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# **Employee Performance Insights: A Data-Driven Approach**

**Team 115**

## **Team Members**

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# Introduction and Problem Statement

## Business Problem

The business problem addresses the need to enhance employee productivity and reduce turnover by identifying attributes that contribute to high performance, thereby optimizing workforce management and aiding in informed hiring and development decisions.

## Context and Importance

This project seeks to identify the demographic and work-related factors that drive employee performance, enabling businesses to make more informed decisions in hiring, training, and retention. By understanding these factors, organizations can enhance productivity, reduce turnover, and foster a more engaged and effective workforce. The insights gained will help optimize recruitment strategies, tailor employee development programs, and improve overall organizational performance, ultimately leading to better outcomes for both employees and the business.

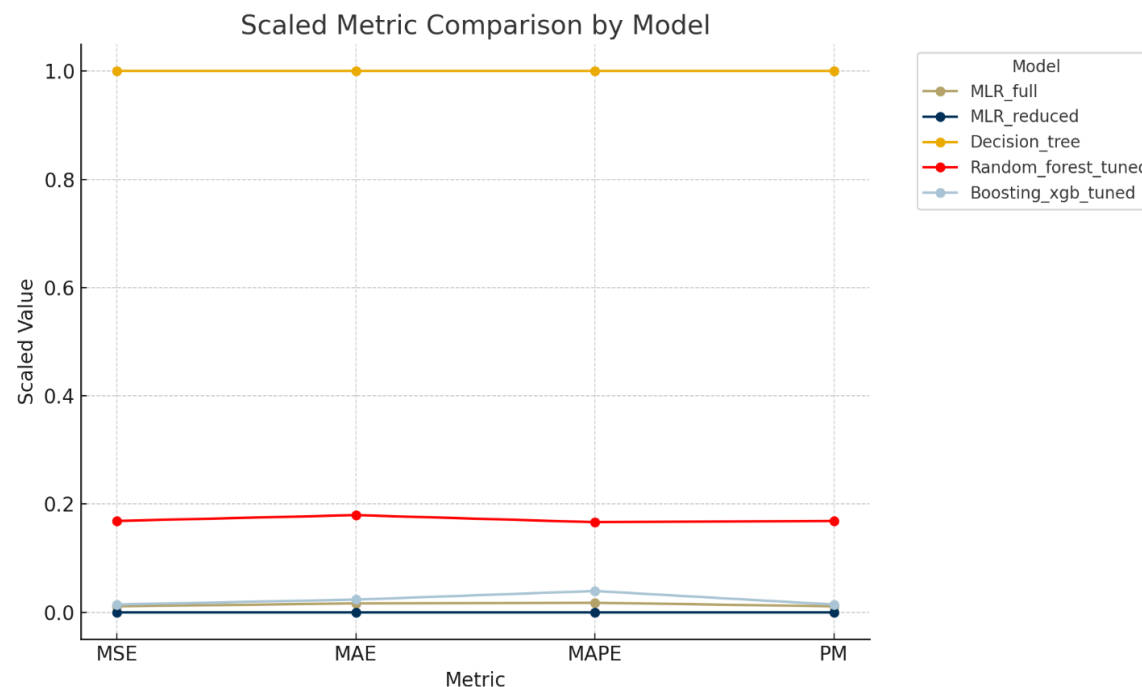
## Project Objectives

- ❖ Identify key demographic and work-related factors influencing employee performance.
- ❖ Support hiring processes by selecting employees with traits that boost performance.
- ❖ Improve overall productivity through employee selection and development.

# Key Insights and Findings

## Top Insights

- ❖ **Key Performance Predictors:** Age, Experience, and Work Hours per Week are the strongest factors influencing performance. Stepwise AIC and Group LASSO models identified these as key predictors.
- ❖ **Model Performance:** The Multiple Linear Regression (MLR) models, particularly the reduced version, outperformed both Random Forest and XGBoost in terms of MSE, MAE, and MAPE, indicating that simpler models provide more reliable and accurate predictions for employee performance.
- ❖ **Parameter Tuning:** Tuning the Random Forest (RF) and XGBoost models helped reduce overfitting and improved performance, emphasizing the importance of parameter optimization in enhancing model effectiveness, although the improvements were limited in this particular use case.



## Interpretation

- ❖ Hire for Experience, Age, and Work Hours
- ❖ Target Training for Less Experienced Employees
- ❖ Improve Performance Through Work Hours and Learning
- ❖ Use Simple Interpretable Models for Predictions

# Business Impact and Implications

## Implication of Findings

- ✓ **Refined Recruitment Processes:**  
Focus recruitment on traits tied to high performance for a stronger team.
- ✓ **Customized Employee Development:**  
Organizations can tailor training to boost skills, competencies, and productivity.
- ✓ **Resource Allocation:**  
Understand drivers, optimize resources, align strengths with business needs.

