Annotated Bibliography

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References

[1] Peter Gyory, S. Sandra Bae, Ruhan Yang, Ellen Yi-Luen Do, and Clement Zheng. Marking material interactions with computer vision. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, CHI '23', New York, NY, USA, 2023. Association for Computing Machinery.

This paper, written in part by the faculty of the ATLAS Institute at the University of Colorado Boulder in 2023, describes a computer vision system that can be run on a local device with a webcam. This is especially helpful as previous articles have been dependent on hardware that may not be accessible to all. This source has 5 citations showing higher engagement than the other sources investigated. The researchers in this paper investigated the creation of a Tangible User Interface system relying on computer vision rather than electronics to receive input due to the struggles novices have with devices like Arduino. They developed the beholder JavaScript library which gives users control over a device's cameras. Beholder could then use the cameras to read ArUco markers and acquire their metadata. ArUco markers resemble QR codes. After the library was designed, it was used in the projects of students. They would create systems and physical devices for which the ArUco marker could be read by Beholder, like a little arcade machine which moved the ArUco marker when a button was pressed. The system was easy to debug because visual information could indicate issues. Limitations of the system include proper lighting and space requirements for the camera. Aside from reinforcing a basic understanding of computer vision, this source is not the most relevant. However, this article does encourage consideration of elements like perspective and lightning when considering what a computer may be required to interpret.

[2] Soonhoi Ha and Eunjin Jeong. Software optimization and design methodology for low power computer vision systems. *ACM Trans. Embed. Comput. Syst.*, 24(1), December 2024.

This article written by Soonhoi Ha, a professor of Computer Science and Engineering, and Eunjin Jeong, a post-doctoral researcher in the same field, in 2024 discusses computer vision systems designed both for accuracy and system

constraints. It encourages the use of specialized hardware to optimize computer vision systems with deep learning. They suggest reducing redundancy in deep learning with approximate computing that does not cause significant accuracy loss. Examples in this article demonstrate systems with several convolutional layers followed by a few fully connected layers. The article goes on to discuss the results of implementing different types of quantization, quantization being the reduction of bits in representation, pruning of unnecessary parameters, reduction of large-size kernels to reduce storage requirements and computation time, and other optimization techniques. The article also strongly emphasizes when different types of hardware such as GPUs can be used to process layers. This article has been downloaded hundreds of times and continues to be downloaded frequently but it has no recorded citations on the ACM Digital Library website. The sources the article references tend to originate from scientific journals and conferences and appear credible. The article provides specific code examples for how the elements of computer vision can be programmed which would be very applicable to work in the field, and it reinforces the understanding of the basic concepts of layers in computer vision by showing examples of their implementations.

[3] Santiago Ponte Ahón, Yael Aidelman, Juan Seery, Facundo Manuel Quiroga, Franco Ronchetti, Waldo Hasperué, Matilde Iannuzzi, Romina Peralta, Mónica Lopez, Aurelio F. Bariviera, Lydia Cidale, and Roberto Gamen. Retroh-unlp: Conservation of the historical observational work of the astronomical observatory of la plata with computer vision. *J. Comput. Cult. Herit.*, July 2025. Just Accepted.

[4] Ying Yu and Yuhe Tian. Research application of computer vision-based convolutional neural network in handwriting recognition technology. In *Proceedings of the 4th International Conference on Computer, Artificial Intelligence and Control Engineering*, CAICE '25, page 177–181, New York, NY, USA, 2025. Association for Computing Machinery.

This paper analyzes how handwriting recognition technology based on convolution neural networks work. A convolution neural network is generally used for processing grid data and is a feed forward neural network. A convolutional neural network has an input layer that takes in data like 2D images, a convolution layer, which applies kernels to an image, which extract specific features to produce an output feature map, the pooling layer which is used to compress the data and prevent overfitting by taking the averages or maximums of regions, and next, the fully connected layer is used in the last layers of the network and perform tasks like classification on each feature, and finally, the output layer returns results. Handwriting recognition technology is used to convert handwriting into a computer-processable form. This handwriting recognition technology is more widely implemented now because of AI's development and used for diverse purposes including the preservation and retrieval of ancient books. The MNIST is a data set containing handwritten digits. Pytorch was used to build a handwriting recognition model with the MNIST as its training

set. The resulting model was vastly successful, but had trouble with multiple digits in succession or with incoherent strokes. The authors of this source, Ying Yu and Yuhe Tian are both associated with the College of Design and Art Shenyang Architecture University, and Yuhe Tian has researched AI in the past, but it is difficult to determine the extent of their background in AI. The sources that the authors use were written by research scholars and faculty at other universities. Overall, the source seems reputable, but the authors are not easily researchable. This source's overview of computer vision implemented in the context of handwriting provided strong background information for any potential investigation computer vision's implementation in identifying historic ligatures which could prove challenging because the authors implied that the computer vision struggled with numbers in succession and this certainly would apply to letters as well.