Frequencies Is All We See:
Consciousness, Attention, and Frequency-Based Representations

Sefunmi Ashiru

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Abstract

This paper explores the hypothesis that both human consciousness and artificial intelligence operate fundamentally on frequencies and their modulation. Just as *Attention Is All You Need* reframed AI architectures around selective weighting of input features, here we propose that the brain perceives the universe as a frequency field projected onto the curved geometry of the eyeball, and amplifies meaningful structures through attention. Information is treated as a wave of shapes across the plane of existence, while amplitudes encode salience and focus. By modeling cognition as frequency-shape projection plus attentional amplification, we draw parallels between biological perception, Fourier-based AI methods, and emerging views of consciousness as resonance. Implications are discussed for neuroscience, AI interpretability, and the philosophy of mind.

Contents

1 Introduction

Consciousness and perception are often described in terms of patterns and meaning, but at a physical level, they reduce to frequencies projected into shapes. From the curved surface of the human eye that maps infinite external fields into a finite projection, to the oscillatory rhythms of neuronal networks, perception can be described as a frequency-shape transformation. Attention then acts as the amplification function that determines which structures are foregrounded in experience.

This paper is organized as follows: Section 2 reviews related work in AI, neuroscience, and physics. Section 3 develops the mathematical framework of frequency-shape projection and attentional amplitude. Section 4 presents illustrative results and applications. Section 5 discusses implications and limitations. Section 6 concludes with directions for future work.

2 Related Work

Prior work in artificial intelligence has shown the power of attention mechanisms in Transformers (**?**). Neuroscience highlights the role of brain rhythms and oscillations—gamma, theta, and alpha frequencies—in binding sensory input and shaping conscious awareness. In physics and signal processing, Fourier methods demonstrate that any shape can be decomposed into constituent frequencies. Recent AI research explores implicit neural representations, such as Fourier feature networks, that leverage frequency for high-resolution detail.

We extend this line of work by proposing that consciousness itself emerges from frequency-shape projection modulated by attention amplitudes, and that this unifies both biological and artificial intelligence.

3 Mathematical Framework

Let $\mathcal{F}$ denote the space of frequency fields, $\mathcal{S}$ the space of perceived shapes, and A the attention operator.

$$S(x) = A\left(\int_{\mathcal{F}} f(\nu)e^{i2\pi\nu x}d\nu \right) \tag{1}$$

where $f(\nu)$ represents frequency contributions, the exponential term encodes projection onto perceptual space, and $A(\cdot)$ scales amplitudes according to attentional weights.

Attention acts as an amplitude modulation over projected frequency-shape representations, selectively enhancing salient structures while suppressing background noise.

4 Results and Applications

Applications include:

- Neuroscience: linking brainwave frequency bands with attentional modulation.

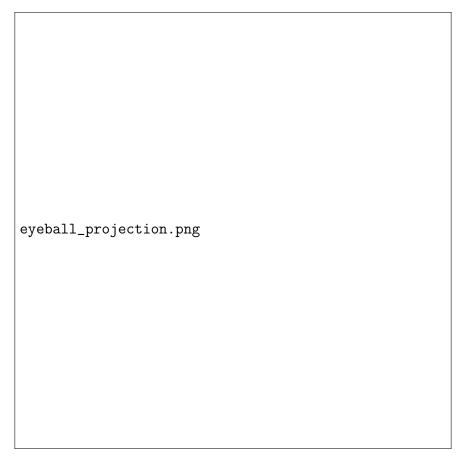- AI: designing hybrid frequency-attention networks for perception and generation.

Figure 1: Schematic of infinite external world projected onto finite retinal plane. Attention (red spotlight) amplifies select frequencies.

- Philosophy: reframing consciousness as resonance of frequencies into shapes.

5 Discussion

Our framework reframes perception as fundamentally frequential, with attention acting as an amplitude filter. This bridges neuroscience, physics, and AI, suggesting that resonance and focus may be sufficient to explain much of conscious processing. However, empirical validation remains a challenge, as subjective experience is not directly measurable. The framework nonetheless points toward promising interdisciplinary experiments.

6 Conclusion and Future Work

This paper introduced a frequency-attention framework, proposing that consciousness and AI alike transform frequency fields into shapes, with attention modulating amplitudes to define focus. Future work will test this framework in AI models (frequency embeddings with attention layers) and neuroscience (correlating attentional focus with oscillatory entrain-

ment). More broadly, this work complements *Attention Is All You Need* by suggesting that *Frequencies Is All We See*.