## *Data Analytics Lab with Mini-Project Report on*

## “SOLAR RADIATION PREDICTION”

***Data Analytics Lab with Mini-Project report submitted in partial fulfillment of the requirements for the award of degree of***

# MASTER OF COMPUTER APPLICATIONS

**Of**



# VISVESVARAYA TECHNOLOGICAL UNIVERSITY

**Submitted By**

**MANOJ SOMANNA**

**(1AM23MC030)**

**Under the guidance of**

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**AMC ENGINEERING COLLEGE**

**Department of Master of Computer Applications**

**18th KM, Bannerghatta Road, Bengaluru - 560083**

**April 2025**

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**Department of Master of Computer Applications**

**[Affiliated to Visvesvaraya Technological University, Belagavi]**

**18th KM, Bannerghatta Road, Bengaluru-560083**

**Academic Year 2024-25**

**CERTIFICATE**

*This is to certify that* **MANOJ SOMANNA (1AM23MC030)** *has completed his Data Analytics Lab with Mini-Project entitled* **“SOLAR RADIATION PREDICTION”** *as partial fulfillment for the award of* ***Master of Computer Applications*** *degree, during the academic year of 2024-25 under our joint supervision*

**Internal Guide Head of the Department**

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**Academic Year 2024-25**

**Continuous Internal Evaluation (CIE)**

**Student Name: MANOJ SOMANNA USN: 1AM23MC030**

**Internal Guide Name**: **Prof. SRAVANTHI K**

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| --- | --- | --- | --- |
| **Sl. No** | **Performance Evaluation** | **Max. Marks** | **Marks Awarded** |
| 1 | Project Planning and Problem Definition | 04 |  |
| 2 | Data Collection, Preprocessing & Data Analysis | 04 |  |
| 3 | Results and Insights | 04 |  |
| 4 | Report Writing and Documentation | 04 |  |
| 5 | Presentation and Communication | 04 |  |
| **Total** | | **20** |  |

**Total Marks Awarded: \_\_\_\_\_\_\_\_\_\_\_ In Words: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Signature of the Internal Guide Signature of the Head of the Dept**

**Name of the Examiner’s Signature with date**

**1.**

**2.**

### DECLARATION

I, **MANOJ SOMANNA** student of 3rd semester MCA, AMC Engineering College, bearing USN **1AM23MC030** here by declare that the Data Analytics Lab with Mini-Project entitled “**SOLAR RADIATION PREDICTION”** has been carried out by me under the supervision of Internal Guide **Prof. Sravanthi K, Assistant Professor,** and Head of the department **Dr. M.S. Shashidhara**, Professor & Head and submitted in partial fulfillment of the requirements for the award of degree in **MASTER OF COMPUTER APPLICATIONS** by **Visvesvaraya Technological University**, **Belagavi** during the academic year 2024-2025. This report has not submitted to any other Organization/University for any award of degree Certificate

**Name: MANOJ SOMANNA**

**Signature:**

**ACKNOWLEDGEMENT**

Firstly, I thank God for helping me throughout this Data Analytics Lab with Mini-Project and strengthening me to complete this work successfully and at my best. I would like to dedicate this work to my parents for their constant support and encouragement during the course of this work.

The success of any task depends on many factors, with people being the most important. Several people have contributed directly and in-directly to the successful completion of this project. I express my gratitude and respect to all those who helped to steer the internship towards its completion and inspire us for the same.

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I express my sincere thanks and deepest gratitude to ***Dr. M. S. Shashidhara*, Professor & Head, Department of MCA, AMC Engineering College,** for providing us with adequate faculties, ways and means by which I was able to complete this project.

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**MANOJ SOMANNA**

**(1AM23MC030)**

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### ABSTRACT

### Solar radiation prediction is crucial for optimizing renewable energy systems, climate modelling, and agricultural planning. This study focuses on utilizing data analysis techniques in Python to develop an accurate predictive model for solar radiation levels. By leveraging historical meteorological data, machine learning algorithms such as Linear Regression, Random Forest, and LSTM are employed to identify patterns and trends in solar radiation.

### The data preprocessing stage includes handling missing values, feature selection, and normalization to improve model efficiency. Exploratory Data Analysis (EDA) is conducted using libraries like Pandas, NumPy, and Matplotlib to gain insights into solar radiation variations. Feature engineering techniques enhance model performance by considering factors such as temperature, humidity, wind speed, and cloud cover.

### The study compares different predictive models using evaluation metrics such as RMSE and R² score to determine the most effective approach. The results demonstrate the feasibility of data-driven solar radiation forecasting, which can be beneficial for optimizing solar power generation and improving energy management strategies. This project highlights the potential of Python-based data analytics in predicting solar radiation, providing valuable insights for researchers and industries aiming to enhance the efficiency of solar energy utilization.