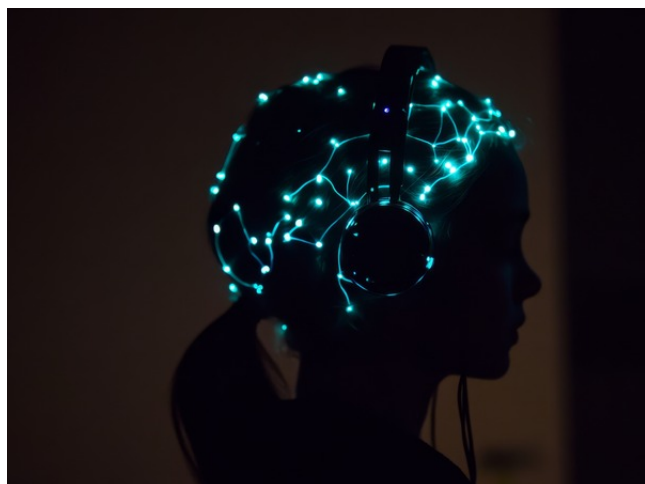




A Direct Selection Brain-Computer Interface for Multiple Choice Testing

TECHNOLOGY NUMBER: 6101



OVERVIEW

A novel brain-computer interface (BCI) enables users—regardless of motor or speech ability—to directly select, verify, and submit answers on standardized multiple-choice assessments using only brain activity.

- **Core Features:** Non-invasive EEG-based selection and verification of answers via a rapid, three-step process; works without physical or verbal input and preserves the integrity of standardized test formats.
- **Market Opportunity:** Transforming access to assessment, education, and medical diagnostics for people with severe motor or communication disabilities while keeping result fidelity equivalent to conventional test-taking.

BACKGROUND

Cognitive assessment is foundational to education, clinical care, and research worldwide, underpinning eligibility for essential services and interventions—especially for people with neurological impairments. Millions of individuals (e.g., with cerebral palsy, ALS, “locked-in” syndrome, or stroke) are excluded from traditional testing due to inability to speak or move. Existing brain-computer interface solutions for these populations rely on slow, indirect selection methods (like mentally moving a screen cursor), which frustrate users, increase error rates, and often require modifying standardized test materials—compromising result comparability and validity.

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Category

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Inventor

Jane Huggins

Further information

Ashwathi Iyer

ashwathi@umich.edu

[View online](#)



There is a pressing and growing market need for accessible, reliable, and efficient cognitive assessment methods in special education, rehabilitation, and remote medicine. The trend toward personalized education, telehealth, and the global aging population further accelerates demand for inclusive assessment technology that doesn't dilute clinical rigor or redesign established tests.

INNOVATION

This technology introduces a direct BCI-driven answer selection mechanism for multiple-choice tests. Users are presented with unmodified test content; answer choices are distinguished by subtle visual cues (e.g., patterned borders flickering at distinct frequencies or timed flashes). The user focuses attention on their chosen answer, which produces a detectable signature in their brain's electrical activity, captured through EEG sensors.

A three-step process guides each selection:

- 1. Intent Detection:** The system confirms the user's intent to answer (e.g., through timing or specific brain signals) to avoid accidental selections.
- 2. Direct Selection:** The user focuses on their chosen answer; the BCI identifies this choice in real time, correlating EEG patterns to the unique visual stimulation of that answer.
- 3. Verification ("Hold-Release"):** To prevent errors or misinterpretation, the chosen answer and a cancellation option are shown. If the user continues focusing on their selection, it is confirmed ("hold"); refocusing on the cancellation icon ("release") lets the user re-choose.

Unlike cursor-based or adaptive UIs, this approach maintains the full fidelity of the original test for all users, ensuring results match those from conventional administration. The core novelty is the fully "direct" selection using only attention focus, robust error-checking through real-time brain signal verification, and compatibility with high-stakes standardized tests out-of-the-box.

This creates a game-changing, scalable solution for equitable assessment, clinical decision-making, and research—removing a major barrier for millions, without requiring redesign of assessment tools or workflows.

ADDITIONAL INFORMATION

INTELLECTUAL PROPERTY:

- [US11266342B2](#) "Brain-computer interface for facilitating direct selection of multiple-choice answers and the identification of state changes"
- [US12121360B2](#) "Brain-computer interface for facilitating direct selection of multiple-choice answers and the identification of state changes"