AI and Education

Challenges, Opportunities and Benefits

Prof. Todor Ganchev, Vice-Chair of the IEEE Bulgaria Section

IEEE at a Glance

IEEE
Advancing Technology for Humanity

140 YEARS

Our Global Reach

Region 8

Region 7

Regions 1 - 6

Region 9

Region 10

~500,000 Members	39 Technical Societies	160 Countries

IEEE Technical Breadth

1,800 Annual Conferences	4,000,000+ Technical Documents	170+ Top-cited Periodicals

IEEE Bulgaria Section (est. 1995)
~ 500 members

IEEE Computational Intelligence Society · IEEE computer society · IEEE Signal Processing Society · IEEE Robotics & Automation Society · IEEE SMC Systems, Man, and Cybernetics Society · IEEE Education Society

AI and Education: Challenges

Equity and Access
- Digital Divide: widening the gap b/w people from different socioeconomic backgrounds.
- Resource Disparities: unequal access to technology-enhanced learning.

Data Privacy and Security
- Sensitive Data Handling: concerns about how data is stored, used, and protected.
- Data Breaches: The risk of unauthorized access to data increases with AI.

Bias and Fairness
- Algorithmic Bias: AI systems can perpetuate existing biases in the data they are trained on, leading to unfair outcomes, such as biased grading or assessments.
- Cultural Sensitivity: AI shall account for cultural differences, potentially leading to content that is inappropriate or irrelevant for certain populations.
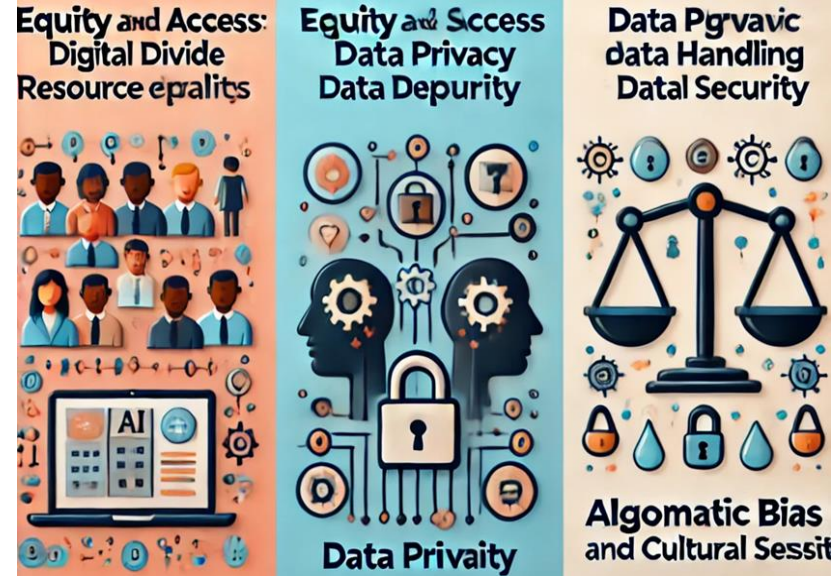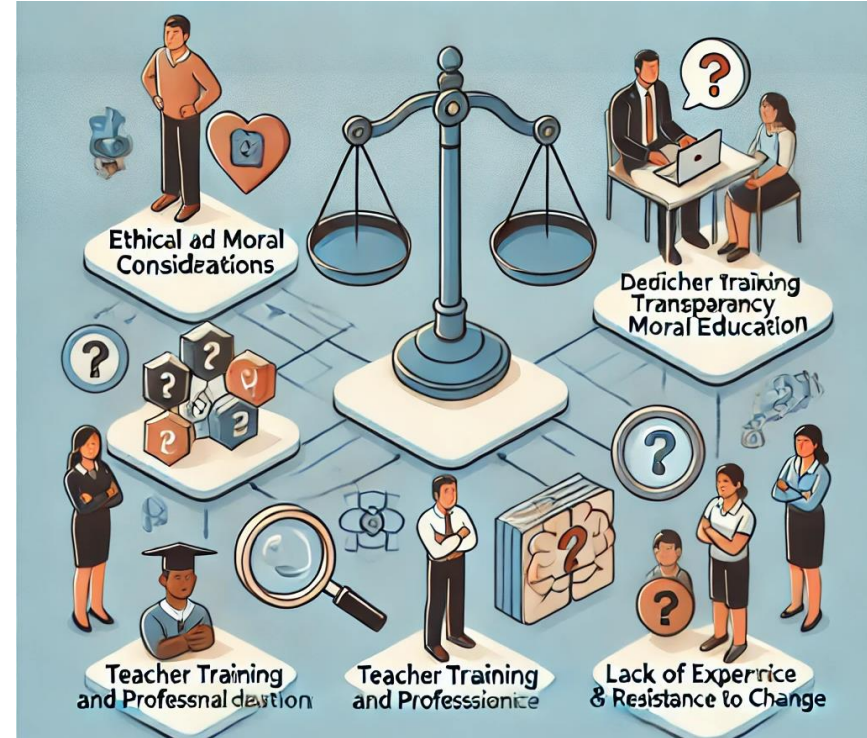
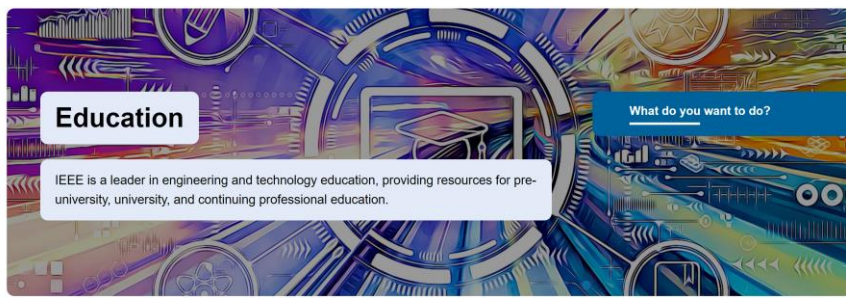# AI and Education: Challenges

