Higher Education Classroom Of the Future

T2.2 Ethical, Privacy and Data Protection Impact Assessment

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Executive Summary

The primary goal of HECOF is to leverage Artificial Intelligence (AI) and Machine Learning (ML) tools to enhance and optimize higher education. By implementing cutting-edge technologies, the project aims to improve overall student experiences within the higher education ecosystem.

The scope of HECOF encompasses the integration of AI and ML tools on developing intelligent systems that can analyze vast amounts of data to make informed decisions, automate routine tasks, and provide personalized experiences for students and faculty members.

HECOF aims, among else, at implementing smart learning environments by introducing adaptive learning platform that tailors educational content to individual student needs and at utilizing natural language processing (NLP) for improved interaction in online courses. The project also focuses on student success prediction by providing targeted interventions and support services to enhance student success rates. It also includes data-driven decision making therefore establishing a robust data analytics framework to extract actionable insights and empowering decision-makers with real-time information for strategic planning.

The benefits of HECOF are centered on enhancing student experiences and improving academic outcomes. At the same time the partners have identified relevant challenges and mitigation thereof such as addressing data privacy concerns through robust security measures and providing training and resources for faculty and staff to adapt to AI and ML tools.

In conclusion, the integration of AI and ML tools in higher education promises to revolutionize traditional practices, fostering a more dynamic and responsive learning environment.

Abbreviations and acronyms

Abbreviation	Definition
AI	Artificial Intelligence
GDPR	General Data Protection Regulation
ML	Machine Learning

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1. Introduction

Trustworthy AI and ML in higher education are essential for fostering positive educational experiences, promoting equity, and ensuring the responsible use of technology. In higher education, AI and ML systems are nowadays a strong and crucial choice for achieving both ethics, trustworthiness and effectiveness. In HECOF the Consortium partners have been trying to address all the issues presented herein and to incorporate where feasible those technologies that safeguard relevant compliance herewith.

In the dynamic landscape of higher education, the fusion of Artificial Intelligence (AI) and Machine Learning (ML) represents a pivotal juncture, offering unprecedented opportunities to redefine and enhance the educational experience. As we stand at the cusp of technological breakthroughs, HECOF embarks on a transformative journey, seeking to leverage cutting-edge AI and ML tools to propel higher education into a new era of efficiency, personalization, and academic excellence.

HECOF's overarching objective is to seamlessly integrate AI and ML tools into the fabric of higher education, fostering an ecosystem that is responsive, adaptive, and centered on the needs of students and faculty alike. By harnessing the power of these technologies, we aim to optimize administrative operations, revolutionize teaching methodologies, and fundamentally enhance the educational journey for all stakeholders.

The key focus areas that constitute the smart learning environments, the student success prediction, the data-driven decision making and the data protection framework would make us anticipate expected outcomes such as improved student satisfaction and a competitive edge in the rapidly evolving landscape of higher education. HECOF not only signifies a technological leap but also a commitment to delivering an educational experience that is adaptive, personalized, and future-ready.

2. Importance of Trustworthy AI and ML in higher education

Trustworthy AI and ML systems enhance students' confidence in the educational tools and assessments they interact with. When students believe in the fairness and reliability of these systems, they are more likely to actively engage with and benefit from them. Educators on the other hand play a pivotal role in implementing and guiding AI and ML tools. If educators trust the technology, they are more likely to incorporate it into their teaching practices. Trust in the tools HECOF engages encourages educators to leverage AI for personalized learning experiences. Trustworthy AI systems are designed to be fair, unbiased, and inclusive. This is crucial in higher education to ensure that all students, regardless of background, have equal opportunities for success. It therefore helps mitigate the risk of reinforcing existing inequalities. Trustworthy AI prioritizes robust data privacy and security measures. In higher education, where sensitive student information is involved, ensuring the confidentiality and integrity of data is essential. Building trust in the handling of student data is crucial for user acceptance. Transparent AI and machine learning systems provide clear explanations for their decisions and recommendations. When students and educators understand how these systems work, they are more likely to trust the outcomes and feel confident in the educational process. They also emphasize ethical considerations in the development and deployment of technology. This includes considerations of fairness, accountability, and the avoidance of discriminatory practices. Responsible use of AI and ML aligns with ethical standards and helps build trust among stakeholders. HECOF has been designed to serve these purposes.

