# Applying Multilayer Perceptron to Forecast Allometric Growth of Mangroves : A Case Study in the Tamsui River

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Mangroves represent a unique global coastal wetland ecosystem, providing multifaceted ecosystem services,such as flood mitigation, shoreline stabilization, habitat provision, and carbon sequestration. Most importantly, the average carbon stock of mangroves can reach 1,023 Mg C $ha^{-1}$, which is approximately 3 to 4 times higher than that of boreal, temperate, and tropical upland.However, current quantitative research on mangrove carbon sequestration primarily focuses on mature stands, with limited analysis of growth characteristics and sequestration potential during the seedling stage. To address this gap, this study developed a machinelearning-based multilayer perceptron (MLP) to establish an allometric growth model that correlates morphological traits with the biomass of mangrove seedlings. We applied the MLP to estimate the mangrove growth at the Luzhou tide embankment of the Tamsui River, Taiwan.showedcan , with the mean absolute error (MAE) for aboveground biomass being 0.24 g (against a mean dry weight of 21.10 g), and the MAE for belowground biomass was 0.28 g (against a mean dry weight of 10.40 g). The MLP can not only predict aboveground biomass with high precision but also provides a scientific, quantitative basis for acquiring critical, hard-to-reach belowground data in Blue Carbon research. In doing so, our study provides insight into the formulation of Nature-based Solutions.

Keywords: Mangrove, Biomass, Machine Learning

 