International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Engineering Talent Evaluation in the Age of Generative AI

Anand Sunder

Capgemini Technology Services

Abstract: ***This paper presents a comprehensive framework for evaluating engineering talent using Generative AI (GenAI). It contrasts traditional staffing models with GenAI-driven approaches, introduces mathematical formulations for skill gain and stability, and embeds flowcharts to illustrate the transformation. Assumptions are explicitly defined to support academic rigor.***

Keywords: Generative AI, engineering talent, staffing models, skill evaluation, academic rigor

1 Introduction

Traditional engineering assessments emphasize memory recall and static evaluations. In contrast, GenAI enables dynamic, context-aware assessments that prioritize problem-solving, creativity, and domain expertise. This paper proposes a sector-wise framework for evaluating engineering talent using GenAI tools.

2 Evaluation Principles

- Critical Thinking Over Memorization
- Core Knowledge Validation
- Contextual Problem Solving
- Ethical and Collaborative Skills
- Transparent GenAI Interaction

3 Sector-Wise Evaluation Framework

3.1 Software Engineering

Skills: Algorithmic thinking, system design, DevOps, CI/CD.

GenAI Use: Code review automation, simulated debugging challenges.

3.2 Manufacturing & Industrial Engineering

Skills: Process optimization, CAD/CAM proficiency, Lean Six Sigma. GenAI Use: Virtual plant simulations, predictive maintenance modeling.

3.3 Healthcare Engineering

Skills: Regulatory compliance, biomedical instrumentation, clinical data interpretation. GenAI Use: Simulated patient data analysis, FDA compliance modeling.

3.4 Energy & Environmental Engineering

Skills: Renewable systems design, environmental modeling, grid optimization. GenAI Use: Climate simulation tools, smart grid fault prediction.

4 GenAI-Driven Assessment Techniques

- Scenario-Based Simulations
- Conversational AI Interviews
- Portfolio Analysis via AI

5 Mathematical Formulations

$$S(t) = B + \int_0^t L \cdot E(\tau)\, d\tau$$

5.1 Skill Gain

Where:

- $S(t)$: Skill level at time t
- B: Baseline skill
- L: Learning rate
- $E(\tau)$: Exposure to tasks/challenges

5.2 Stability Index

$$SI = \frac{\sigma}{\mu}$$

Where:

- σ: *Standard deviation of evaluation scores*
- μ: *Mean of evaluation scores*

6 Assumptions

- GenAI tools are accessible to both candidates and evaluators.
- Evaluation criteria are standardized across sectors.
- Feedback is integrated in real-time.
- Ethical safeguards are in place to mitigate bias.

7 Conclusion

GenAI enables a holistic and equitable approach to engineering talent evaluation. By focusing on critical skills and core knowledge, organizations can better identify and

nurture high-potential engineers across sectors. The proposed framework supports agility, transparency, and continuous skill development.

References

[1] OpenAI. (2023). GPT-4 Technical Report.
[2] Google Research. (2023). PaLM: Scaling Language Models.
[3] Hugging Face. (2023). BLOOM Model Card.
[4] IEEE. (2022). Ethical Considerations in AI Evaluation.
[5] ACM. (2021). Adaptive Learning Systems in Engineering Education