## Strategic Value

- ✓ **Increased Efficiency:**  
Understanding performance factors
- ✓ **Enhanced Talent Management:**  
Boosts alignment and team effectiveness
- ✓ **Improved Predictive Capabilities:**  
Data-driven insights enhance workforce planning.
- ✓ **Strengthened Competitive Edge:**  
Insights help build a strong workforce.

# Recommendations

## Actionable Recommendations

## Implementation Steps

Leverage experience in task assignments

- ❖ Build a skills inventory to identify employees' experience, skills, and expertise
- ❖ Develop a task assignment framework to match responsibilities with skillsets and experience
- ❖ Experienced staff can be assigned as project leads, mentors, or consultants

Rewards and incentives for additional work hours

- ❖ Define additional work criteria and establish a reward system
- ❖ Implement a tracking and review process to approve and validate incentive claims
- ❖ Regularly evaluate impacts and adjust as needed

Development plans are tailored based on Age and Experience

- ❖ Create age and experience-specific training and career development program
- ❖ Setup mentoring program to pair younger employees with experience mentors
- ❖ Customized retention and growth strategies based on experience

# Implementation Plan

## High-Level Plan

<b>Refined Recruitment Processes</b>	Build a skills inventory system to align employee expertise with task assignments. Adjust recruitment strategies to prioritize features linked to high performance.
<b>Balanced Work Hours</b>	<ul style="list-style-type: none"><li>❖ Analyze data to establish optimal productivity ranges.</li><li>❖ Roll out flexible work policies to promote balanced schedules.</li></ul>
<b>Tailored Development Programs</b>	<ul style="list-style-type: none"><li>❖ Launch age and experience-specific training and mentoring programs.</li><li>❖ Design retention strategies for employees at different career stages.</li></ul>

## Resources and Support

- ❖ Skills inventory and analytics tools for productivity tracking.
- ❖ HR team for implementing policies and development programs.
- ❖ Senior leadership to set up the initiatives.



# Challenges and Considerations

## Potential Challenges

**Employee Engagement:** Employees may require additional support to align with new policies and processes, particularly around task assignments and flexible work schedules.

**Data Accuracy:** Ensuring that the data used for skills inventory and productivity analysis is complete and reliable.

**Resource Allocation:** Availability of experienced mentors and budgetary considerations for scaling development programs.

**Policy Implementation:** Consistent application of new work-hour and training policies across teams/departments.

## Mitigation Strategies

### Employee Alignment:

- ❖ Clearly communicate the reasoning and benefits of the new initiatives to employees through team leads and department heads.
- ❖ Use workshops or Q&A sessions to provide clarity and address concerns.

### Data Integrity:

- ❖ Implement standardized processes for collecting and verifying employee data.
- ❖ Use a centralized system for maintaining skills and performance records.

### Targeted Resource Utilization:

- ❖ Try out mentorship and training programs in high-impact areas first, ensuring maximum return on investment.
- ❖ Explore external training providers if needed.

### Policy Monitoring and Support:

- ❖ Equip managers with tools and training to enforce policies effectively.
- ❖ Set up regular reviews to evaluate policy adoption and make adjustments as needed.

# Future Directions

## Further Analysis

- ❖ Expand the model by **incorporating additional predictors** to better explain performance variability.
- ❖ **Analyze residual variance** to identify outliers and uncover factors missing from the model.
- ❖ **Model validation** using new data to ensure its reliability.

## Long-Term Improvements

- ❖ Regularly update data and/or new predictors to make sure the model is up-to-date.
- ❖ Implement automated validation checks to ensure accuracy.
- ❖ Perform periodic re-evaluation of the model to ensure its alignment with changing organizational trends.



# Conclusion and Summary

## Recap

### Key Predictors & Model Performance

Age, Experience, and Work Hours drive performance, with the MLR model outperforming RF and XGBoost in accuracy, though tuning had limited impact

### Implications & Strategic Value

Organizations can optimize recruitment, development, and resource allocation based on key performance drivers, enhancing efficiency and competitiveness

### Recommendations

Leverage employee experience, award additional work hours, and tailor development plans based on age and experience, supported by mentoring and flexible work policies

### Future Outlook

Continuously improve by adding new predictors, assessing residuals, and validating with fresh data, while ensuring regular updates and accuracy through automated checks

## Concluding Thoughts

This analysis provides valuable insights into the factors that drive employee performance, offering organizations practical guidance to boost productivity and improve talent management. By integrating these data-driven insights into recruitment, training, and workforce planning, businesses can enhance performance, increase retention, and gain a competitive edge. Tailored development plans and strategic resource allocation, informed by these insights, will enable organizations to build a high-performing workforce that drives long-term success.