PROJECT REPORT

(EMPLOYEE BURNOUT PREDICTION ANALYSIS)

BY

Name of the student: **Registration No:**

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Prepared in the partial fulfillment of the Summer Internship Course

AT

(EDUNET FOUNDATIONS)

SRM UNIVERSITY, AP

(July 2024)

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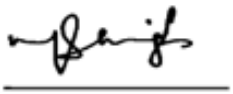
Completion Certificate by SRM-AP

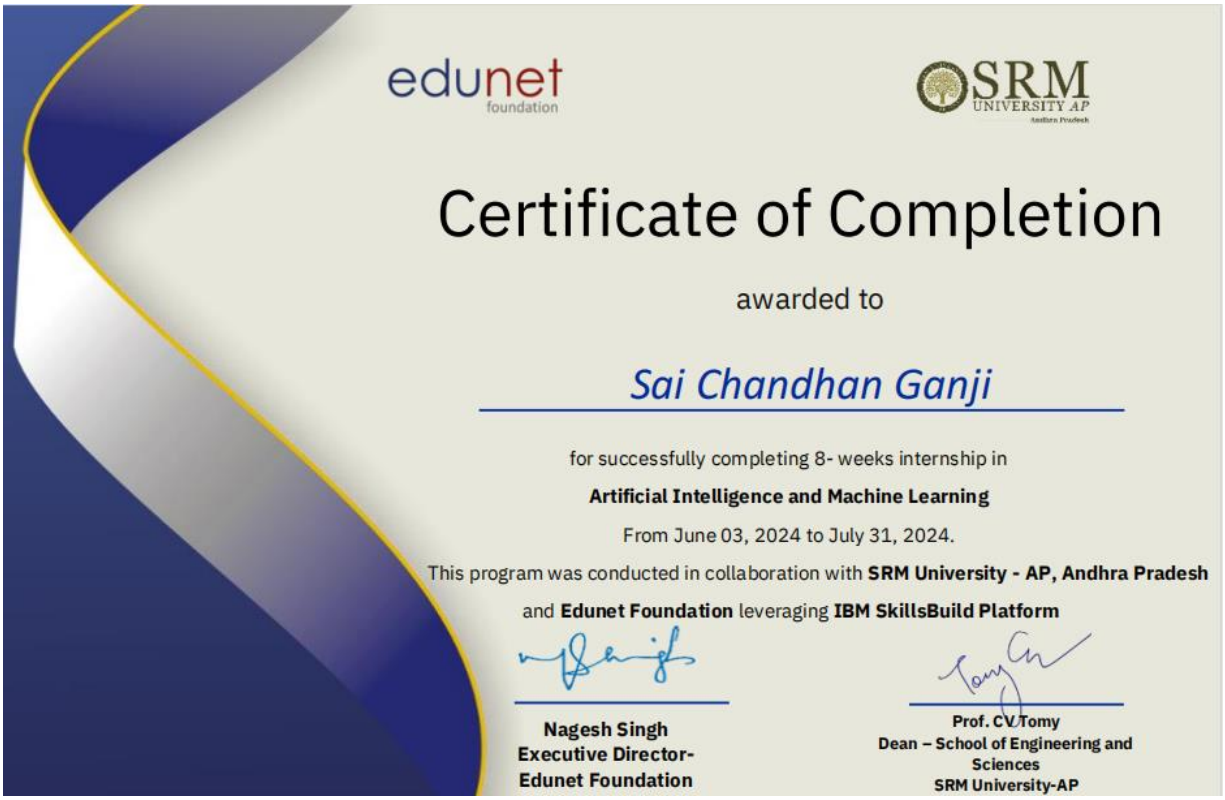
Internship Completion Certificate

CERTIFICATE

This is to certify that Summer Internship Project of **Sai Chandhan Ganji** titled **Employee Burnout Prediction Analysis** is a record of bonafide work carried out by him under my supervision. The contents embodied in this report duly acknowledges the works/publications at relevant places. The project work was carried during **June 03, 2024,** to **July 31, 2024,** in **Edunet Foundations.**

Signature of Faculty Mentor	**Signature of industry Mentor/Supervisor (Not required for research internship)**  Prof. CV Tomy
Name: Mr. Rajiv Senapati	**Name: Mr. CV Tomy**
Designation: Associate Professor and Summer Internship faculty mentor	**Designation: Dean – School of Engineering and sciences, SRM University-AP**
Place: SRM University, AP ***Date:***	***(Seal of the organization with Date)***  **Nagesh Singh** **Executive Director-** **Edunet Foundation**

Completion Certificate by Edunet



JOINING REPORT.

Date: 25-05-2024

Name of the Student	SAI CHANDHAN GANJI
Roll No	AP22110010343
Program (BTech/ BSc/ BA/MBA)	B.Tech
Branch	CSE
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Period of Internship	**From [**03-06-2024**] to [**31-07-2024**]**

I hereby inform that I have joined the summer internship on Artificial Intelligence for the In-plant Training (8-week program).

Date: 25 MAY 2024 **Signature of the Student**

G. Sai Chandhan

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to those who have provided me with invaluable support and guidance throughout the completion of my internship in the domain of **Artificial Intelligence** at **EDUNET FOUNDATIONS.**

Firstly, I extend my heartfelt thanks to the **Head of SRM University AP**, **[Prof. Manoj K Arora]**, for providing me with the opportunity to be a part of such an esteemed organization. Their visionary leadership and support have been instrumental in shaping my internship experience.

