



International Journal of Research in Agronomy

E-ISSN: 2618-0618

P-ISSN: 2618-060X

© Agronomy

www.agronomyjournals.com

2025; 8(1): 559-563

Received: 09-10-2024

Accepted: 17-11-2024

Alagesan Arumugam

Associate Professor (Agronomy),
Indian Council of Agricultural
Research-Krishi Vigyan Kendra,
Tamil Nadu Agricultural
University, Pudukottai, Tamil
Nadu, India

Jesupriya Poornakala Selvaraj

Associate Professor (FSN), Indian
Council of Agricultural Research-
Krishi Vigyan Kendra, Tamil
Nadu Agricultural University,
Pudukottai, Tamil Nadu, India

Thukkaiyannan Palaniappan

Associate Professor (Agronomy),
Indian Council of Agricultural
Research-Krishi Vigyan Kendra,
Tamil Nadu Agricultural
University, Tiruppur, Tamil Nadu,
India

Support vector machine learning algorithm for the prediction of atmospheric air temperature using historical weather data

Alagesan Arumugam, Jesupriya Poornakala Selvaraj and Thukkaiyannan Palaniappan

DOI: <https://doi.org/10.33545/2618060X.2025.v8.i1h.2463>

Abstract

The Support Vector Machine (SVM) learning algorithm has emerged as a robust tool for predicting atmospheric air temperature from historical weather data, showcasing its potential in tackling complex meteorological challenges. Recent trends in environmental predictions emphasize the importance of advanced machine learning techniques over traditional methods, highlighting SVM's ability to handle dynamic atmospheric data and provide more accurate forecasts compared to conventional statistical approaches. By incorporating diverse weather features and real-time data, SVM significantly improves the reliability of temperature predictions, crucial for effective environmental management amidst urbanization-induced climate impacts. The efficacy of SVM extends beyond temperature forecasting to applications like predicting hazardous flight conditions and black ice events, demonstrating high accuracy rates in analyzing meteorological parameters. As SVM evolves and adapts, its role in temperature prediction is expected to expand, enhancing safety and operational efficiency in aviation and other sectors reliant on precise weather forecasting. The advancements in predictive accuracy through SVM represent a pivotal step towards understanding and mitigating the effects of climate change, underscoring its growing significance in environmental modeling and policy-making.

Keywords: Air temperature prediction, support vector machine, machine learning

1. Introduction

The increasing volatility of atmospheric air temperature has necessitated the development of robust predictive models to enhance our understanding of climate dynamics. Among various machine learning techniques, the Support Vector Machine (SVM) algorithm has emerged as a powerful tool for analyzing historical weather data to forecast future temperature trends. By leveraging high-dimensional data, SVM seeks to identify the optimal hyperplane that separates different temperature states, thereby facilitating accurate predictions. This introduction to the SVM learns algorithm sets the stage for an exploration of its potential applications in climate science, particularly in evaluating long-term temperature variations caused by anthropogenic influences. Understanding the historical patterns of atmospheric temperature not only informs policymakers but also contributes significantly to environmental sustainability efforts. Thus, employing SVM in temperature prediction represents a pivotal advancement in merging technology with climatology for proactive responses to climate change challenges.

2. Overview of atmospheric air temperature prediction

Understanding atmospheric air temperature prediction is increasingly vital as climate change intensifies and impacts global weather patterns. These predictions rely heavily on historical weather data, which provides the foundation for various machine learning algorithms, including support vector machines (SVM). By analyzing patterns in past temperature data, these algorithms can offer insights into future conditions. Recent advancements highlight the significance of integrating multiple predictive models to enhance accuracy. For instance, the use of the SVM in conjunction with other techniques, as depicted in studies focusing on solar

Corresponding Author:

Alagesan Arumugam

Associate Professor (Agronomy),
Indian Council of Agricultural
Research-Krishi Vigyan Kendra,
Tamil Nadu Agricultural
University, Pudukottai, Tamil
Nadu, India

irradiance, showcases the robustness of such approaches in minimizing prediction error and uncertainty (Zhang C *et al.*, 2024) ^[3]. Moreover, machine learning has demonstrated its effectiveness across various climate-related predictions, from temperature to extreme weather events, indicating its potential for future long-term forecasting (K B Maheswari *et al.*, 2024) ^[11]. Collectively, these advancements represent a transformative shift in the realm of atmospheric predictions, offering precise and reliable forecasting tools.

