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# Enhanced Compression Medical Image Speed for Computed Radiography

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**ABSTRACT:** In recent years, there has been a significant surge in the volume of medical imaging data. This surge poses challenges for the functioning of PACS communication systems and image archiving. The most effective solution to address this issue involves compressing images through digital encryption, which optimally utilizes storage space. This process involves reformatting the imaging data by reducing redundancy, leading to image compression. While this reduction in redundancy is readily apparent in individual images, there is a vulnerability in these methods that tends to overlook the source of redundancy found in similar stored images. Here the importance of our technology begins with improving the performance of the "frequency group" term, which helped to sort frequently similar images in medical image databases, leading to a significant reduction in redundancy compared to the previous technique.

In this research, our focus is on enhancing control over redundancy extraction in the data used, specifically medical images. To enhance the efficiency of standard image compression used in our technology through optimization of MinMax Predictive (MMP) and Min-Max Differential (MMD) technologies. Our experiments show that these methods lead to significant improvement in brain CT compression, with potential improvements of up to 135% when using Huffman coding. Similar improvements were observed in arithmetic coding, with a 95% improvement over arithmetic number code and a 38% improvement over Lempel-Ziv compression. These improvements occur when MMP technology is combined with MMD technology, using inverse operations through filters that result in lossless compression.

**Keywords:** Keyword 1, keyword 2, number of keywords is usually 3-7, but more is allowed if deemed necessary

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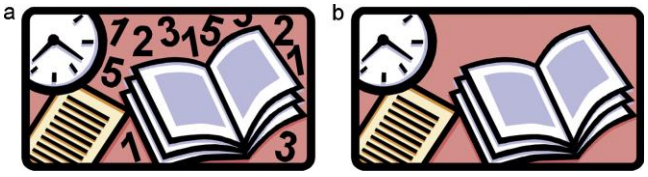


**FIGURE 1. - (a) first picture; (b) second picture**

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$$\rho = \frac{\vec{E}}{J_C\left(T = \text{const.}\right)\cdot\left(P\cdot\left(\frac{\vec{E}}{E_C}\right)^m + \left(1-P\right)\right)} \qquad (1)$$

## REFERENCES

[1] A. Haider and A. Koronios, "Promises of Open-Source Software for Australian Government Agencies-An Exploratory Study," PACIS 2009 Proceedings, p. 16, 2009.

[2] L. Morgan and P. Finnegan, "How perceptions of open-source software influence adoption: An exploratory study," 2007.

[3] Yusmadi Yah Jusoh, Khadijah Chamili, Jamaiah H Yahaya, and Noraini Che Pa, "The selection criteria of open-source software adoption in Malaysia," Int. J. Adv. Comput. Technol., vol. 4, no. 21, pp. 278–287, 2012.

[4] J. M. Gonzalez-Barahona, "Free Software / Open Source: Information Society Opportunities for Europe," 2000.

[5] Titterton G. Users reveal benefits of Open Source. Computer Weekly. 2003;6.

[6] D. Spinellis and C. Szyperski, "How is open source affecting software development," IEEE Softw.vol. 21, no. 1, pp. 28–33, 2004.

[7] T. Murphy, "Evaluate open-source risks," http://www. ftponline. com/wss/2002_10/online/tmurphy/, retrieved, vol. 19, p. 2012, 2001.