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Learning from Data: the Zen of Deep Learning in KamLAND

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Neutrinoless Double Beta Decay($0\nu\beta\beta$) is one of the major research interests in neutrino physics. The discovery of $0\nu\beta\beta$ would answer persistent puzzles in the standard model. KamLAND-Zen experiment is one of the leading efforts in the search of $0\nu\beta\beta$. The data is taken from 745kg of Xe136 isotopes using 1879 PMTs. Simultaneously, deep learning is a process of learning from data. Thus in this talk, I will present the knowledge and insight we learned from KamLAND-Zen data. I will show the path of self-developed machine learning event classification algorithm to increase sensitivity. Furthermore, we enhance the algorithm with spherical geometry of the detector. Eventually, we aim to design an independent analysis chain with the deep learning approach.

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