

# MACHINE LEARNING TECHNIQUES FOR IMAGE CLASSIFICATION - A SURVEY

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## ABSTRACT

This paper explores the existing learning methods in the area of image classification.

**Index Terms**— One, two, three, four, five

## 1. INTRODUCTION

Image classification is the process of assigning one or more category label to an image or an image region. Learning methods will These guidelines include complete descriptions of the fonts, spacing, and related information for producing your proceedings manuscripts. Please follow them and if you have any questions, direct them [info@icip2015.org](mailto:info@icip2015.org).

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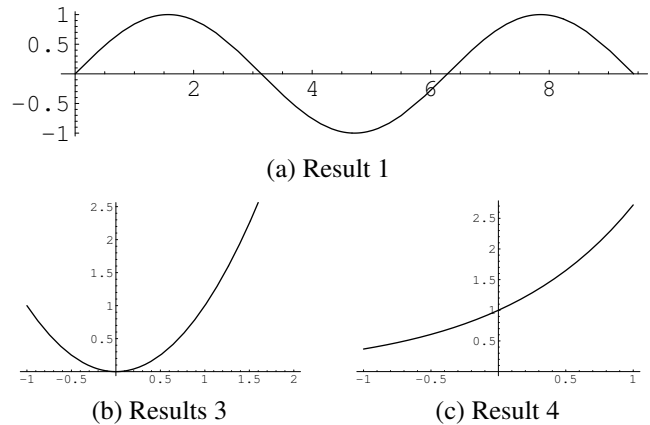
The latest attempt in image classification with an error 5.98set is reported by Ren Wu et al.[1] of Baidu research.They developed an end to end deep learning system named Deep Image. It uses a highly optimized parallel algorithm to implement large deep neural network with augmented input data. The network is trained using stochastic gradient decent algorithms (SGD)[ref] on a custom built high performance system comprised of 36 server nodes, each with 2 six-core Intel Xeon E5-2620 processors and 4 Nvidia Tesla K40m GPUs . System uses an InfiniBand network for interconnections. Parallelism strategies used in their network are model-data parallelism and data parallelism. This methods have been proposed by Alex Krizhevsky [2] and Omry Yadan et al.[3] for training convolutional neural networks with SGD on a multiple GPU sys- tems. But it is not easy extend the same strategies to multiple GPU cluster because of the communication overhead. So the Baidu Team focused on min- imizing network data transfers and overlapping the computation. They uses butterfly synchronization and lazy update strategies to achieve data parallelism in gradient computation. The first one focuses on partitioning gradients and

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**Fig. 1.** Example of placing a figure with experimental results.

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## 12. REFERENCES

- [1] A.B. Smith, C.D. Jones, and E.F. Roberts, “Article title,” *Journal*, vol. 62, pp. 291–294, January 1920.
- [2] C.D. Jones, A.B. Smith, and E.F. Roberts, “Article title,” in *Proceedings Title*. IEEE, 2003, vol. II, pp. 803–806.