, given its length, it interprets the research context in a much broader sense.

There is no doubt that a thesis focused on signal processing and signal analysis does not require an in-depth understanding of neuroanatomy. At the same time, a basic overview of the visual pathway (as provided) is absolutely necessary in order to present a relevant research hypothesis at all. This is also related to my first questions.

1. There are two parallel pathways in the visual system (magno- and parvocellular); one conducts the signal faster, while the other does so more slowly. At the same time, the slower pathway is responsible for revealing fine details. What considerations led to the choice of an 8-second observation window followed by a 4-second decision window? What is the minimum observation interval at which a decision is already made—that is, is it possible to classify the 8-second recordings in a specific way based on when the decision was made? What would a moving average show over a 1–7-second interval, for example, in the alpha band? In other words, can we infer from the dynamic changes in connectivity (which are clearly illustrated in the figures) when the decision will occur?

In addition:

2. In my previous comment, I asked whether the classic EEG frequency banding is suitable for analyzing this type of problem. I received a somewhat ambiguous answer. Now I'm

asking whether it’s possible to refine the frequency band that is clearly suitable for characterizing connectivity.

Of course, my questions and comments do not affect my fundamental conclusions. Iffah Syafiqah Suhaili has done careful, thorough work. Her observations are novel, and her conclusions are sound. In many respects, he also raises the need for further research.

I am, of course, happy to reiterate the positive comments I made during the in-house defense. This is a thorough, high-quality doctoral dissertation. It stems from an excellent research workshop. The findings are considered, yet infinitely vivid. I recommend that the dissertation be scheduled for a public defense, and I, for my part, wholeheartedly support the awarding of the doctoral degree.

Szeged, September 1, 2026.

Ferenc Bari PhD, DSc

professor emeritus