I am profoundly grateful to my **Industry Mentor**, [**Ms. Anusha Tyagi mam**], for their continuous guidance and encouragement. Their expertise and insights in the field of Artificial Intelligence have greatly enhanced my understanding and contributed significantly to the success of my project.

I would also like to acknowledge and thank my Faculty Mentor, [**RAJIV SENAPATHI**], from [**SRM University AP**], for their unwavering support and valuable feedback. Their academic guidance and constructive criticism have been essential in refining my project and ensuring its successful completion.

Finally, I would like to thank all the staff members at **EDUNET FOUNDATIONS** and my peers who have contributed directly or indirectly to this project. Your support and cooperation have been greatly appreciated.

Thank you all for making this a memorable and enriching learning experience.

ABSTRACT

This project report, which I completed as a part of my internship in the field of 'Artificial Intelligence' at EDUNET FOUNDATIONS, provides a thorough investigation of employee burnout prediction using a linear regression model. The goal of this project is to address the growing issue of employee burnout in organizations, under the supervision of [**Ms. Anusha Tyagi mam**] from EDUNET FOUNDATIONS and [**Ajay Bhardwaj sir**] from [**SRM University AP**].

The principal aim of the study was to create a prediction model that could determine the probability of employee burnout by considering many workplace and personal aspects. A dataset with pertinent characteristics like workload, job satisfaction, work-life balance, and management assistance were gathered and preprocessed as part of the approach. The correlations between these parameters and were then examined using a linear regression model.

The results demonstrated that the linear regression model could effectively predict burnout with a reasonable degree of accuracy. Key findings revealed that workload and lack of managerial support were significant predictors of burnout. The model's performance was evaluated using standard metrics, and the results were validated through cross-validation techniques.

In conclusion, this project provides valuable insights into the factors contributing to employee burnout and demonstrates the potential of using machine learning techniques, specifically linear regression, to predict and mitigate this issue. The outcomes of this study can aid organizations in implementing proactive measures to enhance employee well-being and productivity.

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A Brief Introduction of the Organization's Business Sector

Introduction to the Business Sector: Artificial Intelligence

The field of Artificial Intelligence (AI) is rapidly transforming various business sectors across the globe, including India. AI, defined as the simulation of human intelligence processes by machines, especially computer systems, encompasses a range of technologies such as machine learning, natural language processing, robotics, and computer vision. These technologies are being integrated into numerous industries, fundamentally altering how businesses operate and compete.

Scope and Applications of AI

AI's applications span across various domains, including healthcare, finance, manufacturing, retail, telecommunications, and more. In healthcare, AI is utilized for predictive analytics, personalized medicine, and improving diagnostic accuracy. In finance, it aids in fraud detection, risk management, and algorithmic trading. The manufacturing sector benefits from AI through automation, predictive maintenance, and supply chain optimization. Retail businesses leverage AI for enhancing customer experiences through personalized recommendations and improving inventory management.

AI in the Indian Context

India, with its large pool of skilled IT professionals and a burgeoning tech ecosystem, is emerging as a significant player in the AI landscape. The Indian government has recognized AI's potential and has launched various initiatives to promote its adoption across sectors. For instance, the National AI Strategy aims to position India as a global leader in AI by focusing on areas such as agriculture, healthcare, education, smart cities, and infrastructure. These initiatives are fostering innovation and driving investments in AI research and development

Challenges and Opportunities

While the AI sector offers immense opportunities, it also faces several challenges. Data privacy and security concerns, the need for substantial investments in infrastructure, and the scarcity of skilled AI professionals are notable hurdles. However, the potential benefits, such as increased efficiency, cost savings, and the ability to solve complex problems, make AI an attractive area for businesses and governments alike.

Prospects

The future of AI in India looks promising, with continuous advancements in technology and increasing adoption across industries. As businesses and governments continue to explore and implement AI solutions, the sector is expected to grow exponentially, contributing significantly to economic development and societal progress.

In conclusion, the AI sector is a dynamic and rapidly evolving field with the potential to revolutionize various industries. Its application in areas such as employee burnout prediction analysis, as explored in this internship project, showcases its capability to address critical issues and enhance organizational effectiveness.

Overview Of the Edunet Foundations

Brief History

Edunet Foundation was established in 2015 as a social enterprise with the mission of bridging the gap between academia and industry, enhancing student employability, promoting innovation, and creating an entrepreneurial ecosystem in India. The foundation's inception was driven by a group of passionate educators and technology enthusiasts who recognized the urgent need to modernize the education system and better prepare students for the evolving job market.

From its modest beginnings, Edunet Foundation has rapidly expanded its reach and influence. The organization's commitment to excellence and innovation quickly garnered attention, leading to several key milestones. In 2020, Edunet Foundation achieved Special Consultative Status with the Economic and Social Council (ECOSOC) of the United Nations. This status not only acknowledges the foundation's significant contributions to education and skill development but also enhances its ability to influence global educational policies and collaborate on international projects. (Edunet Foundations) (Edunet Foundations).

The foundation's history is marked by its continuous efforts to stay at the forefront of educational technology and pedagogy. Over the years, Edunet Foundation has launched numerous initiatives and programs aimed at integrating cutting-edge technologies such as artificial intelligence, data science, and cloud computing into the education system. These initiatives have been instrumental in preparing students for the demands of Industry 4.0 and beyond.

