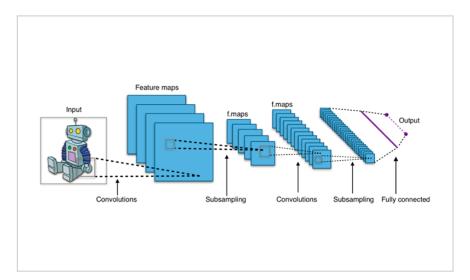
Improved Convolutional Neural Network Models

ID# 2019-4984





Step by step process of CNN

Technology Summary

Convolutional neural network (CNN) is the core artificial neural network model for image classification. It has two major issues: (1) there's very little mathematical understanding why and how CNN works and (2) a typical CNN model is often equipped with an exceedingly large number of weights and parameters, which, as a result, requires a large number of (labelled) data to train a typical CNN and makes it very challenging to train a CNN model. The disclosed invention uses multigrid algorithm to obtain a whole new class of CNN models called MgNet that seeks to fix these problems.

Application & Market Utility

MgNet will improve upon CNN technology and lead to a better mathematical understanding of CNN technology. It will lead to a new generation of "slim" CNN that require less weights and parameters, therefore making the CNN easier and faster to train, and requiring computers with less GPU.

CNNs are used in current technology such as Facebook's photo tagging as well as emerging fields such as self-driving cars. Facial recognition and image search engines can be vastly improved with CNNs.

Next Steps

Seeking one or more collaborators with very powerful (GPU) computers to train large data sets. Seeking licensing opportunities.

TECHNOLOGY READINESS LEVEL

4-7

Seeking

Licensing | Research

Keywords

- Convolutional neural network (CNN)
- image classification
- facial recognition
- image tagging
- deep learning

Researchers

Jinchao Xu

Verne M. Willaman Professor

Online Bio Website

Juncai He

Graduate student

Originating College

Eberly College of Science

Office of Technology Management Contact

Swope, Bradley bas101@psu.edu 814-863-5987



Invent Penn State is a Commonwealth-wide initiative to spur economic development, job creation, and student career success. Invent Penn State blends entrepreneurship-focused academic programs, business startup training and incubation, funding for commercialization, and university-community collaborations to facilitate the challenging process of turning research discoveries into valuable products and services that can benefit Pennsylvanians and humankind. Learn more at invent.psu.edu.

Penn State is an equal opportunity, affirmative action employer, and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability or protected veteran status.