Furthermore, trustworthy AI systems in HECOF are adaptable and capable of continuous improvement. This adaptability ensures that the technology evolves alongside educational needs and incorporates feedback from users. This iterative process helps maintain and strengthen trust over time. Moreover, they actively work to identify and mitigate biases. In the context of education, this is crucial to ensure that assessments and adaptive learning experiences are fair and do not disproportionately impact certain groups of students. Compliance with legal and regulatory requirements is also an issue to be taken into account. Compliance with data protection laws, educational regulations, and ethical standards is fundamental to building and maintaining trust in AI and machine learning systems.

All things considered, the importance of trustworthy AI and ML in higher education cannot be overstated. Building and maintaining trust among students, educators, and the broader community is a foundational element for the successful integration of these technologies into the educational landscape. HECOF is being structured on the basis of both effective and ethical commitment by using all the benefits AI and ML systems can provide but at the same time considering all the ethical issues, involving data protection framework that need to be addressed.

3. Ethical Considerations

In the context of trustworthy AI and ML in higher education, several ethical considerations must be taken into account to ensure responsible and equitable use of technology. The partners actively identify and mitigate biases in algorithms to prevent discriminatory outcomes in assessments, grading, and adaptive learning. Also, they regularly audit algorithms to ensure fairness across diverse student groups. In terms of transparency and explainability they normally ensure that AI and ML processes are transparent and explainable, so that students and educators be able to understand how decisions are made and therefore build trust in the technology. A prerequisite for any lawful data processing is to obtain informed consent from students and educators before collecting and using their data for AI and ML purposes. The data controllers should clearly communicate the purpose of data collection and how it will be used. In the context of data security, the Consortium partners have already planned to adopt robust security measures to protect student data. In the context of obtaining their informed consent they would define and communicate data ownership, usage, and retention policies. Last, they would ensure compliance with European Union and applicable national data protection laws.

As accountability is a most critical issue when it comes to building AI and ML systems in the education sector, the consortium partners will ensure the presence of human oversight in both AI and ML systems. While automation is valuable, human judgment and intervention are critical, especially in educational settings where nuanced understanding is required. Another ethical aspect to be taken into account when developing AI and ML is the equity and inclusion, whereby designing strong and ethical AI systems would ensue at the same time addressing and mitigating existing educational inequalities that is to ensure that technology does not perpetuate or exacerbate disparities based on factors such as race, gender, socioeconomic status, or disability. In the same logic, HECOF has been designed to become inclusive, that is to prioritize accessibility in AI and ML tools by ensuring that they are all usable by all students. The same purpose could be achieved when involving students, educators and other stakeholders in the decision-making process regarding the implementation of AI in education.

When sharing personal and other data it is very important for the data subject to understand and in essence be entitled to retain control and ownership over their data. This exact possibility should be clearly explained to the data subjects in the informed consent forms, among else. Further, the students should be provided with mechanisms that they are entitled to access, correct or delete their data as needed. As these systems concern a valuable sector of our lives, which is the education, continuous monitoring and evaluation should also be part of their development. AI and ML systems need to also provide for continuous monitoring and evaluation processes to assess the impact and their performance. The partners acknowledge that they should regularly review and update ethical guidelines to keep pace with technological advancements. When auditing relevant compliance they should also consider the social responsibility they bear when structuring such tools and the broader community impact thereof. The partners understand that while developing HECOF they should avoid any actions that could possibly ensue harm to individuals or communities. By addressing these ethical considerations, HECOF partners can foster the development and deployment of AI and ML systems that are trustworthy, responsible, and aligned with ethical standards. Obviously, continuous reflection and adaptation of ethical guidelines are essential as technology and ethical norms evolve.

4. Privacy, Data Protection and Data Protection Impact Assessment

The European Union (EU) has implemented several pieces of data protection and privacy legislation that aim to protect the privacy and personal data of individuals. The most significant of these is the General Data Protection Regulation (GDPR), which came into effect in May 2018.