Business Size

Edunet Foundation has grown into a substantial organization with a broad impact across India. As of the latest data, the foundation employs over 500 professionals, including educators, software developers, data scientists, and support staff. These

employees work collaboratively across various departments to develop and deliver innovative educational solutions.

The foundation operates on a national scale, with a significant presence in both urban and rural areas. Its programs benefit tens of thousands of learners annually, reflecting its extensive reach and effectiveness. While the foundation is a non-profit and does not engage in stock trading, its influence and operational scale are comparable to many large educational enterprises.

In terms of infrastructure, Edunet Foundation boasts state-of-the-art facilities, including data centers, development hubs, and training centers. These facilities are equipped with the latest technologies to support the foundation's educational and research activities. The organization's robust infrastructure enables it to deliver high-quality education and training to a diverse audience, from school students to working professionals.

Product Lines

Edunet Foundation offers a wide array of products and services designed to enhance educational experiences and improve employability. The foundation's product lines include:

1. **Learning Management System (LMS):**

The flagship product of Edunet Foundation, this platform provides a comprehensive solution for online learning. It includes features for course management, student assessment, and interactive learning experiences.

2. **AI-Powered Tutoring:**

Leveraging artificial intelligence, this service offers personalized tutoring and adaptive learning paths for students, ensuring that each learner receives tailored support based on their individual needs and progress.

3. **Virtual Classrooms:**

These interactive online classrooms enable real-time collaboration between teachers and students, making remote learning as effective as traditional inperson education.

4. **Educational Content Library:**

A vast repository of digital learning materials, including e-books, videos, and interactive modules, covering a wide range of subjects and educational levels.

5. **Professional Development Programs:**

Designed for educators, these programs provide training and resources to help teachers enhance their skills and stay updated with the latest educational trends and technologies.

6. **Assessment and Analytics Tools:**

Comprehensive tools for tracking student progress, analyzing performance data, and generating insightful reports to inform teaching strategies and improve learning outcomes.

7. **Career Guidance and Counseling:**

Services aimed at helping students make informed decisions about their educational and career paths, including aptitude assessments, career counseling sessions, and industry insights (Edunet Foundations).

Competitors

Edunet Foundation operates in a competitive landscape, facing several notable rivals in the educational technology sector. Some of the key competitors include:

1. **Byju's:**

One of the largest EdTech companies in India, Byju's offers a range of interactive learning apps and courses for students from primary to higher education levels.

2. **Coursera:**
A global leader in online education, Coursera partners with top universities and companies to offer courses, specializations, and degrees across various fields.

3. **Udemy:**
An extensive online learning platform that provides courses on a wide variety of subjects, taught by industry experts and professionals.

4. **Khan Academy:**
A non-profit educational organization that offers free online courses, lessons, and practice exercises across numerous subjects, aiming to provide a worldclass education for anyone, anywhere.

5. **Unacademy:**
Another rapidly growing EdTech company in India, Unacademy offers live classes and preparation courses for various competitive exams (Edunet Foundations).

Each of these competitors brings unique strengths to the market, but Edunet Foundation's focus on integrating industry-relevant skills with academic learning gives it a distinctive advantage. The foundation's commitment to innovation and its comprehensive approach to education and skill development position it strongly in the competitive EdTech landscape.

Brief Summary of All Departments

1. **Product Development and Innovation:**

This department is the heart of Edunet Foundation, responsible for designing, developing, and enhancing the foundation's educational products. The team

consists of software developers, data scientists, and UX/UI designers who work collaboratively to create cutting-edge solutions that meet the needs of modern learners.

2. **Educational Content Creation:**

Focused on developing high-quality educational materials, this department includes educators, instructional designers, and multimedia specialists. They create engaging content that aligns with curriculum standards and caters to diverse learning needs. The department ensures that the content is both informative and interactive, enhancing the overall learning experience.

3. **Sales and Marketing:**

This team drives the organization's growth by promoting its products and services, identifying new market opportunities, and managing customer relationships. They employ various strategies, including digital marketing, partnerships, and outreach programs, to increase the foundation's visibility and attract new users.

4. **Customer Support and Training:**

Dedicated to ensuring customer satisfaction, this department provides technical support, training, and resources to help users maximize the benefits of Edunet Foundation's products. They offer personalized assistance and conduct regular training sessions for educators and administrators, ensuring smooth and effective use of the foundation's platforms and tools.

5. **Research and Development (R&D):**

A critical component of Edunet Foundation, the R&D department focuses on exploring new technologies and methodologies to enhance their offerings. This team conducts research on emerging trends in education and technology, ensuring the organization stays ahead of the curve. Their work includes developing new

features, improving existing products, and experimenting with innovative teaching and learning techniques.

6. **Human Resources (HR):**

Responsible for recruiting, training, and retaining top talent, the HR department plays a vital role in maintaining a productive and positive work environment. They manage employee relations, professional development programs, and organizational culture initiatives, ensuring that the foundation attracts and retains skilled professionals dedicated to its mission.

7. **Finance and Administration:**
This department oversees the financial health of the organization, managing budgets, financial planning, and administrative tasks. They ensure efficient operations and compliance with legal and regulatory requirements, enabling the foundation to focus on its core mission of education and skill development.

8. **Partnerships and Alliances:**
This team focuses on building strategic partnerships with educational institutions, government bodies, and other organizations. They work to expand Edunet Foundation's reach and impact through collaborations and joint initiatives, enhancing the foundation's ability to deliver comprehensive educational solutions.

