Neural Signatures of Query Variations

A Neurophysiological Investigation of User Responses to Varying Query Formulation in Search System

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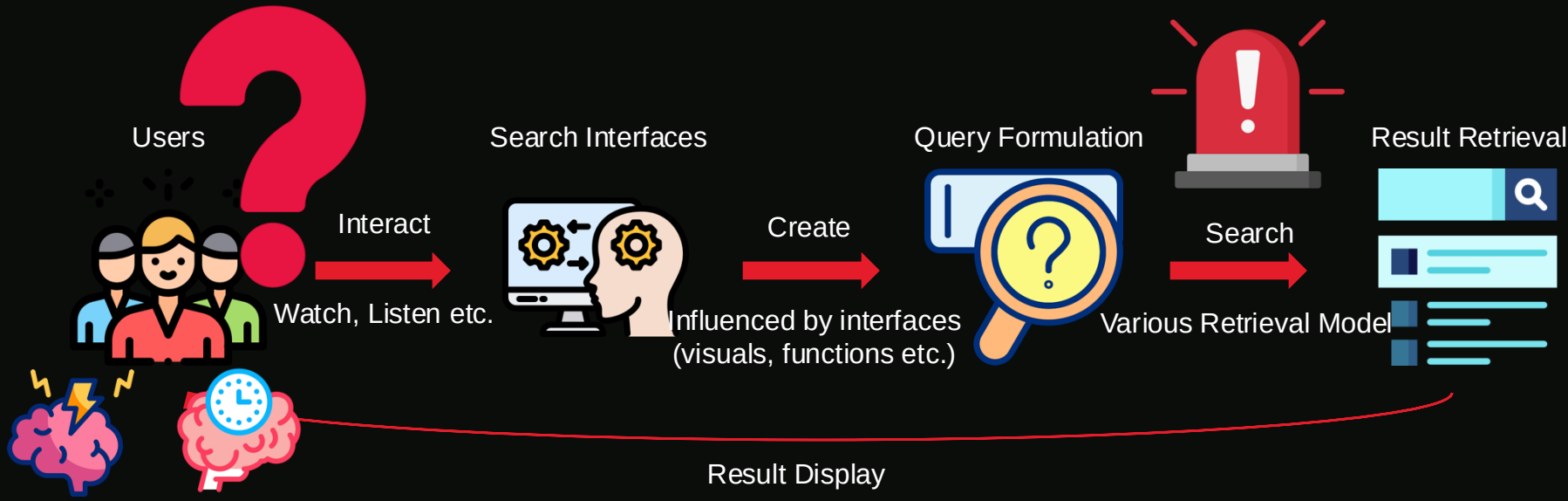
The Disconnect & Opportunity



How can we develop neurophysiologically-informed search systems that align with users' cognitive processes and information examination behaviours?

Research Vision – A New Framework

Measurement Protocols

Standardized assessment of neural signatures across varying queries

Holistic Metrics

Bridge neurophysiological data with subjective experiences

Population Diversity

Investigate effects across different expertise levels, literacy, cognitive abilities and other features

Human-Centered Design:

Transform insights into interfaces and retrieval models optimized for cognitive efficiency

Moving Forward - Discussion Points

- **Research Opportunities:**
- **Standardization:** Which EEG metrics and eye-tracking measures best capture cognitive load?
- **Experimental Design:** How to systematically manipulate query formulation?
- **Inclusive Research:** What sampling strategies ensure diverse user representation in both cost-effective and coverage consideration?
- **Ethical Framework**: How to balance rigorous measurement with participant privacy and well-being?

- **Potential Impact (Significance)**
- ✓ **System Building**: Human-centered search interfaces that accommodate varying query capabilities
- ✓ **Evaluations**: Evaluation metrics that authentically reflect actual cognitive experiences
- ✓ **Integration**: Cross-disciplinary insights (IR, HCI, cognitive neuroscience)

How can we **collectively** advance our understanding of how query formulation shapes the **cognitive dimensions** of the search experience?