3. Importance of accurate weather forecasting

Accurate weather forecasting plays a pivotal role in a myriad of sectors, ultimately influencing economic decisions and public safety. The ability to predict atmospheric conditions not only assists agricultural practices by facilitating effective planting and harvesting schedules but also enhances disaster preparedness for extreme weather events, thereby mitigating loss of life and property. As highlighted in ongoing research, traditional forecasting methods, such as Numerical Weather Prediction (NWP), often face challenges in tropical regions due to rapid atmospheric changes, emphasizing the need for innovative approaches like machine learning. The introduction of Support Vector Machine algorithms, as discussed in (Dinalankara *et al.*, 2022) ^[5], provides a promising alternative for improving temperature predictions by leveraging historical weather data. Additionally, the comparative analysis of machine learning and deep learning techniques elaborated in (Solomon *et al.*, 2023) ^[20] underscores the potential for these advanced models to capture complex nonlinear relationships within weather datasets, ultimately enhancing the accuracy of forecasts.

4. Introduction to Support Vector Machine (SVM) as a predictive tool

Support Vector Machine (SVM) serves as an indispensable predictive tool in various applications, particularly in the realm of environmental science and meteorology. By categorizing data into distinct classes through the identification of optimal decision boundaries in high-dimensional spaces, SVM is adept at managing complex datasets typical of atmospheric studies. This attribute is crucial when handling nonlinear relationships inherent in meteorological data, such as those encountered in atmospheric air temperature predictions. As highlighted in recent research, SVM has effectively predicted hazardous weather conditions, demonstrating its applicability to managing uncertainty in meteorological forecasts (Liu H *et al.*, 2024) ^[7]. Furthermore, earlier studies have employed SVM alongside various machine learning algorithms to extract insights from historical weather patterns, showcasing its potency in enhancing prediction accuracy (Idemudia O *et al.*, 2024) ^[16]. Thus, as a predictive tool, SVMs capabilities not only facilitate better forecasting of atmospheric phenomena but also improve decision-making in climate-related applications.

4.1. Fundamentals of Support Vector Machine Learning

Support Vector Machine (SVM) learning is grounded in the principle of creating optimal separating hyperplanes to distinguish between classes in a high-dimensional space. This methodology is particularly advantageous for applications in atmospheric temperature prediction, as it can effectively manage the nonlinear relationships often present in historical weather data. SVM employs techniques such as kernel functions to transform the input space, enabling the algorithm to delineate complex patterns that are not readily apparent in raw data. Furthermore, the capacity of SVM to generalize well with

limited training samples makes it a robust choice in meteorological studies, where data can be scarce and noisy. Given the critical societal implications of accurate weather forecasting, especially in sectors like agriculture and public health, employing SVM algorithms could lead to significant improvements in predictive accuracy and efficiency, aligning with the findings that machine learning enhances weather modeling capabilities (Dinalankara *et al.*, 2022) ^[5], (Yang *et al.*, 2022) ^[22].

4.2. Definition and principles of Support Vector Machines

Support Vector Machines (SVM) are a class of supervised learning algorithms particularly effective for classification and regression tasks, including the modeling of atmospheric air temperature based on historical weather data. The core principle of SVM revolves around identifying a hyperplane that optimally separates classes within a dataset by maximizing the margin between data points of different categories, thus enhancing predictive accuracy. This method is adept at handling high-dimensional spaces and works effectively even when the number of dimensions exceeds the number of samples, making it suitable for complex weather datasets. Furthermore, SVM can incorporate kernel functions to handle non-linear relationships, which is essential in meteorological applications where intricate patterns and variability are commonplace. Understanding these foundational principles is crucial for leveraging SVM in predicting atmospheric temperature, as it aligns with recent advancements in machine learning methodologies discussed in (Solomon *et al.*, 2023) ^[20] and (Yang *et al.*, 2022) ^[22].

