

AI4BRAIN

COGNITIVE GROWTH AGENT

1. SCOPE & TOPIC

CISTAC 1.0 – AI4Brain explores how Generative AI, cognitive science, and adaptive learning can support personalized cognitive development. Unlike traditional cognitive tests, AI4Brain continuously assesses users and adapts coaching and learning activities to their evolving profiles.

2. CHALLENGE OBJECTIVE

Build a cognitive growth AI agent that can :

- Assess - profile the user across the cognitive dimensions listed in Section 3, non-clinically.
- Understand - turn performance and errors into an uncertainty-aware, percentage profile.
- Coach - give explainable, personalised feedback and motivation.
- Improve - generate adaptive exercises and measurable learning paths.

3. TECHNICAL INSTRUCTIONS & DELIVERABLES

Layers A–C are mandatory; Layer D is optional (Section 4).

- **A — Assessment & Profiling:**

tasks per cognitive dimension listed below; collect score, response time, error rate, behaviour. Each dimension documented (definition, tasks, scoring, uncertainty, biases). Camera/voice (optional) a non-biometric mode is mandatory.

- **Brain Twin:** dynamic, historised profile.

Mandatory: history. Optional: future projections, always with uncertainty, never as certainty

- **B — AI Coach:** explainable natural-language coaching; free but justified architecture; no clinical terms.

- **C — Adaptive Learning & Dashboard:** difficulty and exercise adaptation, evolving plans, radar chart, progress curves, heatmaps, goal tracking.

- **AI Collaboration Score:**

measures how effectively the user collaborates with the AI, on a scale of 0–100. Requires a documented formula.

Proposed weights: clarification 20%, critical verification 25%, iteration 20%, autonomy 20%, responsible use 15% — a design proposal, not validated.

- **Ethics & data:** consent, retention and deletion documented; no sensitive decision on face/voice alone.
- **Deliverables :** GitHub repo, 3–5 min demo video, technical report (max 8 pages), presentation (max 15 slides) — same at every stage

4. BONUS POINTS (OPTIONAL)

Additional points will be awarded for advanced features such as :

- Voice-based coaching
- Emotion-aware AI
- Predictive cognitive growth

5. SELECTION PROCESS

- **Phase 1 — Preselection :**
GitHub repo, demo video, presentation (≤ 15 slides) ; jury selects finalists .
deadline : 1/11/2026
- **Phase 2 — Pitching(7/11/2026) :**
final defense in front of the jury (8 min presentation , 5 min questions) , including a surprise element revealed one day before.

6. EVALUATION CRITERIA

Each entry scored by ≥ 2 evaluators, with conflict-of-interest control.

Phase A :

- Relevance : 20%
- Quality : 20%
- Innovation : 20%
- UX : 15%
- Explainability : 15%
- Safety : 10%

Phase B :

- Generalisation : 25%
- Robustness : 25%
- Profile quality : 20%
- Plan relevance : 15%
- Defense : 15%

overall :

- Phase 1 : 60%
- Phase 2 : 40%

7. RULES & CRITERIA

The official language of the challenge, submissions, pitch and final defense is English. Participants are free to use any external tools, libraries, or frameworks of their choosing. All repositories must be public upon submission. Participants retain full ownership of their intellectual property.

8. SUBMISSION

Before the Phase 1 deadline: GitHub repository, demo video, presentation (≤ 15 slides), via the committee's form.

Link of submission

9. MEMBERS

Team of 2 to 4 members.

- +1 member if the team includes an IEEE CIS member.
- +1 member if the team includes an IEEE YP member.