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# Enhancing Electricity Consumption Forecasting in Limited Dataset: A Simple Stacked Ensemble Approach Incorporating Simple Linear and Support Vector Regression for Malaysia

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## ABSTRACT

Rapid population growth and urbanization, coupled with technological advancements, have driven higher electricity demand, predominantly sourced from contributors to climate change. This article introduces a novel artificial intelligence (AI) time-series algorithm, a simple stacked ensemble of simple linear regression (SLR) and Support Vector Regression (SVR), designed to forecast Malaysia's annual electricity consumption, particularly in scenarios with limited datasets utilizing the Cross Industry Standard Process for Data Mining (CRISP-DM) data science methodology. Analysis revealed that this simple stacked ensemble SVR-based time-series algorithm, employing an $\varepsilon$-insensitive loss function with a third-degree polynomial kernel, outperformed 71 other SVR-based algorithms, including four time-series algorithms from the previous study. The algorithm's forecasting insights from the formulated algorithm could guide policymakers in establishing more effective regulations aligned with Sustainable Development Goals (SDGs) such as affordable and clean energy (SDG7), decent work and economic growth (SDG8), industry, innovation and infrastructure (SDG9), sustainable cities and communities (SDG11), responsible consumption and production (SDG12), and climate action (SDG13), which benefit economic, environmental, human, and social.

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## 1. Introduction

Energy plays a substantial role in socio-economic development worldwide. This is due to energy being a predominant component of the Sustainable Development Goals (SDGs), composed of four principal pillars such as economic, environmental, human, and social (Tan *et al.*, 2013). According to the International Energy Agency's 2007 World Energy Outlook, the global energy