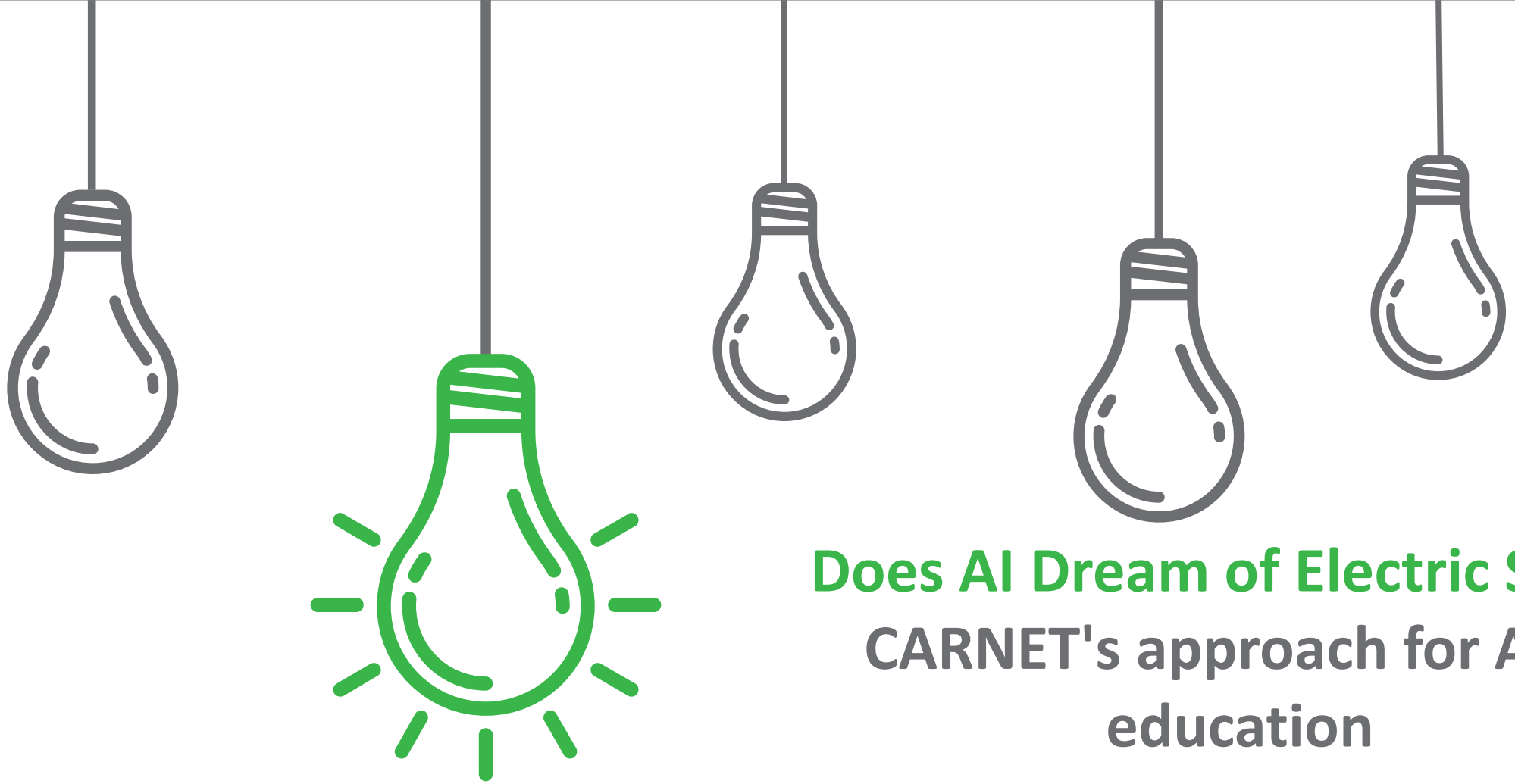

Does AI Dream of Electric Sheep

CARNET's approach for AI in education

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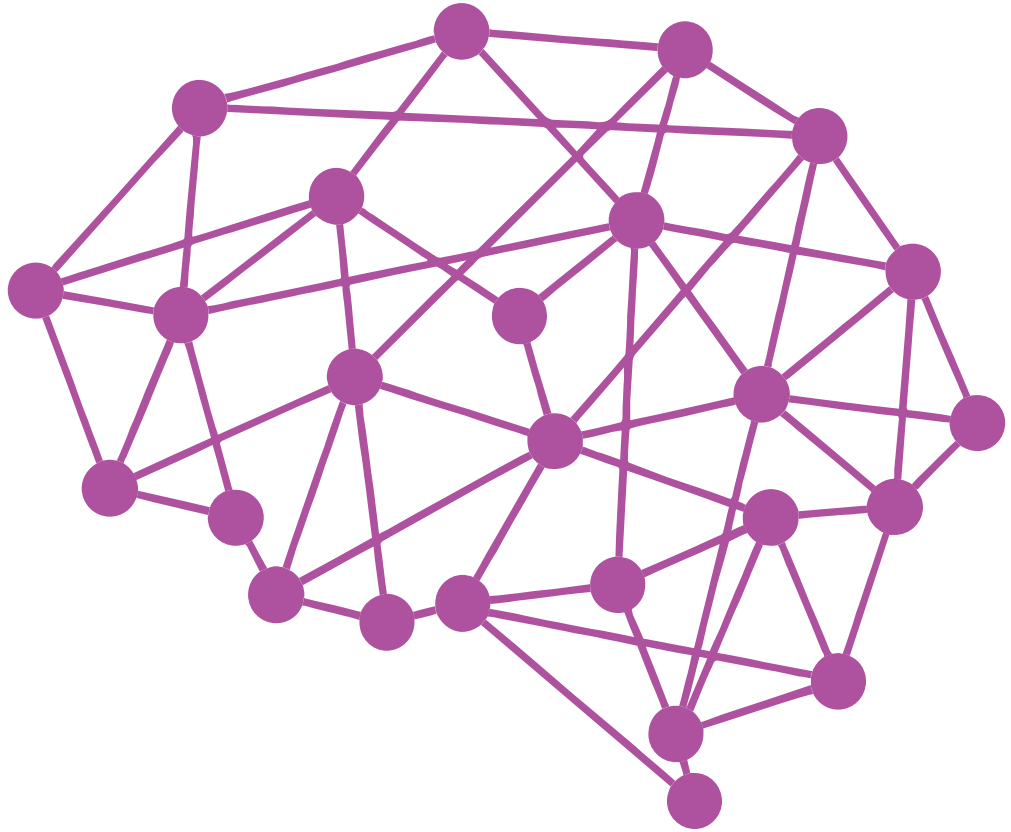
Artificial intelligence is here to stay

1. Through the Digital Europe and Horizon Europe programmes, the Commission plans to invest €1 billion per year in AI