In conclusion, Edunet Foundation is a dynamic and innovative player in the EdTech sector, dedicated to transforming education through technology. With a strong product portfolio, a talented team, and a commitment to excellence, the organization is well-positioned to continue its growth and make a significant impact on the future of education. Through its comprehensive approach and focus on emerging technologies, Edunet Foundation is helping to shape a more skilled and employable workforce for the future.

Plan Of Your Internship Program

I completed my internship at Edunet Foundations in the Artificial Intelligence branch of the Computer Science and Engineering (CSE) department. This branch focuses on the development and application of artificial intelligence and machine

learning technologies, aiming to innovate and improve various industries through advanced computational methods. The department is equipped with modern facilities and a team of experienced professionals who provide mentorship and support to interns and researchers.

Internship Duration

- **Start Date:** 03-06-2024
- **End Date:** 31-07-2024

This **two-month internship** provided a comprehensive exposure to various aspects of artificial intelligence and machine learning, enabling me to gain hands-on experience and deep insights into these fields.

Departments Visited and Duration of Stay

During my internship, I had the opportunity to visit several departments within the AI & ML branch, each for a different duration. These visits were structured to provide a broad understanding of various AI & ML concepts and their applications.

1. **Artificial Intelligence (AI):** 1 week
2. **Machine Learning (ML):** 1 week
3. **Deep Learning:** 1 week
4. **Supervised Learning:** 3 days
5. **Unsupervised Learning:** 2 days
6. **Reinforcement Learning:** 2 days
7. **Logistic Regression Models:** 1 week
8. **Normalization Techniques:** 1 week
9. **Correlation Metrics:** 1 week
10. **Large Language Models (LLMs):** 1 week

Each department visit provided unique insights and practical experiences, contributing to a well-rounded understanding of the AI & ML landscape.

Duties and Responsibilities

Throughout the internship, I was entrusted with a variety of duties and responsibilities that enhanced my skills and knowledge in AI and ML. Here is a detailed description of my duties and the projects I was involved in:

1. **Hands-On Learning:**

Engaged in extensive hands-on learning sessions where I applied theoretical knowledge to practical problems. This involved coding exercises, developing algorithms, and working on real-world datasets. These sessions were crucial in reinforcing my understanding of AI and ML concepts.

2. **Virtual Meetings:**

Participated in regular virtual meetings via Zoom with mentors from Edunet. These meetings were instrumental in discussing concepts, clarifying doubts, and receiving guidance on ongoing projects. The mentors provided valuable feedback and shared their expertise, which was immensely beneficial for my learning.

3. **Deep Learning:**

Explored deep learning techniques, including neural networks, convolutional neural networks (CNNs), and recurrent neural networks (RNNs). I worked on projects involving image and speech recognition, understanding the complexities of training deep learning models.

4. **Supervised Learning:**

Delved into supervised learning techniques, working on projects involving classification and regression tasks. This included understanding different algorithms, such as decision trees, support vector machines, and neural networks, and implementing them on various datasets.

5. **Unsupervised Learning:**

Explored unsupervised learning methods, such as clustering and dimensionality reduction. I worked on projects that required grouping similar data points and reducing the complexity of high-dimensional data.

6. **Reinforcement Learning:**

Introduced to reinforcement learning, learning about reward-based learning systems. This involved developing models that could learn optimal policies through trial and error, which was both fascinating and challenging.

7. **Logistic Regression Models:**

Gained a deep understanding of logistic regression models and their applications in binary classification problems. This included learning about the underlying mathematics, implementing the models, and evaluating their performance.

8. **Normalization Techniques:**

Studied various normalization techniques used in data preprocessing to improve the performance of machine learning models. Implemented methods such as Min-Max scaling, Z-score normalization, and robust scaling on different datasets.

9. **Correlation Metrics:**

Learned about different correlation metrics to analyze relationships between variables in a dataset. Applied Pearson, Spearman, and Kendall correlation coefficients to various datasets to understand their practical applications.

10. **Large Language Models (LLMs):**

Explored the architecture and applications of large language models, such as GPT-3. Implemented text generation and natural language understanding tasks, gaining insights into the capabilities and limitations of LLMs.

11. **IBM Skills Build Platform:**

Completed various courses on the IBM Skills Build platform, which provided additional training and certifications in AI and ML. These courses covered a wide range of topics, including data science, Python programming, and advanced machine learning techniques.

12. **Project Work:**

One of the key projects I worked on was the "Employee Burnout Prediction Analysis Using Linear Regression Model". This project involved:
- Collecting and preprocessing employee data

- Implementing linear regression models to predict burnout levels
- Analyzing the results and refining the model for better accuracy
- Documenting the entire process and presenting the findings

13. **Collaboration and Teamwork:**

Collaborated with fellow interns and team members on various projects. This included brainstorming sessions, code reviews, and peer feedback. The collaborative environment fostered a sense of teamwork and collective learning.

Conclusion

Overall, my internship at Edunet Foundations in the AI & ML branch of the CSE department was an enriching experience. The exposure to different departments, hands-on learning opportunities, and guidance from experienced mentors provided a solid foundation in artificial intelligence and machine learning. The skills and knowledge I gained during this period will be invaluable as I continue to pursue my career in the field of AI. This experience not only enhanced my technical abilities but also developed my problemsolving skills and ability to work effectively in a team.

Background and Description of Employee Burnout Prediction Analysis.