The GDPR replaced the 1995 Data Protection Directive and introduced a number of new requirements and strengthened existing ones. Some of the key aspects of the GDPR include:

Lawful basis for processing: Organizations must have a lawful basis for processing personal data, such as consent from the data subject, contractual necessity, or legitimate interest.

Data protection principles: The GDPR establishes a set of data protection principles that organizations must follow when processing personal data, including the principles of lawfulness, fairness, and transparency, purpose limitation, data minimization, accuracy, storage limitation, integrity and confidentiality, and accountability.

Consent: The GDPR requires that organizations obtain the informed consent of individuals before processing their personal data. Consent must be freely given, specific, informed, and unambiguous.

Data subjects' rights: The GDPR grants data subjects a number of rights, including the right to access their personal data, the right to rectify inaccurate data, the right to erasure, the right to restrict processing, the right to data portability, and the right to object to processing.

Data protection officers: Some organizations are required to appoint a data protection officer (DPO) to oversee their data protection activities and ensure compliance with the GDPR.

Data breach notification: Organizations are required to notify the relevant supervisory authority within 72 hours of becoming aware of a data breach that is likely to result in a risk to the rights and freedoms of individuals.

Cross-border data transfers: The GDPR regulates the transfer of personal data outside the EU, and requires that appropriate safeguards be in place to protect the personal data.

Sanctions: The GDPR provides for significant sanctions for non-compliance, including fines of up to €20 million or 4% of an organization's global annual revenue, whichever is greater.

Privacy by design and by default: The GDPR requires that organizations implement data protection measures from the outset of a project, and that data protection be built into the design of systems and processes.

Joint controllership: The GDPR establishes a framework for joint controllership where two or more entities jointly determine the purposes and means of processing personal data.

In addition to the GDPR, the EU has implemented several other pieces of data protection and privacy legislation, including the ePrivacy Regulation, and the Directive on Security of Network and Information Systems (NIS Directive), which aims to improve the resilience of the EU's critical infrastructure to cyber-attacks.

For the consistency and the common understanding of the issues the main definitions of the GDPR are presented below:

Personal data: Any information that relates to an identified or identifiable natural person, such as name, address, email address, ID number, or online identifiers.

Processing: Any operation or set of operations performed on personal data, such as collection, storage, use, or disclosure.

Data subject: The identified or identifiable natural person to whom the personal data relates.

Controller: The organization that determines the purposes and means of processing personal data.

Processor: An organization that processes personal data on behalf of the controller.

Recipient: A natural or legal person, public authority, agency, or another body to whom personal data is disclosed, whether a third party or not.

Consent: Any freely given, specific, informed, and unambiguous indication of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her.

Special categories of personal data: Personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, as well as genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or sex life and sexual orientation.

Profiling: Any form of automated processing of personal data consisting of the use of personal data to evaluate certain personal aspects relating to a natural person, in particular, to analyze or predict aspects concerning that natural person's performance at work, economic situation, health, personal preferences, interests, reliability, behaviour, location, or movements.

Pseudonymisation: The processing of personal data in such a manner that the personal data can no longer be attributed to a specific data subject without the use of additional information, provided that such additional information is kept separately and is subject to technical and organizational measures to ensure that the personal data is not attributed to an identified or identifiable natural person.

Anonymisation: The processing of personal data in such a manner that the data can no longer be attributed to an identified or identifiable natural person without the use of additional information.

Data protection officer (DPO): A person appointed by the controller or processor who is responsible for overseeing data protection compliance and advising on data protection matters.

Cross-border processing: The processing of personal data that takes place in the context of the activities of establishments in more than one EU member state or that takes place in a single EU member state but affects data subjects in more than one EU member state.

Data breach: A security incident that results in the accidental or unlawful destruction, loss, alteration, unauthorized disclosure of, or access to, personal data.

Data subject rights outlined in the GDPR:

- Right to be informed: The right of a data subject to be informed about the processing of their personal data, including the purposes of the processing, the categories of personal data being processed, and the recipients or categories of recipients of the data.
- Right of access: The right of a data subject to obtain confirmation as to whether or not their personal data is being processed, and to access a copy of their personal data being processed.
- Right to rectification: The right of a data subject to have inaccurate personal data corrected, and incomplete personal data completed.
- Right to erasure: The right of a data subject to have their personal data erased, also known as the "right to be forgotten."