2. IDC forecasts the overall AI software market will approach $596 billion in revenue in 2025 at a compound annual growth rate (CAGR) of 17.7%

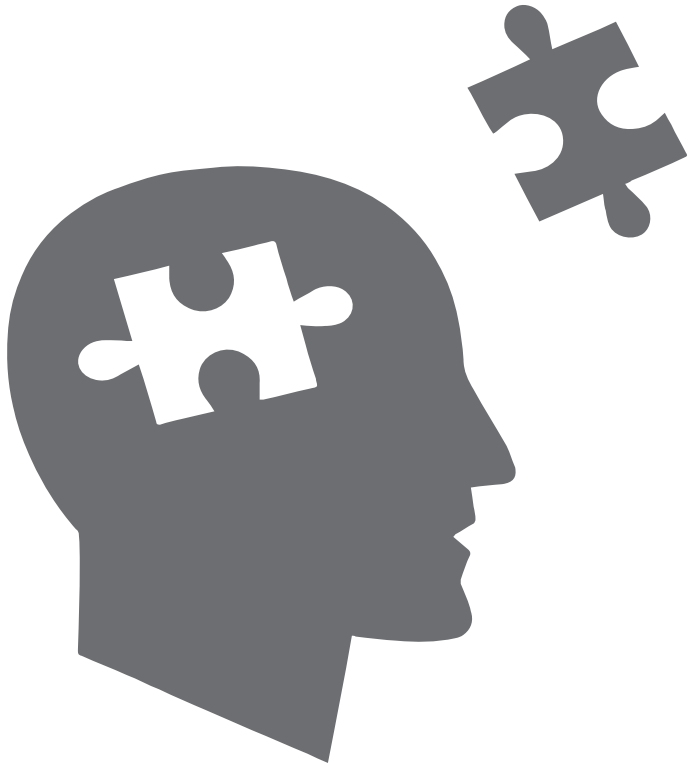
3. Almost all EU member have AI strategy (Croatia is still working on its own)

https://knowledge4policy.ec.europa.eu/ai-watch/national-strategies-artificial-intelligence_en