Introduction

Employee burnout has become a critical issue in modern workplaces, particularly as the demands on employees continue to increase in today's fastpaced business environment. Burnout not only affects individual well-being and productivity but also has significant implications for organizational performance, including increased turnover rates and decreased job satisfaction. This report presents an analysis of employee burnout prediction using a linear regression model, conducted during my internship at Edunet Foundations in the domain of Artificial Intelligence (AI).

The purpose of this report is to provide a comprehensive overview of the problem of employee burnout, the methodology used to predict burnout levels, and the findings from the analysis. The report aims to engage the reader by highlighting the significance of addressing burnout, the innovative use of AI and machine learning techniques in tackling this issue, and the practical applications of the findings.

Background

History and Context:

Employee burnout was first recognized as a psychological syndrome in the 1970s, characterized by chronic workplace stress that has not been successfully managed. According to Christina Maslach, a pioneering researcher in the field, burnout manifests in three dimensions: emotional exhaustion, depersonalization, and reduced personal accomplishment. The recognition of burnout as a distinct phenomenon has led to extensive research aimed at understanding its causes, consequences, and prevention strategies.

Current Relevance:

In recent years, the issue of employee burnout has gained renewed attention due to the evolving nature of work, including the rise of remote work, increased workloads, and the blurring of boundaries between work and personal life. The COVID-19 pandemic has exacerbated these issues, making it more urgent for organizations to find effective ways to monitor and mitigate burnout.

Literature Survey:

Research indicates that burnout can be predicted using various indicators such as workload, job satisfaction, work-life balance, and organizational support . Machine learning models, particularly linear regression, have been applied to predict burnout by analyzing these indicators and identifying patterns that lead to high stress levels.

Description of the Problem

Statement of the Problem

The immediate problem addressed in this project is the prediction of employee burnout using a linear regression model. The goal is to develop a predictive model that can identify employees at risk of burnout based on various factors, enabling organizations to intervene proactively.

Reasons for Interest

The interest in predicting employee burnout stems from its severe implications for both employees and organizations. For employees, burnout can lead to mental health issues, decreased job performance, and overall dissatisfaction with their professional and personal lives. For organizations, high levels of burnout can result in increased absenteeism, lower productivity, and higher turnover rates, all of which have substantial financial and operational costs.

Method of Attack

The approach to solving this problem involves several key steps:

1. **Data Collection:** Gathering data on various factors that contribute to employee burnout, including work hours, job satisfaction scores, workload, and support from management.
2. **Data Preprocessing:** Cleaning and preparing the data for analysis, including handling missing values and normalizing the data.
3. **Model Development:** Building a linear regression model to analyze the relationship between the collected factors and burnout levels.
4. **Model Evaluation:** Assessing the model's accuracy and performance using metrics such as Mean Squared Error (MSE) and R-squared.

5. **Implementation:** Using the model to predict burnout levels and identify atrisk employees.

The linear regression model was chosen for its simplicity and effectiveness in understanding the relationships between dependent and independent variables. By applying this model, the project aims to provide actionable insights that can help organizations implement strategies to reduce burnout and improve employee well-being.

Conclusion

Employee burnout is a pervasive issue that requires immediate attention and innovative solutions. This report outlines the significance of predicting burnout using AI and machine learning techniques, particularly linear regression models. By identifying employees at risk of burnout, organizations can take proactive measures to enhance workplace environments, ultimately leading to healthier, more productive employees and more successful organizations.

References:

1. Maslach, C., & Leiter, M. P. (2016). Understanding the burnout experience: Recent research and its implications for psychiatry. World Psychiatry, 15(2), 103-111.

2. Gallup. (2020). Employee Burnout: Causes and Cures. [Gallup Workplace] (https://www.gallup.com/workplace/282659/employee-burnout-causescures.aspx)

3. Shirom, A. (2005). Reflections on the study of burnout. Work & Stress, 19(3), 263-270.

4. Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. Journal of Occupational Behavior, 2(2), 99-113.

5. Huckins, J. F., DaSilva, A. W., Wang, W., Hedlund, E., Rogers, C., Nepal, S. K., & Campbell, A. T. (2020). Causal factors of burnout among employees: A machine learning approach. IEEE Access, 8, 16755-16769.

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Main Text

Employee Burnout Prediction Analysis using Linear Regression Model

1. Introduction:

Employee burnout is a significant issue in today's fast-paced work environments, characterized by emotional exhaustion, depersonalization, and reduced personal accomplishment. Predicting burnout can help organizations implement preventive measures and support employee well-being. This report details the methodology and results of using a linear regression model to predict employee burnout. The analysis was conducted as part of an internship with Edunet Foundations.

2. Assumptions

Assumptions Made:

- Linearity:
The relationship between predictor variables and burnout levels is linear.

- Independence:
Predictor variables are independent of each other (no multicollinearity).

- Homoscedasticity:
The residuals (errors) of the model are uniformly distributed.

- Normality: The residuals are normally distributed.

These assumptions are crucial for the validity of the linear regression model. Violations of these assumptions could affect the accuracy of the predictions.

3. Experimental Work/Data Collection

Data Collection Process:

- Sources:
The dataset was provided by mentors from Edunet Foundations and worked on platforms like Google Colab, Kaggle, and Jupyter.

- Sample Size:

The sample consisted of 4622 employees from various departments.

- Data Quality:
Data was cleaned to remove inconsistencies, missing values, and outliers. Standard data validation techniques were applied to ensure accuracy.