Ethical and Moral Considerations

- o **Decision-Making Transparency:** AI's role in decisions such as grading or student placement raises questions about transparency and accountability.
- o **Moral Education:** As AI's influence grows, understanding its ethical implications becomes increasingly important.

Teacher Training and Professional Development

- o **Lack of Expertise:** Many educators may not have the training needed to effectively integrate AI into their teaching, leading to underutilization or misuse of AI tools.
- o **Resistance to Change:** Teachers may resist adopting AI due to concerns about job displacement or the complexity of new technologies.

AI and Education: Opportunities

Education

IEEE is a leader in engineering and technology education, providing resources for pre-university, university, and continuing professional education.

What do you want to do?

Pre-university STEM education programs

IEEE university education programs

IEEE continuing education courses
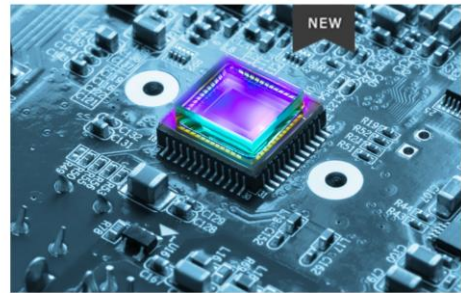
AI and Education: Opportunities

IEEE Learning Network

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Machine Learning
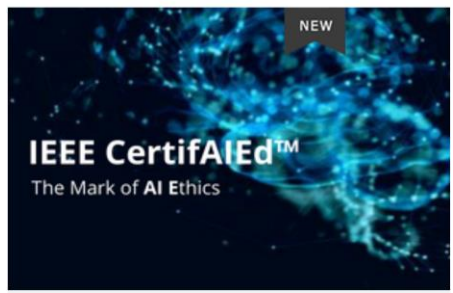
IEEE CertifAIEd™
The Mark of **AI E**thics
IEEE Awareness Module on AI Ethics

python
Python for Everyone
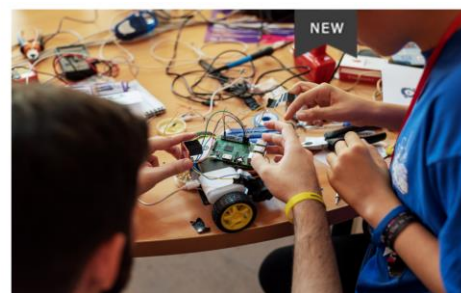

Sensor Networks for Internet of Things

Introduction to Innovation Management and Intellectual Property

Communication Models and Protocols for IoT Systems

Embedded Systems with Drones

Embedded Linux for IoT Systems

AI Tools for Education

STUDENT-focused AIED

▸ Intelligent Tutoring Systems (ITS)

▸ AI-assisted Apps (e.g., maths, text-to-speech, language learning)

▸ AI-assisted Simulations (e.g., games-based learning, VR, AR)

▸ AI to Support Learners with Disabilities

▸ Automatic Essay Writing (AEW)

▸ Chatbots

▸ Automatic Formative Assessment (AFA)

▸ Learning Network Orchestrators

▸ Dialogue-based Tutoring Systems (DBTS)

▸ Exploratory Learning Environments (ELE)

▸ AI-assisted Lifelong Learning Assistant

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Image: freepik

AI Tools for Education

TEACHER-focused AIED

- ‣ Plagiarism detection

- ‣ Smart Curation of Learning Materials

- ‣ Classroom Monitoring

- ‣ Automatic Summative Assessment

- ‣ AI Teaching Assistant (including assessment assistant)

- ‣ Classroom Orchestration

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Image: freepik

AI Tools for Education

INSTITUTION-focused AIED

- ▸ Admissions (e.g., student selection)
- ▸ Course-planning, Scheduling, Timetabling
- ▸ School Security
- ▸ Identifying Dropouts and Students at risk
- ▸ e-Proctoring

