

Preface

The main aim of the Fifteenth International Conference *Digital Presentation and Preservation of Cultural and Scientific Heritage (DiPP2025)* is to bring together as many interested institutions as possible working on digitising, recording, documenting, archiving, presenting, protecting and managing cultural and scientific heritage, so that they can share their advanced thoughts, know-how and experience. Public and specialised libraries, museums, galleries, archives, community centres, research institutions and universities are expected to share and acquire knowledge, skills, and expertise at the event.

Four types of papers are presented – invited papers, full papers, short papers, and project papers. The first three types discuss current scientific results, trends and achievements in the field of digital preservation and presentation of cultural and scientific heritage. The project papers present developments in progress, part of them experimental, made by memory institutions within their institutional projects.

- *Invited papers*

I. Pratikakis explores tools for analysis of historical handwritten documents. Challenges include the age of manuscripts, language complexity and the unconstrained content of these documents. The paper describes distinct methodologies and tools for Handwritten Text Recognition and Keyword spotting.

G. Giuffrida presents an initial attempt to develop an automatic manuscript dating system through digital codicological analysis of manuscripts using high-resolution images. The analysis reveals the evolution of eight codicological parameters, eventually leading to a neural network for automatically dating mediaeval manuscripts.

M. Scarpa and D. Paneva-Marinova investigate the obstacles and potential presented by modern information technologies in the innovative study of the Cyrillic script. The emphasis is on the development of a digital repository of data from primary mediaeval South Slavic inscriptions and manuscripts, enhancing services related to their identification and classification on the basis of palaeographic and codicological features.

Z. Székely, O. Székely-Keresztesi, Zs. L. Márkus, A. Majdik and T. Szkaliczki discuss the B-prepared project, which uses a collaborative knowledge base and data hub to enhance disaster preparedness through a cooperative multiplayer VR serious game, an interactive gamified mobile app and a Learning Management System. The platform encourages teamwork, collaboration and communication.

A. I. Iliev analyses deepfake technologies across five media modalities. He examines content creation architectures and detection techniques, evaluating accuracy, robustness and practical implementation. The work provides a balanced perspective on the synthetic media's opportunities and challenges in the artistic domain.

T. Ballı, H. Peker, Ş. Pişkin and E. F. Yetkin present a case study based on the ancient city of Karkemish, proposing a plan for an AI-assisted Virtual Reality system. The framework includes a user-friendly, gamified interface, with both qualitative and quantitative evaluations. It aims at preserving and disseminating endangered cultural heritage and improving access for people with limited mobility through virtual access.

T. Ballı and E. F. Yetkin proposes an EEG-based evaluation pipeline for an AI-assisted VR platform designed to deliver immersive cultural heritage experiences for elderly people. EEG data is used to evaluate emotional and cognitive responses while performing real-world versus virtual tasks, offering a reusable evaluation framework for future immersive heritage applications.

D. Valeine and G. Mikuda look at how Latvian public libraries are digitising local cultural documents and showcasing local history through digital collections and virtual exhibitions. A new platform integrates these collections, enhancing sustainable preservation and accessibility.

- *Full papers*

D. Tatić, R. Stanković and M. Goynov describe a mobile application using geospatial augmented reality to showcase outdoor heritage sites, detailing the AR tracking with ARCore Geospatial API, presenting the system's architecture and illustrating its application on the examples of monuments in the city of Niš. This technology provides quick and intuitive information search about heritage site landmarks.

R. Stewart, K. Kralev and D. Stoyanov examine deep learning methods for face recognition in order to identify societal patterns in historical databases. They use scanned early 20th-century photographs to recognise basic facial features like gender, age and emotion.

M. Riparante and M. Davidović employ the Cyrillic Palaeography Toolkit to re-assess a number of manuscripts attributed to the Serbian copyist Damijan-Iosif, attributing eight of them to him and on a further occasion revealing the presence of a collaborator on the basis of through palaeographic and layout features.

D. Lesigyarski, I. Tsvetanska and I. Dimitrova present the initial stages of the preparation of a digital catalogue, including analytical information gathered by using a portable Raman spectroscopy instrument for the study of mediaeval parchment manuscripts from the repository of the Bulgarian National Library.

P. T. Tsvetkova, G. P. Dimitrov, K. Rasheva-Yordanova and V. Martsenyuk explore AI-based image processing techniques to enhance the readability of 12th-century palimpsests from the Bulgarian National Library. The study demonstrates significant improvements in recovering obscured texts for research and educational purposes.

K. Rasheva-Yordanova, G. P. Dimitrov and I. Dimitrova present a methodology for enhancing palimpsest readability using image processing. The results show effective separation of scriptio inferior and superior, supporting further analysis through digital reconstruction and OCR.