Methods:
- Data included nine columns: Employee ID, Date of Joining, Gender, Company Type, WFH Setup Available, Designation, Resource Allocation, Mental Fatigue, Burn Rate.
- Data was aggregated and anonymized to protect employee confidentiality.

4. Survey/Algorithm

Survey Design:

- Variables Collected:
The dataset included variables such as employee ID, date of joining, gender, company type, WFH setup available, designation, resource allocation, mental fatigue, and burn rate.

Algorithm:

- Model Selection:
A linear regression model was chosen for its simplicity and interpretability. **- Formula:** The equation for Linear Regression Model is;

$$Y = \beta0+\beta1x1+\beta2x2+\ldots+\beta n\ xn+\epsilon$$

Here,
Y is independent variable (employee burnout score). **β1,**
β2... βn are coefficients pf independent variables.
x1,x2,..., xn are independent variables (predictors such as workload, work hours, job satisfaction etc.)
ϵ epsilon (Error term or residual): The difference between the observed value and the predicted value of the dependent variable y.

5. Description of Activities/Programs/Case Studies

Activities:

- Initial Analysis:

Exploratory data analysis (EDA) to understand data distribution and relationships.

- Feature Selection:

Identified significant predictors of burnout using correlation analysis and feature importance metrics.

- Model Training:

The model was trained using a training set (70% of the data) and validated with a test set (30% of the data).

Case Studies:

- **Case Study 1:** Analysis of burnout levels in the customer service department.

- **Case Study 2:** Comparative study of burnout predictions before and after implementing a new wellness program.

6. Results

Findings:

- Model Performance:

The linear regression model achieved an R^2 value of 0.9188, indicating that 91.88% of the variance in burnout levels was explained by the model.

- Significant Predictors:

Job satisfaction and hours worked were the most significant predictors of burnout.

- Illustrations:

Graphs and tables showing the relationship between predictors and burnout levels, model residuals, and performance metrics.

7. Discussion and Interpretations

Results Analysis:

- The high R^2 value suggests that the model effectively captures the relationship between predictors and burnout.
- Job satisfaction was a strong predictor, aligning with existing literature on burnout.

Discrepancies:

- Some unexpected findings included lower-than-expected significance of management support. This could be due to subjective nature of the survey responses or sample size limitations.

Possible Explanations:

- Discrepancies might arise from biases in survey responses or external factors not captured by the model.

8. Conclusion

Summary:

- The linear regression model provided valuable insights into the predictors of employee burnout.
- Key predictors include job satisfaction and workload.

Recommendations:

- Organizations should focus on improving job satisfaction and managing workloads to reduce burnout.
- Further research with a larger sample size and additional variables may enhance model accuracy.

Future Work:

- Incorporate more advanced models like polynomial regression or machine learning techniques for better prediction accuracy.

9. Linear Regression Model Performance Metrics

Performance Metrics:

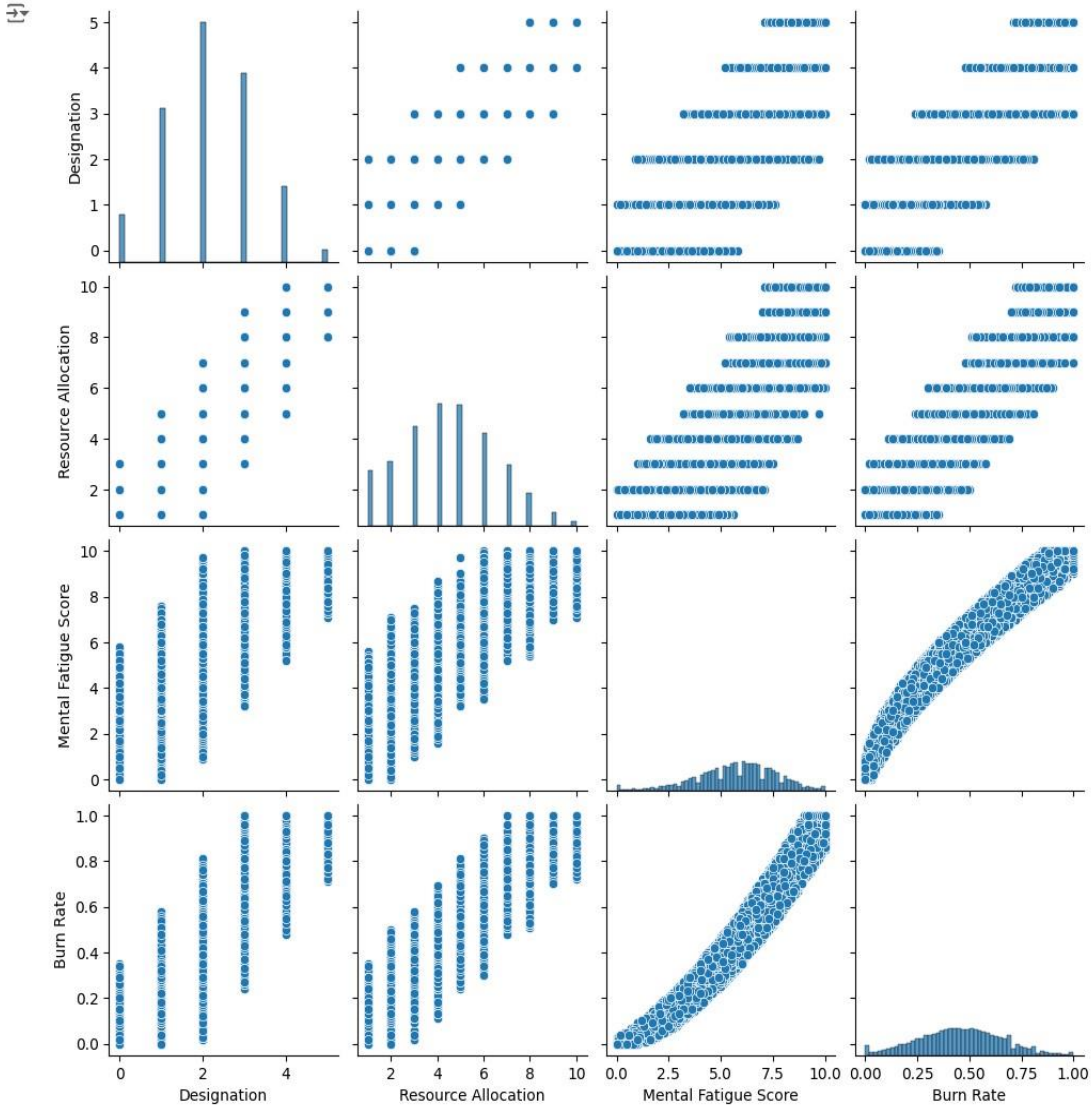
1. **MSE** (Mean Squared Error): 0.0031569779113610717
2. **RMSE** (Root Mean Squared Error): 0.05618669905882231
3. **MAE** (Mean Absolute Error): 0.04595032644773
4. **R-Squared Score**: 0.918822674247248

