

developing computing and thinking skills along with data science from an early stage of education.

REFERENCES

- [1] Pedro, Francesc, et al. "Artificial intelligence in education: Challenges and opportunities for sustainable development," 2019, [Online]. Available: <http://repositorio.minedu.gob.pe/handle/20.500.12799/6533>
- [2] Luckin, Rosemary, and Mutlu Cukurova, "Designing educational technologies in the age of AI: A learning sciences-driven approach," *British Journal of Educational Technology*, vol. 50, No. 6, pp. 2824-2838, 2019.
- [3] Natalie Garrett, Nathan Beard, and Casey Fiesler, "More Than 'If Time Allows' The Role of Ethics in AI Education," in *Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society*, 2020, pp. 272-278.
- [4] Aparicio, Fernando, et al., "Perceptions of the use of intelligent information access systems in university level active learning activities among teachers of biomedical subjects," *International journal of medical informatics*, vol. 112, pp. 21-33, 2018.
- [5] Elish, Madeleine Clare and Danah Boyd, "Situating methods in the magic of Big Data and AI," *Communication monographs*, Vol. 85, No. 1, pp. 57-80, 2018.
- [6] Perrotta, Carlo and Neil Selwyn, "Deep learning goes to school: Toward a relational understanding of AI in education," *Learning, Media and Technology*, Vol. 45, No. 3, pp. 251-269, 2020.
- [7] Goh, Wilson Wen Bin and Chun Chau Sze, "AI paradigms for teaching biotechnology," *Trends in biotechnology*, Vol. 37, No. 1, pp. 1-5, 2019.
- [8] Hussain, Mushtaq, et al., "Student engagement predictions in an e-learning system and their impact on student course assessment scores," *Computational intelligence and neuroscience*, 2018.
- [9] Zawacki-Richter, Olaf, et al., "Systematic review of research on artificial intelligence applications in higher education—where are the educators?," *International Journal of Educational Technology in Higher Education*, Vol. 16, No. 1, pp. 1-27, 2019.
- [10] Touretzky, David S., et al., "K-12 Guidelines for Artificial Intelligence: What Students Should Know," in *Proc. of the ISTE Conference*, 2019.
- [11] Chassignol, Maud, et al., "Artificial Intelligence trends in education: a narrative overview," *Procedia Computer Science*, Vol. 136, pp. 16-24, 2018.
- [12] Sung, Woonhee, Junghyun Ahn, and John B. Black, "Introducing computational thinking to young learners: Practicing computational perspectives through embodiment in mathematics education," *Technology, Knowledge and Learning*, Vol. 22, No. 3, pp. 443-463, 2017.
- [13] Al-Samarraie, Hosam, et al., "E-learning continuance satisfaction in higher education: a unified perspective from instructors and students," *Studies in higher education*, Vol. 43, No. 11, pp. 2003-2019, 2018.
- [14] Hussain, Mushtaq, et al., "Using machine learning to predict student difficulties from learning session data," *Artificial Intelligence Review*, Vol. 52, No. 1, pp. 381-407, 2019.
- [15] Conati, Cristina, Kaska Porayska-Pomsta, and Manolis Mavrikis, "AI in Education needs interpretable machine learning: Lessons from Open Learner Modelling," *arXiv preprint arXiv:1807.00154*, 2018.
- [16] Marques, Livia S., Christiane Gresse von Wangenheim, and Jean CR HAUCK, "Teaching Machine Learning in School: A Systematic Mapping of the State of the Art," *Informatics in Education*, Vol. 19, No. 2, pp. 283-321, 2020.
- [17] ZHU, Kevin, "An educational approach to machine learning with mobile applications," PhD Thesis, Massachusetts Institute of Technology, 2019.
- [18] Google, Teachable Machine, 2020, [Online]. Available: <https://teachablemachine.withgoogle.com/>.
- [19] Pombo, Nuno, Nuno Garcia, and Kouamana Bousson, "Classification techniques on computerized systems to predict and/or to detect Apnea: A systematic review," *Computer methods and programs in biomedicine*, Vol. 140, pp. 265-274, 2017.
- [20] Barnes, Tiffany, et al., "Preface for the special issue on AI-supported education in computer science," *International Journal of Artificial Intelligence in Education*, Vol. 27, No. 1, pp. 1-4, 2017.
- [21] Vlasov, Andrey I., Ludmila V. Juravleva, and Vadim A. Shakhnov, "Visual environment of cognitive graphics for end-to-end engineering project-based education," *Journal of Applied Engineering Science*, Vol. 17, No. 1, pp. 99-106, 2019.
- [22] Gadanidis, George, "Artificial intelligence, computational thinking, and mathematics education," *International Journal of Information and Learning Technology*, 2017.
- [23] How, Meng-Leong, and Wei Loong David Hung, "Educating AI-thinking in science, technology, engineering, arts, and mathematics (STEAM) education," *Education Sciences*, Vol. 9, No. 3, p. 184, 2019. <https://doi.org/10.3390/educsci9030184>
- [24] Passonneau, Rebecca J., et al., "Preface: special issue on multidisciplinary approaches to AI and education for reading and writing," *International Journal of Artificial Intelligence in Education*, Vol. 27, No. 4, pp. 665-670, 2017.
- [25] Duzhin, Fedor, and Anders Gustafsson, "Machine learning-based app for self-evaluation of teacher-specific instructional style and tools," *Education Sciences*, Vol. 8, No. 1, p. 7, 2018. <https://doi.org/10.3390/educsci8010007>
- [26] Özdemir, Abdulkadir, Uğur Yavuz, and Fares Abdulhafidh Dael, "Performance evaluation of different classification techniques using different datasets," *International Journal of Electrical and Computer Engineering*, Vol. 9, No. 5, pp. 3584-3590, 2019.
- [27] Verma, Jyoti, et al., "Analysis and identification of kidney stone using K th nearest neighbour (KNN) and support vector machine (SVM) classification techniques," *Pattern Recognition and Image Analysis*, Vol. 27, No. 3, pp. 574-580, 2017.
- [28] Zhang, Ke, et al., "Multiple feature reweight densenet for image classification," *IEEE Access*, Vol. 7, pp. 9872-9880, 2019.
- [29] Recht, Benjamin, et al., "Do cifar-10 classifiers generalize to cifar-10?," *arXiv preprint arXiv:1806.00451*, 2018.
- [30] Thyagarajan, K. K., and I. Kiruba Raji, "A review of visual descriptors and classification techniques used in leaf species identification," *Archives of Computational Methods in Engineering*, Vol. 26, No. 4, pp. 933-960, 2019.