- Right to restriction of processing: The right of a data subject to restrict the processing of their personal data under certain circumstances, such as if the accuracy of the data is contested, or if the processing is unlawful.
- Right to data portability: The right of a data subject to receive a copy of their personal data in a structured, commonly used, and machine-readable format, and to transmit that data to another controller.
- Right to object: The right of a data subject to object to the processing of their personal data in certain circumstances, such as for direct marketing purposes.
- Rights in relation to automated decision-making and profiling: The right of a data subject to not be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning them or similarly significantly affects them.

The key provisions and definitions mentioned above in GDPR are essential for identifying HECOF's project compliance obligations with data protection legislation.

The General Data Protection Regulation (GDPR) establishes new obligations and responsibilities for data controllers, defined as entities that determine the purposes and means of processing personal data. Controllers must comply with the GDPR when collecting, using, storing, and sharing personal data of EU residents. Below are some of the key obligations of data controllers under the GDPR:

1. Lawfulness, fairness, and transparency

Under the GDPR, data controllers must ensure that the processing of personal data is lawful, fair, and transparent. This means that controllers must have a legal basis for processing personal data and must inform individuals of the processing activities, including the purposes for processing, the types of data being processed, and the legal basis for processing.

2. Purpose limitation

Data controllers must process personal data only for specified, explicit, and legitimate purposes. This means that they cannot collect data for one purpose and use it for another. Controllers must be transparent about the purpose of processing and ensure that it aligns with the reason for which the data was collected.

3. Data minimization

Data controllers must ensure that the personal data they process is adequate, relevant, and limited to what is necessary for the purposes for which it is processed. This means that controllers must not collect excessive data and must only collect the data that is necessary for the purpose of processing.

4. Accuracy

Data controllers must ensure that the personal data they process is accurate and kept up to date. This means that controllers must take reasonable steps to ensure that inaccurate or incomplete data is rectified or erased.

5. Storage limitation

Data controllers must ensure that personal data is kept in a form that allows identification of data subjects for no longer than is necessary for the purposes for which the data is processed. This means that controllers must have processes in place to securely delete data once it is no longer needed for the purpose for which it was collected.

6. Security

Data controllers must implement appropriate technical and organizational measures to ensure a level of security appropriate to the risk presented by the processing of personal data. This means that controllers must take steps to protect personal data from unauthorized access, accidental loss, destruction, or damage.

7. Accountability

Data controllers must be able to demonstrate their compliance with the GDPR. This means that they must maintain records of their processing activities and have processes in place to identify, assess, and mitigate data protection risks. Controllers must also appoint a data protection officer (DPO) if their core activities involve large-scale processing of sensitive personal data. If the processing would be carried out by a public authority or a body a DPO will be mandatory while the consortium will be interacting with them frequently.

8. Data protection impact assessment

Data controllers must conduct data protection impact assessments (DPIAs) for processing activities that are likely to result in a high risk to the rights and freedoms of individuals. DPIAs are designed to identify and mitigate risks to individuals' privacy and personal data.

During the implementation of the Hecof Project, activities will take place in the context of which the processing of personal data will occur. The following Data Protection Impact Assessment Table provides the following information:

a. Overview of activities in the context of which personal data may be processed,

b. Overview of Personal Data Categories and Data Subjects for each activity,

c. Overview of main obligations and compliance measures for each activity,

d. Allocation of compliance actions throughout the lifecycle of the project,

e. Possible risk, effect of the measure to the risk, any residual risk and relevant approval or not of the measure.

Activity	Type of Personal Data and Data Subjects	Main obligations coming from GDPR – Compliance Measures	Allocation of compliance actions through the lifecycle of the project	Risk/effect on risk/residual risk/measure approval
Co-design workshops and interviews	Participants and selected data	- Information about the processing of their personal data according to art. 12-14 of GDPR	WP2	Sharing data with no consent/eliminated/no residual/approved
HECOF platform	Design of the	- Privacy by design/Privacy by default consultation and	WP3, WP5	Data security purposes, leaks no authorized