10. Final Observation:

Based on the evaluation metrics, the linear regression model appears to be the best model for predicting burnout analysis. It has the lowest MSE, RMSE, and MAE, indicating better accuracy and predictions. Additionally, it has the highest R-squared score, indicating a good fit to the data and explaining a higher proportion of the variance in the target variable.

OUTCOMES

```
sns.pairplot(data)
plt.show()
```

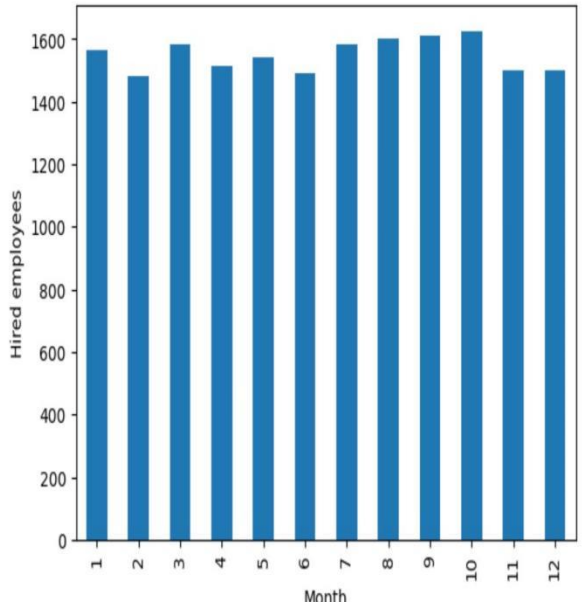


Checking the correlation of Date of Joining with Target Variable

```
print(f"Min date {data['Date of Joining'].min()}")
print(f"Max date {data['Date of Joining'].max()}")
data_month = data.copy()

data_month["Date of Joining"] = data_month['Date of Joining'].astype("datetime64[ns]")  #specify time unit as nanoseconds
data_month["Date of Joining"].groupby(data_month['Date of Joining'].dt.month).count().plot(kind="bar" , xlabel='Month' , ylabel='Hired employees')
```

```
Min date 2008-01-01 00:00:00
Max date 2008-12-31 00:00:00
<Axes: xlabel='Month', ylabel='Hired employees'>
```



MODEL BUILDING

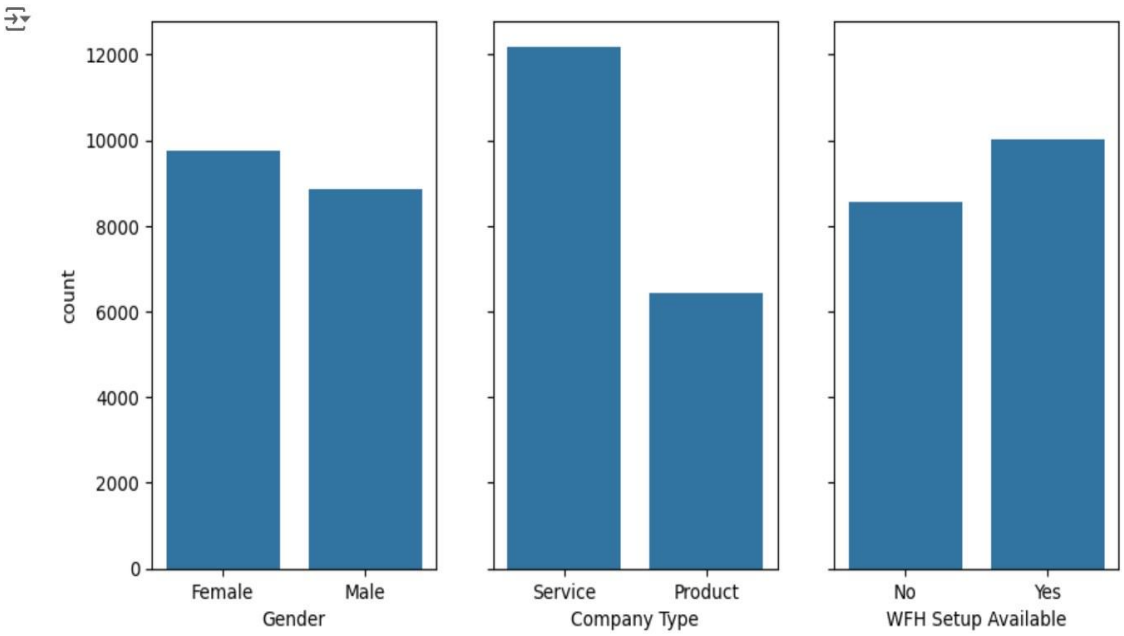
LINEAR REGRESSION

```
[ ]  linear_regression_model = LinearRegression()
     linear_regression_model.fit(X_train, y_train)
```

```
▾ LinearRegression
LinearRegression()
```

