論 文 の 内 容 の 要 旨

論文題目　Neuroarchitecture: A Study on the Relationship Between Architecture and Neuroscience
（ニューロアーキテクチャー：建築学と脳科学の関係に関する研究）

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Neuroarchitecture portrays a new frontier in architecture that lies between the interrelation of neuroscience and architecture. This discipline aims to combine human experience in architecture on one hand and brain research on the other in order to accumulate factual knowledge on the impact of architectural design in the human brain. Efforts to understand the relationship between neuroscience and architecture, in particular from a neuroscientific point of view have provided a groundwork for further investigation. Several neuroscientists have given stimulating arguments on the relationship between these two disciplines. However, research in this area from an architectural point of view leaves much to be desired. The general aim of this research is to examine the relationship between architecture and neuroscience from an architectural point of view as well as to present the potential of interrelation between these two fields of study. The goal is to analyze the possibilities that architects could have in the use of

tools provided by the field of neuroscience - wearable devices - the interpretation of results, and the potential of implementing those results in the design processes.

The intention is not to provide scientific details from the field of neuroscience, but rather to analyze from an architectural point of view this given possibility. Therefore, this research will try to focus on architectural factors by trying to break down the complex system of environments so that we can understand more closely which factors tend to have the most notable impact on our brains. This will be achieved through the analysis of existing researches as well as from the original experiments designed for this research. Neuroscience is a complex field of study, and architects alone could have substantial obstacles in understanding or using it without the professional assistance of neuroscientists. However, through this study, we aim to investigate whether architects could independently achieve efficient use of neuroscientific devices as a means to set the stage for an evidence-based approach in design. This research will analyze effective strategies for increasing the potential of the use of neuroscientific tools, particularly non-invasive brain monitoring wearable devices, in assisting the process of architectural design. Therefore, this research's main question is: ***How can the use of neuroscientific tools aid the decision-making process in architectural design?*** To answer the main research question, we conducted theoretical research as well as designed original research through which we aim to verify the limits and possibilities that architects may have to achieve this goal. To complement this search, we will concurrently find answers so several subsidiary questions:

1. What is the past experience in the use of wearable neuroscientific devices in the field of architecture?
2. What is the most effective way to select, analyze, and evaluate architectural parameters?
3. What are the possibilities and limitations of the independent use of neuroscientific tools for architects?
4. Are algorithms of neuroscientific devices reliable in offer sufficient freedom and accuracy of use?

Consequently, this study introduces a new methodology of research that combines analysis of the built environment and measures of the brain's responses towards uncovering feelings and preferences of the living environments. With the latest technological advances, this study will focus on offerings from non-intrusive and wearable devices for the evaluation of psychological responses. These technological advances provide a wide variety of biometric research scenarios and paradigms for a more well-rounded view of human behavior. Due to the novelty of the topic regarding empirical evidence, this research will start by collecting initial information from the first test studies in order to achieve an understanding of the relationship between brain responses and subjective declarations.

In conclusion, neuroscience displays excellent potential to provide new applied science tools for 21st-century engineering. As a result, just as a joint effort of architects, mechanical engineers, electrical engineers, construction engineers, is needed to complete an architectural project, the need to introduce the contribution of neuroscientists in this process is equally important. This synergy would add to the understanding of human experience in the architectural environment.