Dr. Ramendra Singh Niranjan
Department of Mechanical Engineering
UIET, CSJM University, Kanpur

Problem: I am the In-charge of an Institute Admission Committee. Over the years, I have observed that most students prefer to take admission in Computer Science, even when their academic performance or aptitude may not support success in that field. This has led to a shortage of students in other branches like Mechanical, Civil, Electrical, etc. Additionally, the software industry cannot absorb such a large number of Computer Science graduates, creating future employability issues.

Objective: Using AI, how can I design a system or strategy to:

1. Help students make better, data-driven decisions about which engineering branch suits them best;
2. Balance admissions across all branches; and
3. Align student choices with long-term career opportunities and industry demand?

Please provide a solution in around 200 words using AI techniques like career prediction models, psychometric analysis, recommendation systems, or data analytics.

Solution 1

To address the imbalance in engineering admissions, AI can be used to design a **smart career guidance and decision-support system**. This system would begin with **psychometric assessments** and **aptitude tests** to evaluate each student's cognitive skills, interests, and personality traits. Using **AI-based career prediction models**, the system can then match students to the engineering branches they are most likely to excel in, based on historical success patterns.

A **machine learning recommendation engine** can suggest suitable branches by analyzing past data — including student academic records, career outcomes, and industry demand trends. For example, if a student with strong spatial reasoning and mechanical aptitude prefers Computer Science only due to peer pressure, the system can recommend Mechanical or Mechatronics with real-time job trend insights.

AI-powered **data visualization dashboards** can help the admission committee understand evolving patterns and design informed seat allocation strategies. **Natural Language Processing (NLP)** can be used in virtual counselling bots to engage students and parents, addressing misconceptions and providing personalized feedback.

By leveraging these AI techniques, the institute can guide students toward more appropriate branches, reduce dropout and failure rates, and balance admissions while aligning education with realistic and diverse career opportunities.

……..

AI can be a valuable tool in addressing the imbalance of student admissions across branches. Firstly, AI-driven **career guidance systems** can be developed using psychometric analysis, academic performance, and interest profiling to suggest the most suitable engineering branch for each student — not just the popular one. By using **machine learning models**, students can be matched to disciplines where they are more likely to succeed and remain engaged, rather than blindly choosing Computer Science.

AI can also help identify patterns through **data analytics** — analyzing admission trends, student performance, dropout rates, and placement outcomes over the years. This insight can guide institutions to reform admission policies, introduce awareness programs, and design balanced seat allocation strategies.

Moreover, **AI-powered recommendation systems** can expose students to job trends in various engineering domains, showcasing career opportunities beyond software — like mechanical design, renewable energy, civil infrastructure, or embedded systems.

AI chatbots or virtual counsellors can engage students and parents in interactive sessions to clarify misconceptions, while **natural language processing (NLP)** tools can be used to analyze student queries and concerns in real-time to shape future counselling efforts.

Thus, AI can offer personalized, data-backed solutions to align student choices with real potential and industry demand, promoting balanced academic ecosystems.