design and development	processing of personal data in the context of Hecof’s Platform’s design and operation	conduction of Data Protection Impact Assessment according to art. 35 of GDPR. Particularly focus on: a. Source of Platform’s personal data b. Categorization of personal data that will be processed b. Identification of legal basis for the process of each category of personal data (normal/special categories) c. Compliance with the legal requirements of the art. 12,13,14 and 22 of GDPR (A. 12,13,14: Information and Transparency requirements, A. 22: The right for individuals not to be subject to a decision based solely on automated processing, including profiling, which produces legal or significant effects concerning them. This means that individuals have the right to challenge decisions made by automated systems, such		access/reduced/low/approved

		as algorithms or artificial intelligence, that affect their lives or rights d. Specification of technical security measures, such as encryption of data, anonymization/pseudonymization of personal data, cybersecurity controls etc. e. Specification of organisational security measures, and adoption of relevant policies and procedures (f.e. Data Breach Policy, Website Privacy Policy, Cookies Policy). Focus on prevention of unauthorized access through Personal Information Management System f. Risk Assessment g. Proposal and adoption of mitigation actions.		
Pilot activities	End Users' personal data	Additionally to the implemented compliance actions is needed: a. Information about the processing of their personal data according to art. 12,13,14 of GDPR	WP 5	

		b. The end users to provide informed consent for the process of their personal data (separate explicit consent for the sensitive personal data according to art. 9 of GDPR is needed).		
Project Management - Cooperation between partners	a. Personal Data of Partners' employees b. Personal Data of other Data Subjects such as educators, end users, other participants	-Joint Controllership Agreement according to art. 26 of GDPR (and actions described in the agreement) - Contact mailing list per organization to avoid data breaches through false emailing - Authorization to specific persons for the usage of project management tools per organisation	WP1, WP5	Sharing data with no consent/eliminated/no residual/approved
Monitoring of Compliance		Preparation of data protection policy and ethical protocol	WP2	Sharing data with no consent and data security

with data protection requirements through the implementation of the project				issues/reduced/low/approved
Dissemination, Communication and Exploitation	a. Personal Data of Partners' employees b. Personal Data of other Data Subjects such as educators	For category a: The Partners shall ensure that they have dully informed their employees for the process of their personal data in the context of dissemination activities (based on the legal basis of legitimate interest of the Data Controller of art. 6 6(1)(f) GDPR). In addition, they shall ensure that provide them the right to obtain. For category b: Informed consent is needed	WP6	Sharing data with no consent/eliminated/no residual/approved

Table 1. Compliance Actions Board in the Data Protection Impact Assessment

9. Data subject rights

Data controllers must facilitate the exercise of data subject rights under the GDPR, within 30 days.

10. Notification of data breaches

Data controllers must notify data protection authorities of data breaches without undue delay and, where feasible, no later than 72 hours after becoming aware of the breach. They must also notify affected individuals when the breach is likely to result in a high risk to their rights and freedoms.

In summary, the GDPR establishes a comprehensive framework of obligations for data controllers designed to protect the privacy and personal data of individuals. Controllers must ensure that their processing activities are lawful, fair, and transparent, and that they are accountable for their compliance with the GDPR. By implementing these obligations, controllers can ensure that they are processing personal data in a responsible and ethical manner, thereby fostering trust and confidence.

11. Data Processing Agreements and Joint Controllership Agreements

Controllers and Processors must have a written data processing agreement in place, comply with the GDPR's data protection principles and data subjects' rights, implement appropriate security measures, keep records of their processing activities, and notify each other of any personal data breaches. Joint controllers must also have a clear arrangement in place, determine their respective roles and responsibilities, ensure a lawful basis for processing, keep records, and cooperate with each other. The relation between Controller and Processor, as well as the content of the DPAs are defined in article 28 of GDPR; The relation between Joint Controllers and the content of the Joint Controllership Agreement is defined in the article 26 of GDPR.

5. Recommendations on possible solutions to AI and ML risks regarding privacy

Developing AI and ML tools in HECOF requires a thoughtful approach to identify, assess, and manage relevant risks to appear. Some recommendations on possible solutions to avoid, minimize, transfer, or share risks would be conducting robust risk assessments, that is conducting thorough risk assessments already now at the outset of HECOF. Identifying potential risks related to privacy, security, bias, and system performance would be critical to mitigate any relevant risks. Under this perspective, engaging with stakeholders, including students, educators, lecturers/assistant professors/instructional designers to gain diverse perspectives would be important prerequisite.