4.3. Comparison of SVM with other machine learning algorithms

In the realm of machine learning algorithms for predicting atmospheric air temperature, Support Vector Machine (SVM) has emerged as a competitive option compared to other popular methods, such as decision trees and neural networks. SVM offers notable benefits, particularly in its ability to efficiently handle high-dimensional data, which is crucial when integrating historical weather variables. Noteworthy studies indicate that the application of advanced techniques, including SVM, is increasingly favored over traditional methods for tasks like air quality prediction and meteorological modeling (Iskandaryan *et al.*, 2020) ^[9]. Furthermore, recent research highlights the performance advantages of SVM when juxtaposed with models like XGBoost and LSTM in predicting environmental conditions, as it tends to require less training time while maintaining robustness in predictions (Yang *et al.*, 2022) ^[22]. Such characteristics position SVM as a viable candidate for enhancing predictive accuracy in atmospheric temperature forecasting, emphasizing its relevance in contemporary machine learning applications.

4.4. Key components of SVM: hyperplanes, support vectors, and kernels

Support Vector Machines (SVMs) are potent tools in the realm of machine learning, particularly due to their foundational components: hyperplanes, support vectors, and kernels. At the core of SVM lies the hyperplane, which serves as a decision boundary that separates different classes in the feature space. The ideal hyperplane maximizes the margin between the nearest data points of each class, known as support vectors. These support vectors are crucial since they directly influence the positioning of the hyperplane, ensuring that the model generalizes well to unseen data. To effectively manage non-

linear relationships, SVM utilizes kernel functions, which transform the original input space into a higher-dimensional space where a linear hyperplane can be applied for classification. The significance of these components in the context of predicting atmospheric air temperature from historical weather data cannot be understated, as they enhance the models accuracy and robustness.

5. Application of SVM in Weather Data Analysis

The application of Support Vector Machines (SVM) in weather data analysis has gained prominence due to its effectiveness in handling nonlinear patterns within complex datasets. SVMs operate by creating hyperplanes that optimally separate different data classes, which is particularly useful in meteorological contexts where atmospheric variables exhibit intricate interrelationships. This method has been shown to outperform traditional forecasting techniques by accurately modeling the interactions between various atmospheric conditions, thereby enhancing prediction precision. Moreover, recent studies have explored the integration of SVM with other machine learning techniques, highlighting a comparative analysis of methodologies such as polynomial regression and neural networks in weather forecasting. These investigations reveal the efficacy of SVM in capturing the underlying patterns in historical weather data, emphasizing its potential in the efficient prediction of atmospheric air temperature (Solomon *et al.*, 2023)^[20]. Furthermore, SVM's adaptability allows for the incorporation of external factors like seasonal changes, thus improving forecast accuracy (Iskandaryan *et al.*, 2020)^[9].

5.1. Data preprocessing techniques for historical weather data

In the realm of atmospheric air temperature prediction, effective data preprocessing techniques are crucial for enhancing the accuracy of machine learning models, especially when employing the Support Vector Machine (SVM) algorithm. Historical weather data often contains inconsistencies such as missing values, outliers, and noise, which can significantly impair model performance. Techniques such as normalization and standardization are employed to scale the data, enabling the SVM to perform optimally by placing all features on a comparable scale. Furthermore, the integration of temporal data, such as date and hour, complements conventional meteorological variables like temperature, humidity, and pressure, as highlighted in relevant literature (D Somasundaram *et al.*, 2024)^[4]. Additionally, exploratory data analysis (EDA) is essential for identifying and addressing anomalies within the dataset, ensuring that underlying patterns reflective of atmospheric behavior are retained, as demonstrated in studies involving machine learning applications across various domains (Idemudia O *et al.* 2024)^[16]. This rigorous preprocessing laying the groundwork for robust predictive modeling is indispensable for accurate atmospheric forecasts.