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Image: Adobe Stock

AI and Education: Benefits

▶ **Personalized Learning**
- Adaptive learning platforms
- Real-time feedback and tailored content

▶ **Accessibility and Inclusion**
- AI tools for students with disabilities
- Language translation and accessibility

▶ **Support for Teachers**
- AI teaching assistants,
- Automating (administrative) tasks

▶ **Cost-Effectiveness and Scalability**
- Efficient resource allocation
- Scaling quality education globally

Image: John Handley High School

AI and Education: Benefits

Time-saving for teachers /professors

AI tutors can assist students

AI can enhance students' health

Help teachers to become learning motivators

AI-driven functionality can give feedback to students and educators

Image credit: AITT
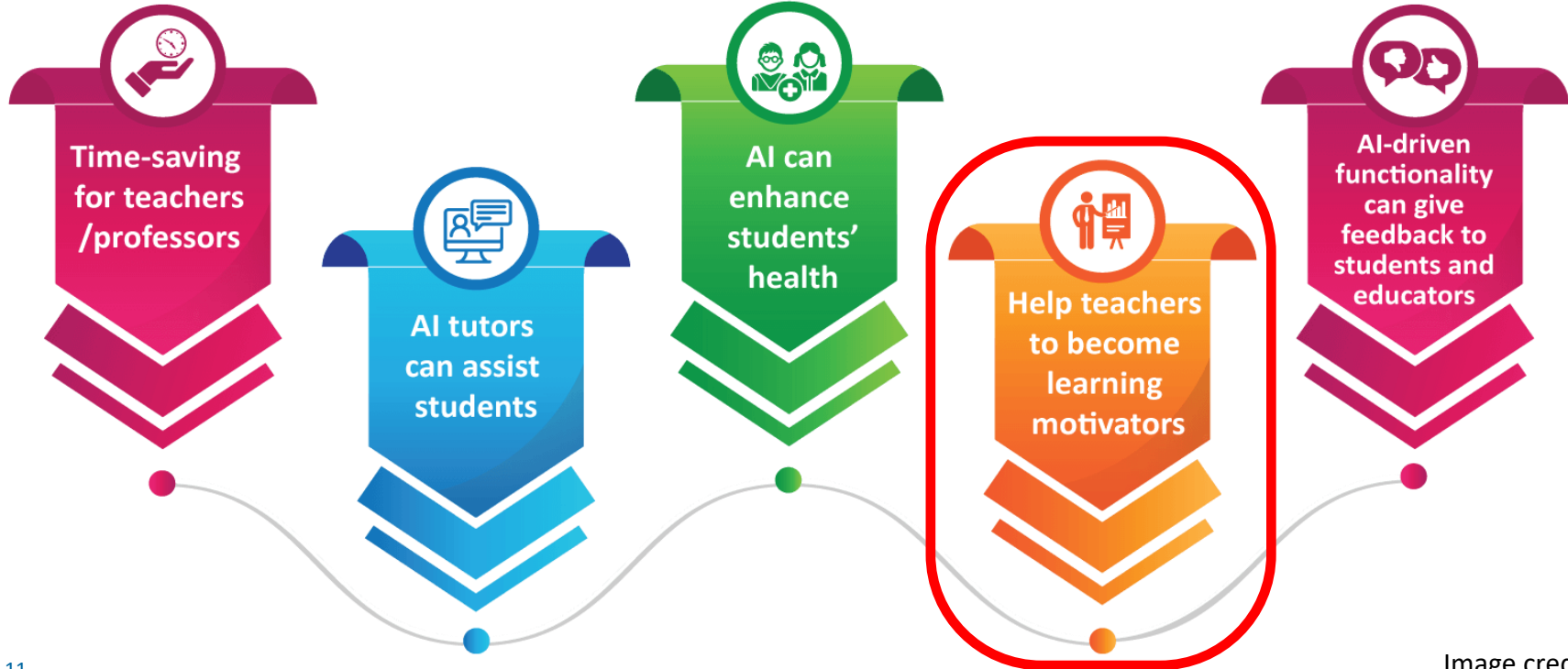
Continuing Education

▸ Continuing Education Partners Program

▸ Discounted Pricing for IEEE Conferences and Events

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- IEEEx offered by edX

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- https://events.vtools.ieee.org/

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- http://www.ieee.org/publications_standards

▸ IEEE Standards
- http://standards.ieee.org/

▸ IEEE Education Resources
- http://www.ieee.org/education_careers/index.html

▸ Humanitarian and Philanthropic Activities
- www.ieee.org/doing-good

▸ IEEE Young Professional
- yp.ieee.org

▸ IEEE Women In Engineering
- wie.ieee.org

Thank you!
(*tganchev@ieee.org*)

Image credit: metamorworks/shutterstock