In the same idea, developing and adhering to clear ethical guidelines for AI and ML development would be a priority. Fairness, transparency, and accountability would be the guideline for developing HECOF and ensuring that the guidelines align with relevant ethical standards and best practices.

Also, adopting a "Privacy by Design" approach to minimize the risk of privacy breaches would most assist to the risk mitigation purposes. Limiting data collection to what is necessary for the intended purpose would also ensue compliance with GDPR and risk mitigation.

Further, implementing robust data security measures, including encryption, pseudonymization, access controls, and secure data storage are clue issues to HECOF. The partners will also update security protocols to address emerging threats and will conduct security audits to identify and address vulnerabilities.

With the purpose to provide transparency and explainability, the partners would prioritize transparency in AI and ML algorithms and further provide clear explanations for decisions and recommendations, allowing students and educators to understand how HECOF works, therefore fostering trust through openness and communication.

Informed consent mechanisms for the benefit of both the students and the educators regarding the collection and use of their data, by clearly communicating the purpose of data collection, how it will be used, and any potential risks involved would also help with risk mitigation.Establishing data ownership and control policies as explained above would also serve the same purpose while this would be achieved by adopting policies that prioritize the rights of individuals over their personal information.

Moreover, implementing bias mitigation strategies and actively working to identify and mitigate biases in AI algorithms is essential to HECOF. In cooperation with the above human oversight and intervention would also correspond to the obvious necessity for a human intervention and observance.

Another technique that would serve risk mitigation would also be to diversify the data sources, that is to use diverse and representative datasets to train AI models. This would help mitigate the risk of biased outcomes by ensuring that the system is exposed to a wide range of examples from different students (demographic) groups.

Obviously, for all recommendations and risk mitigation measures to apply, the partners need to ensure that when adopted, they fall within the applicable legislative framework as in force from time to time.

For the above measures to apply in HECOF it is critically important for the stakeholders (students, educators, lecturers/assistant professors/instructional designers) to be properly educated and trained. The partners understand that they should raise awareness about potential risks, ethical considerations, and best practices for using these tools in higher education.

By adopting these recommendations, HECOF partners are able to proactively address risks associated with AI and ML tools, fostering responsible and trustworthy development and deployment thereof. Regular monitoring, feedback loops, and adaptability to emerging challenges are crucial for ongoing risk management

6. Conclusion

In conclusion, the development and implementation of AI and ML tools in higher education represent a transformative opportunity to enhance student learning experiences, personalize education, and improve overall educational outcomes. However, to ensure the success of these endeavors, it is imperative to prioritize ethical considerations, adhere to legal standards, and proactively mitigate potential risks, in privacy among else..

Ethically, these tools must be designed with fairness, transparency, and accountability at their core. Addressing biases, ensuring algorithmic transparency, and obtaining informed consent from stakeholders, in particular from students and educators, are crucial steps to foster trust and promote ethical AI practices.

Legally, compliance with data protection laws and relevant educational regulations is non-negotiable. HECOF partners stay abreast of evolving legal landscapes, collaborate with legal experts, and establish robust mechanisms to safeguard student data privacy. Moreover, clarity on data ownership, control policies, and informed consent procedures is vital for navigating legal complexities.

Risk mitigation measures should be woven into the fabric of AI and ML tool development. From conducting comprehensive risk assessments to implementing robust data security measures and providing mechanisms for human oversight, HECOF partners must adopt a proactive stance in identifying, minimizing, and managing potential risks. Collaboration with stakeholders, including legal experts, educators, and students, is key to comprehensively addressing ethical and legal considerations while actively managing risks.

In embracing AI and ML tools in higher education, stakeholders have an unprecedented opportunity to propel education into the future. By steadfastly prioritizing ethical, legal, and risk mitigation measures, they can build a foundation for technology-driven education that is not only innovative but also responsible, equitable, and trusted by all stakeholders. This commitment to ethical and legal excellence, coupled with a proactive approach to risk mitigation, will ensure that AI and ML tools contribute positively to the advancement of higher education in a manner that is sustainable, inclusive, and beneficial for all.

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