



CoMFoS-NASC International Conference 2026

20–23 June 2026 | Lapu-Lapu City, Cebu, Philippines 6015

<https://comfos-nasc2026.github.io/CoMFoS-NASC2026/>

comfos-nasc2026@math.upd.edu.ph

Post-Training Quantized Convolutional Neural Networks for Efficient Baybayin Handwriting Recognition on Edge Devices

James Arnold E. Nogra^{*1} and Rachelle Sambayan^{1,2}

¹Data Science Program, College of Science, University of the Philippines Diliman, Quezon City 1101, Philippines

²Institute of Mathematics, College of Science, University of the Philippines Diliman, Quezon city 1101, Philippines

*contact: jamesnogra@gmail.com

Since the approval of Baybayin as the national handwriting of the Philippines in 2016, many handwriting recognition systems have been developed. However, these models are limited in running on desktop computers or servers due to their computational requirements. This study investigates the feasibility of deploying a convolutional neural network (CNN) or inception network for Baybayin handwriting recognition into web or mobile devices. Using post-training quantization (PTQ), several models were trained in standard 32-bit floating point (fp32) format and then quantized down to 8-bit integer (int8). One of the objectives is that the model should correctly identify 58 out of the 59 Baybayin characters correctly (98.3% accurate). The quantization experiments show that quantization using PTQ offers almost no degradation in accuracy while reducing the file size up to 4 times. The smallest model meeting the 98.3% accuracy threshold has a file size of 122 kilobytes for the int8 model down from 432 kilobytes fp32. With 109,243 parameters, this model has a validation accuracy rate of 98.62% (fp32) and 98.49% (int8). The largest inception model with 464,955 parameters has a validation accuracy rate of 99.07% for both int8 and fp32 while having a file size of 489 kilobytes for the quantized int8. The results show that PTQ is an effective strategy to reduce file size of neural network models making it possible to run these models in edge devices without the need of powerful machines.

Keywords: Quantization, post-training quantization (PTQ), CNN, Inception Networks, Baybayin Handwriting Recognition

MSC2020: 68T07, 68T10, 62R07, 68U10, 68T45

References

- [1] P. A. M. Dirac. *The Principles of Quantum Mechanics*. International series of monographs on physics. Clarendon Press, 1981.
- [2] A. Einstein. Zur Elektrodynamik bewegter Körper. (German) [On the electrodynamics of moving bodies]. *Annalen der Physik*, 322(10):891–921, 1905.