

Pengembangan Media Pembelajaran Pengenalan Hewan Berdasarkan Habitatnya Untuk Anak Usia Dini Menggunakan CNN (*Development of a Learning Media for Animal Recognition Based on Habitat for Early Childhood Using CNN*)

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ABSTRACT

Early childhood cognitive development is a critical phase that requires appropriate stimulation through interactive and engaging learning media. One effective approach is introducing animals, which helps develop classification skills and naturalistic intelligence. This study aims to develop a web-based interactive learning media that introduces animals based on their habitats using a Convolutional Neural Network (CNN). The model utilizes EfficientNetB0 with a transfer learning approach to classify 35 animal types mapped into their respective habitats. Data augmentation techniques were applied to enhance dataset variability. The results show that the model achieved an accuracy of 99.14%, with precision, recall, and F1-score each reaching 0.99. The application is implemented using Python (Flask) as the backend and HTML, CSS, and JavaScript as the frontend. The system provides real-time detection, image upload, and camera capture features, along with bilingual audio (Indonesian and English) and interactive educational games. Evaluation results indicate that the system performs optimally at a distance of 5–10 cm and a minimum lighting intensity of 30 lux. The User Acceptance Test (UAT) achieved a satisfaction rate of 89%, while pre-test post test analysis showed moderate to high learning improvement. Thus, the developed learning media is effective in enhancing early childhood understanding of animals and their habitats.

Key words: *Augmentation, CNN, EfficientNetB0, Childhood, Learning Media, Animals classification.*