2026 "Huashu Cup" International Mathematical Contest in Modeling

ICM

Problem B: Who Will Win the Global Competition in Artificial Intelligence?

Background

In the current era, artificial intelligence (AI) has emerged as the core domain of global technological competition, exerting a profound impact on economic development, social progress, and national security. Countries worldwide have significantly increased their investment in the AI field, aiming to gain a leading position in this technological revolution. However, different countries possess distinct resource advantages in AI development, and their progress is influenced by a combination of factors, such as the sophistication of infrastructure, the reserve of professional talents, and the richness of data application scenarios.

A comprehensive and in-depth understanding of these factors and their interrelationships is crucial for accurately evaluating the AI development capabilities and potential of various countries. By quantifying these factors and establishing a scientific evaluation model, it is possible to assist countries in formulating rational AI development strategies, as well as gain insights into the global AI development pattern and its future evolution trends.

Requirements

Please establish a mathematical model to address the following questions:

- Identify the factors that can effectively evaluate AI development capabilities, quantify these factors, explore the inherent correlations among the factors, and analyze how they interact and influence each other to collectively promote or constrain AI development.

- Based on the aforementioned quantified factors and their correlations, construct a scientifically sound evaluation model for AI development capabilities. Use this model to assess ten countries—namely the United States, China, the United Kingdom, Germany, South Korea, Japan, France, Canada, the United Arab Emirates, and India. Provide their 2025 AI competitiveness rankings.

- Focusing on the ten countries mentioned in Question 2, and based on their 2016–2025 development strategies, resource investment trends, and technological development trajectories, combined with the evaluation model constructed in Question 2, predict the changes in the AI competitiveness rankings of these ten countries during the 2026–2035 period.

- Assume that starting from 2026, China plans to allocate an additional 1 trillion yuan in special funds to enhance the development competitiveness. The core goal is to achieve "the maximization of China’s comprehensive AI competitiveness" by 2035 through scientific fund allocation. Please provide your investment recommendations.

Your PDF solution of no more than 25 total pages should include:

• One-page Summary Sheet.

• Table of Contents.

• Your complete solution.

• References list.

• AI Use Report (If used does not count toward the 25-page limit.)