

ANNOTATIONS OF THE PUBLICATIONS INCLUDED IN THE DOCUMENTS FOR THE PROCEDURE

1. *Georgi Cholakov, Asya Stoyanova-Doycheva, „Extending Fraud Detection in Students Exams Using AI“, TEM Journal, 13(4), pp.3068-3078, (2024).*

The aim of this research is to present an attempt to improve the functionality of the FraudDetector software agent running in the Distributed eLearning Center (DeLC) — a platform used for e-learning activities. DeLC helps students and teachers organize learning materials, bridge knowledge gaps, administer exams, and create personalized learning environments. The main contribution of the work is the integration of large language models, in particular by using the ChatGPT knowledge base, to improve FraudDetector’s fraud detection capabilities. The integration shows promising results, with experimental data pointing to a significant improvement in the accuracy of the agent.

2. *Asya Stoyanova-Doycheva, Georgi Cholakov, Todorka Glushkova, „Using Ontologies in e-Learning in Software Engineering Course“, Computer Science and Interdisciplinary Research Journal, Vol. 1 No. 1 (2024)*

This paper explores the use of ontologies in e-learning in software engineering. It examines the development of educational content and the automated generation of test questions using two integrated ontologies. This integration improves the adaptability and effectiveness of learning resources and assessment, providing better learning.

3. *Georgi Cholakov, Asya Stoyanova-Doycheva, "Using AI to improve answer evaluation in automated exams", Сп. „Математика и информатика“, vol. 67, No. 3, 2024. DOI: 10.53656/math2024-3-4-imp, ISSN: 1310–2230 (Print), 1314–8532 (Online)*

The paper examines the use of artificial intelligence to improve grading in automated exams. It presents the integration of AI technologies such as large language models (LLMs) with an assessment agent, which expands its knowledge base and improves the accuracy of assessment of answers. Experiments were conducted to compare the performance before and after the integration. This research aims to facilitate teachers in processing and analyzing free text answers. The work focuses on the assessment of short free text answers, with the agent expanding its vocabulary using test data and correct answers entered by teachers. The results of the initial experiments show significant improvements in grading.

4. *Гл. ас. д-р Георги Чолаков, доц. д-р Емил Дойчев, проф. д-р Светла Коева, “ПРЕДИЗВИКАТЕЛСТВА ПРИ ОБХОЖДАНЕТО НА ИНТЕРНЕТ С ЦЕЛ ИЗВЛИЧАНЕ НА ДАННИ”, Сп. „Математика и информатика“, vol. 67, No. 1, 2024. DOI: 10.53656/math2024-1-1-cha, ISSN: 1310–2230 (Print), 1314–8532 (Online)*

The article examines the challenges in developing a system for extracting and visualizing data from the Internet by crawling language resources from the Hugging Face repository.

The focus is on extracting data related to these resources, which are updated periodically in order to track the dynamics of the creation of language resources over different periods. The authors analyze the structure of the available data and the methods for crawling web pages, as well as solving specific problems in their extraction. The shared experience can be useful for solving similar problems in other projects, including student projects. The article emphasizes that these systems are sensitive to changes in the data structure of the crawled source, with each change requiring an update of the extraction process to maintain the functionality of the system.

5. *Гл. ас. д-р Георги Чолаков, доц. д-р Емил Дойчев, проф. д-р Светла Коева, Система за извличане и визуализация на данни от интернет, Сп. "Математика и Информатика", vol. 66, No. 5, 2023, DOI: 10.53656/math2023-5-3-sys, ISSN: 1310–2230 (Print), 1314–8532 (Online)*

The article presents a system that dynamically demonstrates the availability of datasets and language models used in the field of artificial intelligence, located in large repositories such as Hugging Face. The goal of the system is to show that for all official European languages, except English, the datasets and language models needed for language technology and artificial intelligence development have either average or fragmentary support. In addition, the system presents an architecture that uses tools such as Node-RED, MariaDB and Grafana, which offer extensive capabilities for crawling data from the Internet, storing it in a database and visualizing it. These tools can be useful in the implementation of student projects at the high school level.

6. *A. Stoyanova-Doycheva, I. Stoyanov, G. Cholakov, E. Doychev, "Data Representation in Crop Cultivation Events", 12th INTERNATIONAL IEEE CONFERENCE ON INTELLIGENT SYSTEMS, Varna, 2024, DOI: 10.1109/IS61756.2024.10705218, ISBN: 979-8-3503-5098-2.*

The article presents the creation of TomatoEventOntology, an ontology covering events related to tomato cultivation. The events are categorized into two groups: domain events, which denote the different stages of tomato growth, and emergency events, which indicate critical problems that could reduce yields if not resolved in time. TomatoEventOntology is designed to integrate seamlessly with ZEMELA, an intelligent agricultural ecosystem. It includes intelligent components that use the ontology to alert farmers to relevant events in tomato cultivation, thus increasing the efficiency of agricultural production.

7. *Stoyanova-Doycheva A., Madanska S., Grancharova M., Glushkova T., Cholakov G., „Development of Ontologies in Different Domains for a Test Generation Environment“, 8th International Conference on Higher Education Advances (HEAd'22), DOI: 10.4995/HEAd22.2022.14205.*

The article presents the creation of ontologies for automatic generation of test questions within a test generation environment, part of a virtual educational space. The ontologies cover areas such as botany, literature and history of Bulgaria, and architecture of Renaissance houses, and are designed to assist students in exams or for self-study. The article presents examples of automatically generated questions for each of these areas.

8. *Cholakov G., Stoyanova-Doycheva A., "Using data analysis to predict the students' trend of choosing preferred data storage", 8th International Conference on Higher Education Advances (HEAd'22), DOI: 10.4995/HEAd22.2022.14195.*

The article presents results of a study of students' preferences for a preferred type of database used for training or in real-world projects, and these preferences were discovered through the analysis of data collected by software agents in the e-learning platform DeLC. Although the agents were created for completely different purposes, the results they generated and the analysis of the collected data reveal specific patterns of behavior and trends among students when choosing a specific database.

9. *Georgi Cholakov, Asya Stoyanova-Doycheva, "Model for Profiler Agent during unexpected educational circumstances", 7th International Conference on Higher Education Advances (HEAd'21), DOI: 10.4995/HEAd21.2021.12841.*

The article examines the problem of maintaining students' attention in distance learning and proposes a practical approach to solving it. To improve engagement, a new intelligent assistant has been developed that will monitor students' progress in specific topics and recommend areas for improvement. This software agent will operate in an agent-oriented environment, representing an extension of an existing system (DeLC), cooperating with other agents operating in it, and will support both student learning and the efforts of teachers to prepare more appropriate learning materials, taking into account the specifics of distance learning conditions.

10. *G. Cholakov, "Approbation of software agent Evaluator in a nonspecific environment for extension of its purpose," 2020 International Conference Automatics and Informatics (ICAI), 2020, pp. 1-5, DOI: 10.1109/ICAI50593.2020.9311346, ISBN: 978-1-7281-9308-3.*

The article presents the testing of the Evaluator agent, whose purpose is to automatically evaluate answers to "open-ended" questions, i.e. answers in free text. Its architecture is briefly presented, as well as the specifics of its application. The purpose of this testing is to show whether it would cope with similar success if applied in fields that are not characterized by as much terminology as technical sciences such as computer science - e.g. in philology or sociology. For this purpose, it was implemented in a system representing a personal blog, where it supports free text search, presenting a degree of coincidence of the searched text in different articles. Comparative results are presented, showing that its functionality is not tied to a specific field of science, but can be used universally.

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