

[CS & IT Conference Proceedings](#)

- [Home](#)
- [Current issue](#)
- [Archives](#)
- [Contact](#)

Micam: Visualizing Feature Extraction of Nonnatural Data

AUTHORS

Randy Klepetko and Ram Krishnan, University of Texas at San Antonio, USA

ABSTRACT

Convolutional Neural Networks (CNN) continue to revolutionize image recognition technology and are being used in non-image related fields such as cybersecurity. They are known to work as feature extractors, identifying patterns within large data sets, but when dealing with nonnatural data, what these features represent is not understood. Several class activation map (CAM) visualization tools are available that assist with understanding the CNN decisions when used with images, but they are not intuitively comprehended when dealing with nonnatural security data. Understanding what the extracted features represent should enable the data analyst and model architect tailor a model to maximize the extracted features while minimizing the computational parameters. In this paper we offer a new tool Model integrated Class Activation Maps, (MiCAM) which allows the analyst the ability to visually compare extracted feature intensities at the individual layer detail. We explore using this new tool to analyse several datasets. First the MNIST handwriting data set to gain a baseline understanding. We then analyse two security data sets: computers process metrics from cloud based application servers that are infected with malware and the CIC-IDS-2017 IP data traffic set and identify how re-ordering nonnatural security related data affects feature extraction performance and identify how reordering the data affect feature extraction performance.

KEYWORDS

Convolutional Neural Networks, Security, Malware Detection, Visualizations, Deep Learning.

[Full Text](#) [Volume 13, Number 2](#)

-  [Editorial Board](#)
-  [Most Cited Articles](#)
-  [Indexing](#)

- [FAQ](#)



-

Open Access Conference Proceedings
Computer Science & Engineering - Information Technology - Information Systems

Designed and Developed by NNN Net Solutions Team