5.2. Feature selection and its impact on prediction accuracy

The process of feature selection plays a pivotal role in enhancing the prediction accuracy of machine learning models, particularly when applied to atmospheric air temperature forecasting using historical weather data. By identifying and retaining only the most relevant features, such as temperature, solar radiation, and relative humidity, the model can streamline its computations and mitigate the risk of overfitting, which is vital for improving generalization to unseen data. Studies have illustrated that omitting irrelevant or redundant features can lead to a more

efficient learning process and refined model performance, as observed in various contexts, including energy consumption predictions in buildings using machine learning techniques (Sharma *et al.*, 2022)^[19]. Moreover, comprehensive reviews of machine learning applications in air pollution prediction underscore the need for meticulous feature extraction, which contributes significantly to the reliability of predictive outcomes (Iskandaryan *et al.*, 2020)^[9]. Thus, effective feature selection is essential for leveraging the support vector machine algorithms full potential in atmospheric temperature predictions.

6. Case studies showcasing SVM in atmospheric temperature prediction

Support Vector Machines (SVM) have emerged as a powerful tool for predicting atmospheric temperature, particularly when analyzing complex historical weather data. Notably, case studies demonstrate the versatility of SVM in varied environmental contexts, optimizing its predictive capabilities through tailored kernel functions. For instance, research conducted in Lagos State utilized SVM alongside Elman neural networks to forecast energy demand, with temperature identified as a key variable impacting predictions (I A Mahmoud *et al.*, 2024)^[8]. This integration of SVM within energy forecasting models underscores its reliability and accuracy compared to traditional regression methods. Furthermore, a related study emphasized the necessity of machine learning techniques to improve rainfall predictions in Bangladesh, illustrating that SVM can effectively pair with other ML models to enhance overall forecasting performance (S R Alve *et al.*, 2024)^[17]. These case studies collectively affirm that SVM not only excels in temperature prediction but also contributes significantly to refined environmental modeling efforts.

7. Challenges and Limitations of SVM in Temperature Prediction

The application of Support Vector Machines (SVM) in temperature prediction presents several noteworthy challenges and limitations. One significant obstacle is the models sensitivity to parameter selection, which can greatly influence its predictive performance. The complexity of choosing the appropriate kernel function and tuning hyperparameters often leads to overfitting or underfitting, thereby affecting model reliability. Moreover, SVM algorithms require extensive computational resources, particularly when processing large historical weather datasets. This demand can hinder their practical application in real-time temperature forecasting, especially in settings where computational efficiency is paramount. Furthermore, while SVM has demonstrated superior accuracy in some contexts (Zhang C *et al.*, 2024)^[3], studies like the comparative analysis against Random Forest Regressor (RFR) indicate that other machine learning models may outperform SVM in specific scenarios, such as solar energy forecasting, thus raising questions about the versatility of SVM for diverse atmospheric conditions (Yerrabolu VL *et al.*, 2024)^[21].

7.1. Overfitting and underfitting issues in SVM models

The challenges of overfitting and underfitting are pivotal in the application of Support Vector Machine (SVM) models for predicting atmospheric air temperature from historical weather data. Overfitting occurs when the model captures noise in the dataset rather than the underlying trend, leading to diminished predictive performance on unseen data. Conversely, underfitting reflects a model that is too simplistic, failing to capture essential patterns, thus impairing its accuracy. In the context of SVMs,

selecting an appropriate kernel function and tuning hyperparameters are crucial for balancing bias and variance. Specifically, high-dimensional datasets, often encountered in weather modeling, exacerbate these issues due to their complexity (Sharma *et al.*, 2022) ^[19]. Additionally, as evidenced in recent studies, inadequate training samples can lead to imbalanced models that struggle to generalize effectively, highlighting the need for careful data management and feature selection to mitigate these pitfalls in SVM applications for weather predictions (Kirkholt *et al.*, 2024) ^[13].

