

Research on some machine learning and deep learning techniques, applied in career analysis and orientation for vocational students at the Continuing Education Center of Thai Nguyen Province.

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Abstract: This study investigates the application of machine learning and deep learning techniques for career analysis and guidance for vocational students at the Continuing Education Center in Thai Nguyen Province. Given the critical need for personalized career orientation in vocational training, traditional advisory methods often fail to account for the complex, multi-dimensional nature of student capabilities and labor market demands. This research proposes and evaluates predictive models based on supervised learning algorithms, including Random Forest and Support Vector Machines, alongside deep learning architectures such as Multilayer Perceptrons and Recurrent Neural Networks. The models are trained on a dataset comprising student academic records, skill assessments, and psychological profiles. Experimental results demonstrate that deep learning approaches significantly outperform conventional machine learning methods in accuracy and adaptability, achieving a prediction precision of over 92% for suitable career pathways. The findings underscore the potential of intelligent systems to provide data-driven, personalized career recommendations, thereby enhancing educational outcomes and workforce alignment in regional vocational centers.

Keywords: machine learning, deep learning, career analysis, career orientation