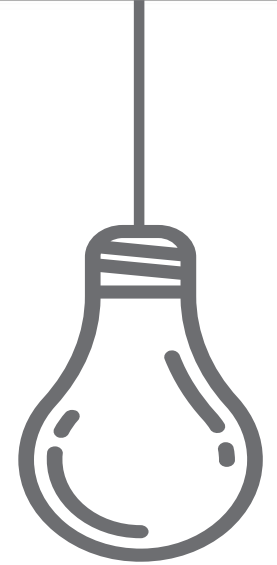
But what kind of AI we want is big issue

AI in education



- Use of artificial intelligence in problem-solving in the education sector
- Education on artificial intelligence

Examples of problem-solving in education



- Personalized learning
- AI-assisted personalized testing
  - Personalized learning, determining the difficulty of the task based on student's achievement (80:20)
  - Automatic solution evaluation providing the solution procedure (Photomath in mathematics)
  - Self-assessment and comparison of students at the national level (encouragement through gamification)

Is artificial intelligence a threat?

Is artificial general intelligence (AGI) possible and can AGI be dangerous?

- Artificial general intelligence (AGI) is the hypothetical ability of an intelligent agent to understand or learn any intellectual task that a human being can (Hal Hodson, "DeepMind and Google: the battle to control artificial intelligence", https://www.economist.com/1843/2019/03/01/deepmind-and-google-the-battle-to-control-artificial-intelligence)
- A super-intelligent AI will be extremely good at accomplishing its goals, and if those goals aren't aligned with ours, we have a problem (Max Tegmark,Benefits & Risks of Artificial Intelligence, https://futureoflife.org/background/benefits-risks-of-artificial-intelligence /

High-risk: AI systems identified as high-risk include AI technology used in:

- Critical infrastructures (e.g. transport), that could put the life and health of citizens at risk;
- Educational or vocational training, that may determine the access to education and professional course of someone's life (e.g. scoring of exams);
- Safety components of products (e.g. AI application in robot-assisted surgery);
- Employment, workers management and access to self-employment (e.g. CV-sorting software for recruitment procedures);
- Essential private and public services (e.g. credit scoring denying citizens opportunity to obtain a loan);

High-risk: AI systems identified as high-risk include AI technology used in:

- Law enforcement that may interfere with people's fundamental rights (e.g. evaluation of the reliability of evidence);
- Migration, asylum and border control management (e.g. verification of authenticity of travel documents);
- Administration of justice and democratic processes (e.g. applying the law to a concrete set of facts).

https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai

Critical thinking in the age of AI

- Artificial intelligence will outperform us in some areas and we must focus on skills and capabilities that artificial intelligence has trouble replicating
  - Be aware that AI can be biased
  - Avoid competing with AI in the sense that you can't compete in terms of what they do best – that is processing information at scale
  - Build skills in things that only humans can do, in person
  - Realise that humanity is a competitive edge, not a handicap
  - (source: Richard Baldwin, The Globotics Upheaval: Globalization, Robotics, and the Future of Work)

