EÖTVÖS LORÁND TUDOMÁNYEGYETEM

INFORMATIKAI KAR

DIPLOMAMUNKA TÉMABEJELENTŐ

Hallgató adatai:

Név: Csonka László

Neptun kód: H6XS3I

Képzési adatok:

Szak: programtervező informatikus, mesterképzés (MA/MSc)

Tagozat : Nappali

Belső témavezetővel rendelkezem

Témavezető neve: Dr. Cserép Máté

munkahelyének neve, tanszéke: **ELTE IK, Programozáselmélet és Szoftvertechnológia Tanszék**

munkahelyének címe: **1117, Budapest, Pázmány Péter sétány 1/C.**

beosztás és iskolai végzettsége: **egyetemi adjunktus és Informatikai tudományok PhD**

A diplomamunka címe: Leveraging Machine Learning to Predict Student Performance in Computer Science Courses

A diplomamunka témája:

(A témavezetővel konzultálva adja meg 1/2 - 1 oldal terjedelemben diplomamunka témájának leírását)

The goal of my thesis is to apply and compare three different machine learning algorithms (Random Forest, Deep Neural Network, Support Vector Machine) based on the results of students in the first-year programming courses at the university, including "Imperative Programming" and "Programming Fundamentals". The purpose of these algorithms is to predict the academic performance of students and to assist instructors in timely identifying those students who may need more attention during the course.

The methodology of the thesis focuses on the implementation and comparative analysis of the selected algorithms, processing the academic results of students from previous semesters provided by the university. By separately evaluating the Random Forest, Deep Neural Network, and Support Vector Machine algorithms, I determine which performs best in predicting student performance. Subsequently, the best-performing algorithm will be integrated into the university's TMS (Task Management System), where predictions will be made for the instructors.

Regarding future use, the algorithm will not only process data from previous semesters but will also utilize the results from the first half of the current semester to predict the performance of students in that semester. This provides an opportunity for instructors to recognize early in the semester those students who are likely to face difficulties and to intervene accordingly.

Additionally, the algorithm plays a role in end-of-year evaluations, enabling instructors to compare predicted outcomes with actual exam results. This helps to reveal how a student has progressed over the year or why they may have underperformed despite initially favorable predictions. Through such analyses, instructors can better understand the learning dynamics of students and provide more accurate, targeted support in the future.

Budapest, 2024. 10. 08.