D. Luchev, M. Goynov, R. Pavlov, M. Monova-Zheleva, Y. Zhelev, L. Pavlova, S. Dalakchieva, D. Paneva-Marinova, G. Senka and K. Rangochiev discuss the design and

development of the ProNature platform, its modular architecture and the role of the game scenario module in the making of adaptable and reusable educational games.

I. Kratchanov proposes a Hybrid Educational-Persuasive Framework for designing serious games that alleviate library anxiety. The goal is to integrate pedagogical and persuasive elements, emphasising learner context, motivation, and gameplay mechanics to boost user familiarity and comfort.

H. M. K. Murthy and A. I. Iliev explore secure and intelligent curation of digital scientific data using Retrieval-Augmented Generation (RAG) systems. They propose models for fraud detection, enhancing semantic interpretation, personalization, and secure access to digital knowledge assets in critical sectors.

V. Kazashka and V. Tabakova-Komsalova explore managers' attitudes towards digitalisation in art organisations. The research focuses on the digitalisation of art management processes and presents a prototype for digital art management.

E. Nikolova and V. Ruseva study the impact of digitising cultural and historical heritage on cultural tourism on the Bulgarian Black Sea Coast. Their analysis of tourism websites and surveys with tour guides show that absence of VR, AR and virtual tours limits website appeal, highlighting a need for technology investment and training.

B. Borůvková addresses ethical challenges of authenticity and interpretation when digitally restoring missing parts of historical artefacts. The interplay between ethical standards and technology in digitisation and access to cultural heritage is explored.

E. Zaharieva-Stoyanova and S. Bozov discuss the digital display and preservation of handmade embroidery, introducing a new cross-stitch software application that allows users to create embroidery patterns by selecting stitches and techniques, which will help digitalisation and serve as an instructional tool for the training of craftsmen.

V. Muchanova, V. Danev, A. Chikurteva and P. Petrov outline a plan to promote cultural heritage to digital users, focusing on the Glozhene village in Bulgaria. The goals include digitising local landmarks and artifacts and creating a virtual platform to showcase the region's heritage. The study explores effective methods for presenting cultural heritage in line with modern technology and user experience standards.

M. Kraev and D. Luchev examine how artificial intelligence and machine learning enhance entity recognition, contextualisation, and knowledge enrichment in cultural heritage knowledge graphs. They highlight the integration of knowledge graphs with immersive technologies like augmented and virtual reality for broader access.

I. Derzhanski and O. Siruk compare the lexical and semantic fields of memory in Bulgarian and Ukrainian, using material from a parallel bilingual corpus. They study the lexical and grammatical correspondences, the frequencies of word-formation patterns and the most common collocations, and compare translation strategies.

M. Stoyanova and M. Minova explore IT opportunities such as databases, vocabularies and linked data developed in the course of improving the beneficial properties of natural biological objects, highlighting their role in the transition of heritage science to renewable supplies and technologies meeting ecological and health standards.

B. R. Yoshinov, R. R. Yoshinov and I. B. Koleva present the structure of a digital library on pain and analgesia. They discuss the necessity of its creation, the steps of its introduction in the educational process of the medical staff, and the impact of its application on the professional competencies of members of the pain team.

- *Short papers*

S. Madanska and A. Stoyanova-Doycheva offer two short papers.

In the first of these they consider options for integrating ontologies into Bulgarian cultural and historical heritage and especially the applied Cataloguing Cultural Objects (CCO) standard. Ontology integration mechanisms using Protégé are discussed.

In the second the authors present an ontology for alternative tourism in the municipality of Devin, reusable as a template for other localities as well. The technological aspects are briefly described, including classes, individuals, properties, and reasoning.

- *Project papers*

D. Popova explores the new creative opportunities introduced by the generative artificial intelligence for the architectural practice, and specifically architectural heritage. The reconstructed visions of interiors from a 19th century house are result of two input data models: from-text-to-image and from-image-to-image.

G. Angelova explores the structure and technological development of a digital bibliographic product for Bulgarian Catholic books published between 1878 and 1944. The bibliographic repertoire's components and user interface are examined, along with its potential for cross-disciplinary research in Book History.

E. Atanasov, A. Karaivanova, A. Kirilov and S. Yordanov present the initial Data Service Portfolio of the Centre of Excellence in Informatics and ICT, outlining its hardware and software organisation, metadata management service and accounting service. They discuss future plans and a roadmap for enhancement of the portfolio.

T. Gurov, S.-M. Gurova and A. Karaivanova present Bulgaria's participation in the Skills4EOSC project, the benefits of the project for advancing Open Science and its contribution to the country's integration into the European Research Area.

- *Workshops and Demos*

The Workshop and the 16th National Information Day on Open Science, Open Data, and Open Access – chaired by Peter Stanchev – provided an overview of the current landscape and key activities at both the national and institutional levels, focusing on Open Science initiatives, access to scientific information, data sharing, and the development of the Bulgarian Open Science Cloud.

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