Problem of bias

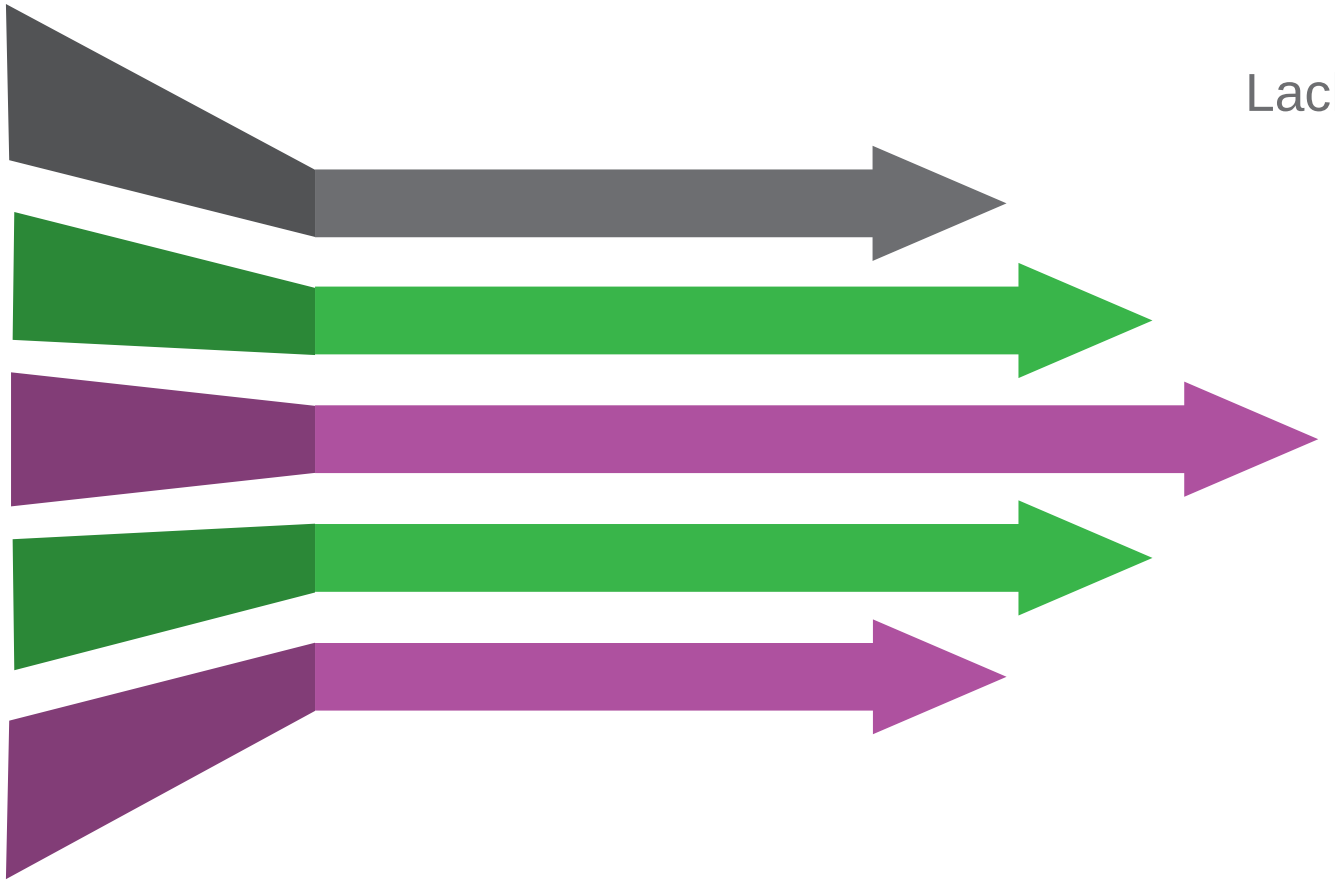
Despite the potential of AI for education, there are many challenges specific to harnessing AI (UNESCO, AI and education - Guidance for policy-makers, https://unesdoc.unesco.org/ark:/48223/pf0000376709)

- data is at the heart of contemporary approaches to AI and bias are real problem

Solution can be (Ryan S. Baker, Algorithmic Bias in Education, https://edarxiv.org/pbmvz/):

- Improving data collection
- Improve tools and resources
- Openness and Incentive Structures
- Broaden the Community

Challenges



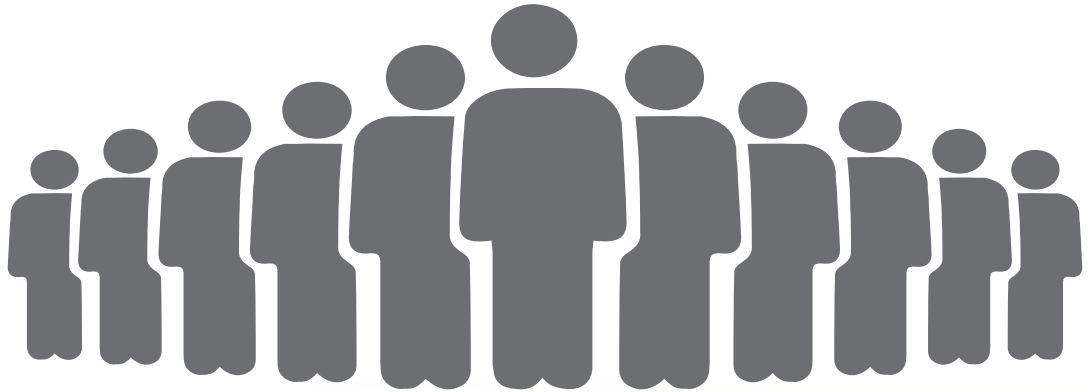
Lack of expertise

Large amounts of data needed for learning

AI’s Bias Algorithm Affecting the Education System (https://analyticsindiamag.com/is-ai-bias-algorithm-affecting-education-system/)