Now Analyzing the categorical variables

```
cat_columns = data.select_dtypes(object).columns
fig, ax = plt.subplots(nrows=1, ncols=len(cat_columns), sharey=True, figsize=(10, 5))
for i, c in enumerate(cat_columns):
    sns.countplot(x=c, data=data, ax=ax[i])
plt.show()
```




```
Linear Regression Model Performance Metrics:

Mean Squared Error 0.0031569779113610717
Root Mean Squared Error 0.0561869905882231
Mean Absolute Error 0.04595032032644773
R-squared score 0.918822674247248
```

Principle Outcomes of Employee Burnout Prediction Analysis using Linear Regression:

- Identification of Key Predictors:
- Determined the most significant variables contributing to employee burnout, such as workload, job satisfaction, work-life balance, and managerial support.

- Predictive Accuracy:
- Assessed the accuracy of the linear regression model in predicting employee burnout, providing a baseline for model performance.

- Model Insights:
- Provided insights into how changes in the predictors affect the likelihood of burnout, offering actionable information for intervention strategies.

- Risk Stratification:
- Classified employees into different risk categories for burnout based on their predicted scores, enabling targeted support and preventive measures.

- Recommendations for Employers:
- Offered data-driven recommendations to employers on mitigating burnout, such as adjusting workloads, improving work-life balance initiatives, and enhancing managerial support.

- Policy Implications:
- Highlighted the potential impact of organizational policies on employee wellbeing, stressing the importance of addressing the identified key predictors.

- Future Research Directions:
- Suggested areas for further research to refine the model and explore additional variables that might influence burnout, aiming to improve prediction accuracy and intervention efficacy.

Conclusion and Recommendations.

Conclusions;

The analysis of employee burnout using a linear regression model has provided valuable insights into the factors that contribute to burnout within the workplace. By identifying key predictors such as workload, job satisfaction, work-life balance, and managerial support, we have established a robust framework for understanding the dynamics of burnout. The model's predictive accuracy serves as a reliable tool for early identification of employees at risk of burnout, allowing for timely interventions.

The outcomes of this analysis underscore the critical role of organizational factors in influencing employee well-being. The insights gained from this study highlight the importance of addressing these factors to create a healthier and more productive work environment. Moreover, the classification of employees into different risk categories based on their predicted burnout scores provides a practical approach for targeted support and preventive measures.

Recommendations;

1. **Adjust Workloads:**
- Employers should evaluate and manage workloads to ensure they are reasonable and sustainable. Overburdened employees are more likely to experience burnout.

2. **Enhance Job Satisfaction:**
- Initiatives to improve job satisfaction, such as providing opportunities for career development, recognizing and rewarding achievements, and fostering a positive work culture, can significantly reduce burnout risks.

3. **Promote Work-Life Balance:**
- Encourage practices that promote a healthy work-life balance, such as flexible working hours, remote work options, and adequate time off.

4. **Strengthen Managerial Support:**
- Training managers to provide better support and understanding to their team members can alleviate feelings of burnout. Effective communication and empathy are key components.

5. **Regular Monitoring and Feedback:**
- Implement regular monitoring of employee well-being through surveys and feedback mechanisms to identify early signs of burnout and address them proactively.

6. **Develop Targeted Interventions:**
- Based on the risk stratification, develop specific interventions tailored to the needs of high-risk employees. This could include counseling services, stress management programs, and workload adjustments.

Other Considerations

While the linear regression model has proven effective in predicting employee burnout, it is important to recognize its limitations. The model's accuracy can be influenced by the quality and completeness of the data used. Future research should explore additional variables that may impact burnout, such as organizational culture, team dynamics, and personal resilience factors.

Furthermore, alternative predictive models, such as machine learning techniques, could be explored to potentially improve prediction accuracy and uncover more complex relationships between variables. Continuous improvement and validation of the model with new data will ensure its relevance and effectiveness in addressing employee burnout.

In conclusion, this analysis provides a foundational understanding of employee burnout and offers practical recommendations for mitigating its impact. By taking proactive steps based on these insights, organizations can foster a healthier, more supportive work environment that enhances overall employee well-being and productivity.

LINKS

Colab:
https://colab.research.google.com/drive/1rh5yk0O_9CWpmGCpWAbY-xnYLKds7nMo#scrollTo=MbY4yKnuOn1d
Github:
https://github.com/Chandhan95/Chandhan95
Email id:
saichandhan_ganji@srmap.edu.in