

# **Neutron/Gamma Pulse Discrimination Using Recurrent Deep Neural Networks**

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Neutron and gamma detection instruments play a crucial role in ensuring radiation security and safety across various fields. These instruments help in assuring safety against nuclear threats that emerge from the illegal use of fissile materials. Assessing the safety of workplaces and environments by identifying smuggled radioactive materials that could be used for malicious purposes is also accomplished with the help of these instruments. It can also be beneficial in protecting workers and the public from radiation by monitoring radiation levels in nuclear power plants, medical facilities, and research laboratories. It is important to distinguish between the two types of radiation. In this paper, we propose the use of a recurrent deep neural network-based method for neutron/gamma pulse discrimination. The proposed method is verified using a dataset of neutron-gamma-ray pulses. The accuracy and performance of the proposed method for neutron Gamma discrimination were evaluated and validated by comparing it with recent methods according to classification efficiency. The results indicate that the proposed method has more competitive discrimination accuracy than the compared methods.