Transformer-Based Deep Learning for Ranking Systems in Games and Esports

Jacek Klimek
MORAI R & D

Abstract

Ranking systems (also known as ratings or scoring) are used in many practical, real-world applications in areas such as finance, politics, commerce, and sports. Most ranking systems are based on the aggregated opinions of experts or other opinion-forming groups. However, the most interesting and objective ranking systems are those based on objective data related to a specific issue (so-called 'data-driven' ratings). Various types of algorithms can be used to create such systems. An interesting area for researching algorithms that create rankings is sports or esports competitions. They allow for the collection of large amounts of data on specific competitions, which makes it possible to test the developed algorithms according to the principle that a higher ranked player should win against lower-ranked players in most cases. The most well-known rankings based on mathematical formulas or algorithms are ELO, Glicko, and Trueskill. However, all these systems contain arbitrary assumptions regarding the probability distributions of the parameters that describe the games played. In practice, these assumptions are, at best, only approximately fulfilled and, at worst, false. This is an obvious disadvantage of these rankings and indicates that they do not perform well in practice.

A completely new approach to solving this problem is to use Deep Learning algorithms to create an AI model that, based on historical data consisting of the results of games played in previous rounds, will be able to predict the results of games in subsequent rounds with a high degree of probability. The problem of creating rankings as a matter of predicting, with a certain probability, the next vector values at subsequent points in time allows us to use methods known from research on time series modeling using deep learning algorithms, in particular the Transformer algorithm. In this study, we drew on our previous experience in this area of research. These methods have proven to be extremely effective in predicting subsequent parameters in time series in the fields of energy and business data.