**ACKNOWLEDGEMENT**

A great deal of time and lot of effort has gone into completing this project report and documenting it. The number of hours spent in getting through various books and other materials related to this topic chosen by us have reaffirmed its power and utility in doing this project.

Several special people have contributed significantly to this effort. First of all, we are grateful to our institution **Channabasaveshwara Institute of Technolog**y, **Gubbi** which provided us an opportunity in fulfilling our most cherished desire of reaching the goal.

We acknowledge and express our sincere thanks to the beloved Director and Principal **Dr. Suresh D S** for his many valuable suggestions and continued encouragement and support in the academic endeavors.

We wish to express our deep sense of gratitude to **Dr. Gavisiddappa**, Professor & Head of the Department of **Artificial Intelligence & Data Science** for all the guidance and who still remains a constant driving force and motivated through innovative ideas with tireless support and advice during the project.

We wish to express our deep sense of gratitude to our guide **Mr.Dharaneshkumar M L** Dept of AD ,CIT, for his meticulous attention to details, which has contributed immeasurably to the quality of the project report

We would express our gratitude towards our parents and friends for their kind cooperation and encouragement which helped us in completion of this project.

Finally, we would like to thank all the teaching and non-teaching staff of Dept of AD, for their cooperation.

Thanking everyone....

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**ABSTRACT**

In the rapidly evolving digital marketing landscape, accurately predicting whether a user will click on an advertisement is crucial for maximizing advertising effectiveness and return on investment. This project aims to build a robust machine learning-based classification model to predict ad click behavior using user data such as age, daily time spent on site, daily internet usage, income, and gender. Various algorithms including Logistic Regression, Decision Tree, Random Forest, K-Nearest Neighbors, Gradient Boosting, and XGBoost were implemented and compared for performance. The model identifies key features influencing ad engagement and provides actionable insights for businesses to optimize their targeting strategies. The results show significant improvements in both click-through rates and advertising profitability, demonstrating the potential of data-driven decision-making in online advertising.

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