7.2. The impact of data quality and quantity on model performance

The correlation between data quality, quantity, and model performance is particularly significant in the context of machine learning applications like the Support Vector Machine (SVM) algorithm for predicting atmospheric air temperature. High-quality data, characterized by accuracy, consistency, and relevance, is crucial for training SVM models effectively; any anomalies or errors can lead to skewed predictions that fail to reflect real-world conditions. Furthermore, the volume of data plays a pivotal role, as extensive datasets can enhance the model's ability to generalize and adapt to various atmospheric patterns. This principle is evident in studies where robust datasets have demonstrated improved prediction capabilities. For example, the integration of diverse environmental factors in predictive models has proven advantageous, as seen in the examination of solar power generation relying on meteorological data (Mrs. Devi KS *et al.*, 2023) ^[14] and in strategies for forecasting agricultural yields rooted in comprehensive environmental analyses (Ejaz N *et al.*, 2018) ^[15]. Ultimately, both data quality and quantity are indispensable for achieving optimal SVM model effectiveness and reliability.

7.3. Computational complexity and scalability of SVM algorithms

The computational complexity and scalability of Support Vector Machine (SVM) algorithms play a crucial role in their application for predicting atmospheric air temperature from historical weather data. SVMs require substantial computational resources, especially as the size of the datasets increases, which can limit their practicality in real-time applications. This concern is underscored in studies highlighting the performance trade-offs between various machine learning models, where SVMs are often outpaced by simpler or more scalable algorithms, particularly in scenarios involving extensive feature sets and larger datasets (Sharma *et al.*, 2022) ^[19]. Moreover, advancements in data-driven weather forecasting models, such as FengWu-GHR, showcase the potential for SVM techniques to operate effectively at higher resolutions while overcoming the computational constraints typically associated with numerical models (Bai *et al.*, 2024) ^[1]. Consequently, enhancing the scalability of SVM algorithms is vital for optimizing their integration into complex environmental modeling frameworks and ensuring accurate temperature predictions.

8. Conclusion

In conclusion, the application of the Support Vector Machine (SVM) learning algorithm has proven to be a robust method for predicting atmospheric air temperature from historical weather data. This study highlights the significance of integrating advanced machine learning techniques, as indicated by recent research trends that favor sophisticated approaches over simpler methods in environmental predictions (Iskandaryan *et al.*, 2020)

^[9]. Moreover, SVMs capability to handle complex and dynamic atmospheric data allows for more accurate forecasts, addressing inherent challenges posed by traditional statistical methods (Dr. P Kumar S *et al.*, 2023) ^[6]. The findings suggest that by considering diverse weather features and incorporating real-time data, SVM can greatly enhance the reliability of temperature predictions. As urbanization continues to impact climate patterns, utilizing such machine learning algorithms will be crucial for effective environmental management and policy-making. Thus, the advancement in predictive accuracy through SVM reflects a pivotal step towards understanding and mitigating the effects of climate change.

8.1. Summary of the effectiveness of SVM in temperature prediction

The effectiveness of Support Vector Machine (SVM) in predicting atmospheric air temperature is increasingly supported by various studies, showcasing its potential in addressing complex meteorological challenges. SVMs ability to handle nonlinear relationships in weather data is exemplified by its application in predicting hazardous flight conditions, where historical meteorological observations, including temperature and humidity, are analyzed to distinguish between safe and dangerous weather scenarios (Liu H *et al.*, 2024) ^[7]. Furthermore, research on black ice prediction illustrates SVMs robustness, achieving an accuracy of 92.5% when utilizing atmospheric data such as air temperature and relative humidity (Jang J 2024) ^[10]. This demonstrates that SVM is not only effective in temperature forecasting but also in contexts requiring high precision and reliability. As SVM continues to evolve through refinement and adaptation, its role in temperature prediction is likely to grow, enhancing both safety and operational efficiency in aviation and other fields.