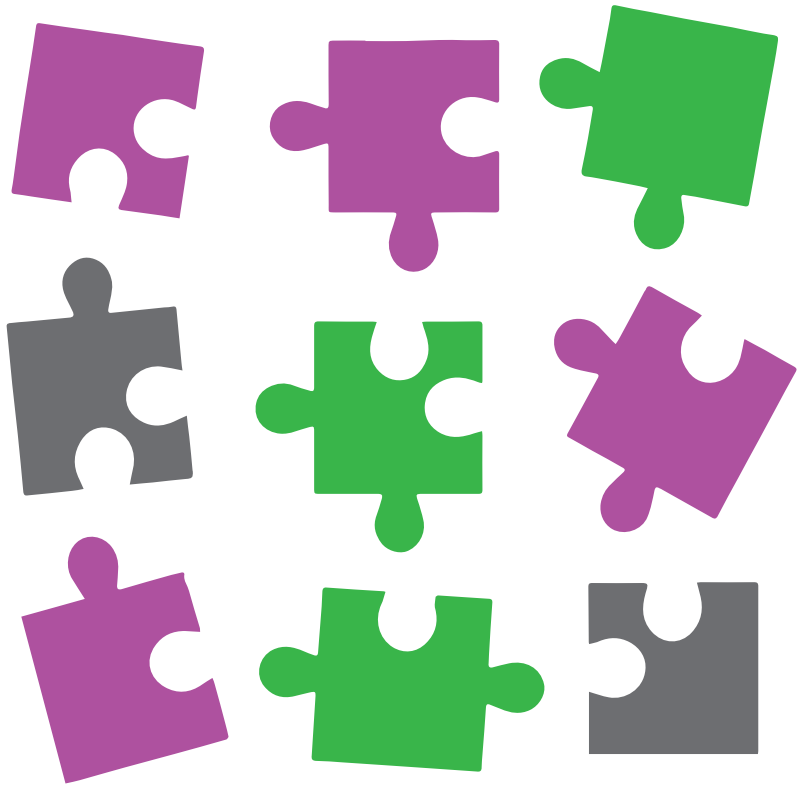
Preparing the society

- How to motivate students to get acquainted with AI in time to later decide on a career in the field
- How to teach future generations what AI is so that they can make informed decisions
- How to train those who come to the labor market to know how to use AI in their business
- How to prepare and encourage lifelong learning about AI



CARNET's approach

1. Through the introduction of systematic education on AI
2. By encouraging research into the application of AI in education
3. Through a pilot example on a test system



Education about and for AI

- Curricula about and for AI
- Cross-curricular topics and optional classes - they are easier to introduce
- Equipping schools
- Open systems with AI learning data and AI models (github for AI)
- Organizing competitions for schools in the field of AI
- Training The Trainers - AI teacher training program

Education about and for AI - Purpose

- Develop Digital Literacy
  - *Critical thinking and reading/observing with understanding in a digital, on-line environment*
- Understand underlying algorithms, logic and intentions (of the providers) behind provided digital products (portals, social media, social networks…)
- Encourage students to become educated users and (co)creators not consumers

Research on the application of AI among students

- Piloting new ideas for applying AI to education
- Dissecting algorithms behind social media, networks, clickbaitism, echo chambers and various forms of content currating
- Support start-ups that develop an innovative approach to AI in education
- Establishing an on-demand computing resources for AI model training
- Establishing open data to practice new AI models

Research on the application of AI in education - Purpose

- Research team on AI application in education established
  - *Part of the wider team of researchers investigating impact of ICT on students' mental, social and physical health.*
- Understanding alorithms, models, logic and intent behind the use of AI in products provided to students and education sector
- Link the findings to curricula

System for self-assessment / knowledge testing

- General goal: to improve the personal achievements of students in the field of national secondary school leaving examination and PISA testing
- Specific objectives:
  - Develop a system of testing and self-testing of students' knowledge in the field of secondary school leaving examination materials (or other interesting areas)
  - Improve and automate the processes of creating, evaluating and including tasks in the workbook based on the results of NCEEE projects
  - Develop models for monitoring student results, comparing personal achievements, predicting future results and proposing a personalized development path
  - Develop models for evaluating new tasks and grading them before including them in the workbook

Current status

- A complex , groundbreaking project developed together with Ministry of Science and Education, awarded 15 million € through European Social Fund
- Project Implementation Plan is being developed, with special focus on aligning research and curricula
- 17th of September 2022 the project will be submitted for evaluation and feedback to the Ministry. Official launch of the project expected in the first quarter of 2023.

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Questions?

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Albert Novak

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