This study was conducted using gene expression programming (GEP) and an adaptive neural-based fuzzy inference system (ANFIS) as an alternative approach to estimate daily pan evaporation, which is an important parameter in hydrological and meteorological studies. The input parameters used to estimate daily pan evaporation from Lake Egirdir in the southwestern part of Turkey are the daily pan evaporation data of Lake Kovada (Kot) and Lake Karacaoren Dam (Kat) and the previous 1-, 2-, and 3-day pan evaporation values of Lake Egirdir. The various input combinations were tried by using pan evaporation data for the years 1998–2005. The GEP model with the highest Nash–Sutcliffe efficiency and the lowest mean square error have the daily pan evaporation data of Lake Kovada (Kot) and Lake Karacaoren Dam (Kat) and the previous 1-day pan evaporation values of Lake Egirdir. The NSE of the best GEP model was obtained as 0.729, 0.722, and 0.701 for training, testing, and validation sets, respectively. Furthermore, the ANFIS models were developed using the same input combinations. It was seen that the GEP model was more superior to the ANFIS model.