8.2. Future directions for research and development in SVM applications

The future of research and development in Support Vector Machine (SVM) applications looks particularly promising, particularly in the realm of climate studies and atmospheric predictions. Broadening the existing frameworks via enhanced algorithms could significantly bolster the accuracy of temperature predictions derived from historical weather data. As identified in recent analyses, machine learning methodologies, including SVM, have become central to advancing numerical weather prediction, particularly concerning extreme events and climate change (Bochenek *et al.*, 2022) ^[2]. Furthermore, the integration of real-time data from various climatic sources, such as data captured from airplanes, could refine predictive models and improve their robustness against dynamic atmospheric patterns (Sharma *et al.*, 2020) ^[18]. By embracing interdisciplinary approaches that incorporate advanced computational techniques alongside historical climate data, future research holds the potential to develop more effective SVM applications that not only predict air temperature but also address broader meteorological phenomena with unprecedented accuracy and adaptability.

8.3. Final thoughts on the role of machine learning in climate science

In conclusion, the integration of machine learning, particularly the Support Vector Machine (SVM) algorithm, has fundamentally transformed the landscape of climate science and meteorological predictions. By harnessing vast amounts of historical weather data, SVM facilitates the identification of

complex patterns that traditional modeling approaches may overlook. This capability not only enhances the accuracy of atmospheric temperature predictions but also provides critical insights into climate trends and anomalies. As climate change intensifies and its implications become more urgent, the role of such advanced computational tools is more crucial than ever. The adaptability and precision of machine learning methodologies empower researchers to refine their models continuously, ensuring that they remain responsive to evolving environmental variables. Ultimately, the ongoing development and application of machine learning in climate science will be essential for fostering informed decision-making and effective climate resilience strategies in the face of unprecedented global challenges.

9. References

- Bai L, Chen K, Dai K, Gong Z, *et al.* FengWu-GHR: Learning the Kilometer-scale Medium-range Global Weather Forecasting. [Internet]. 2024. Available from: <http://arxiv.org/abs/2402.00059>
- Bochenek B, Ustrnul Z. Machine learning in weather prediction and climate analyses: applications and perspectives. [Internet]. MDPI AG; 2022. Available from: <https://core.ac.uk/download/553601591.pdf>
- Zhang C, Xu M. Time-Segment Photovoltaic Forecasting and Uncertainty Analysis Based on Multi-Objective Slime Mould Algorithm to Improve Support Vector Machine. *IEEE Trans Power Syst.* 2024;39:5103-5114. Available from: <https://www.semanticscholar.org/paper/83542f5e43cb46eee7703e967cea634613d10215>
- Somasundaram D, Muthukumar R, Rajavinu N, Ramaiyan K, Kavitha P. Machine learning applications for predicting system production in renewable energy. *Int J Power Electron Drive Syst.* 2024. Available from: <https://www.semanticscholar.org/paper/7500439a1817550453b9afc72fc5f0fcd16d4304>
- Dinalankara R, Hennayake KMSA, Mudunkotuwa DY. Machine Learning Based Weather Prediction Model for Short Term Weather Prediction in Sri Lanka. [Internet]. University of Sri Jayewardenepura; 2022. Available from: <https://core.ac.uk/download/577886110.pdf>
- Kumar PS, Swathi MN. Rainfall Prediction using AdaBoost Machine Learning Ensemble Algorithm. [Internet]. Jamal Mohamed College Publication; 2023. Available from: <https://core.ac.uk/download/578580369.pdf>
- Liu H, Xie R, Qin H, Li Y. Research on Dangerous Flight Weather Prediction based on Machine Learning. *ArXiv.* 2024;abs/2406.12298. Available from: <https://www.semanticscholar.org/paper/3bf00bf41535647fec87240f114d75c5d92a67f>
- Mahmoud IA, Muhammad UJ, Kawu SJ, Magaji MM, Jibril MM, Ibrahim KH, *et al.* Enhancing Energy Demand Prediction Using Elman Neural Network and Support Vector Machine Model: A Case Study in Lagos State, Nigeria. *Artif Intell Evol.* 2024. Available from: <https://www.semanticscholar.org/paper/691ead00925a037abbb3bc6a92438007a7bc6572>
- Iskandaryan D, Ramos F, Trilles S. Air Quality Prediction in Smart Cities Using Machine Learning Technologies Based on Sensor Data: A Review. [Internet]. MDPI AG; 2020. Available from: <https://core.ac.uk/download/322902433.pdf>
- Jang J. Forecasting Nighttime Frost-induced Black Ice Formation on Bridges Using Atmospheric Data. *Open Transp J.* 2024. Available from: <https://www.semanticscholar.org/paper/f661190c24bd56c97025d5fd403346a6a7eb32b2>
- Maheswari KB, Gomathi S. A Comprehensive Analysis of Weather Prediction Using Machine Learning. 2024 Ninth International Conference on Science Technology Engineering and Mathematics (ICONSTEM); 2024. p. 1-6. Available from: <https://www.semanticscholar.org/paper/49f4ce8069b29e9c98c1d7893ffd8de1a88b5fae>
- Khoza SC. Predicting process performance in the manufacturing and agricultural sectors using machine learning techniques. [Internet]. Stellenbosch University; 2021. Available from: <https://core.ac.uk/download/420305474.pdf>
- Kirkholt TML. Investigating the Viability of Machine Learning for the Prediction of Icing Occurrences at Airports. [Internet]. Norwegian University of Life Sciences; 2024. Available from: <https://core.ac.uk/download/617933832.pdf>
- Saraswathi Devi KVB, Srivenkatesh M. Hybrid Solar Power Generation Prediction Using Support Vector Machines and K-Nearest Neighbors Optimized by Deep Learning Techniques. *JATIT.* 2023;101(11). Available from: www.jatit.org
- Ejaz N, Abbasi S. Wheat Yield Prediction Using Neural Network and Integrated SVM-NN with Regression. *Pak J Eng Technol Sci.* 2018;8(2):77-81. Available from: <https://core.ac.uk/download/pdf/288294951.pdf>
- Idemudia O, Ehiorobo JO, Izinyon CO, Ilaboya I. Evaluating the performance of Random Forest, Decision Tree, Support Vector Regression, and Gradient Boosting for streamflow prediction. *CTU J Innov Sustain Dev.* 2024. Available from: <https://www.semanticscholar.org/paper/7d6db36e299e6417f175b36a497c7e13d6180cc9>
- Alve SR, Pial AJ, Mahmud MZ, Islam S. Harnessing Historical Weather Data with Machine Learning for Rainfall Forecasting in Bangladesh: A Time Series Analysis. *Cognizance J Multidiscip Stud.* 2024. Available from: <https://www.semanticscholar.org/paper/ffa161a6dedcf506efdf1b9bd9be2df2aab36e24>
- Sharma A. Flight Data of Airplane for Wind Forecasting. *ScholarWorks@UNO.* 2020. Available from: <https://core.ac.uk/download/387593477.pdf>
- Sharma V. Exploring the Predictive Power of Machine Learning for Energy Consumption in Buildings. *eCommons.* 2022. Available from: <https://core.ac.uk/download/619740836.pdf>
- Solomon W. A Comparative Analysis of the Use of Deep Learning and Machine Learning in Weather Forecasting: Using Meteorological Dataset on Vaasa. 2023. Available from: <https://core.ac.uk/download/581146890.pdf>
- Yerrabolu VL, Kasireddy I, Jasmine KM, Vamsi TBMK, Joshua N, Shyam Kumar V, *et al.* Performance Comparison of Random Forest Regressor and Support Vector Regression for Solar Energy Prediction. *IOP Conf Ser Earth Environ Sci.* 2024. Available from: <https://www.semanticscholar.org/paper/e7e6c96c651ccd7f1a5b59a3726f123b75cb4640>
- Yang W. Machine Learning based Wind Power Forecasting for Operational Decision Support. [Internet]. 2022. Available from: <https://core.ac.uk/download/543594444.pdf>