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Artificial intelligence-assisted classification of library resources: a case study of DeepSeek

Deepak Singh [1]

[1] Mandsaur University, Mandsaur (Madhya Pradesh), India

dsingh071@gmail.com

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Abstract

Artificial intelligence (AI) is an emerging area of information technology with growing applications in library and information services. Although previous studies have discussed its use in areas such as reference services and security, its effectiveness in cataloguing and classification requires further empirical examination. This study investigates how DeepSeek responds to selected cataloguing and classification tasks. Specifically, it examines the tool's ability to suggest a class mark, identify subject terms, and generate a Cutter number for a given book. A randomly selected book title was used to frame the prompts. Each of the three tasks was submitted in three separate DeepSeek login sessions, and the responses were recorded and analyzed. The findings indicate that DeepSeek can suggest class marks, subject terms, and Cutter numbers, potentially reducing some of the intellectual effort involved in subject analysis. However, its responses varied across sessions, indicating a lack of consistency. The study concludes that DeepSeek may be useful as an assistive tool, but cataloguing and classification librarians should not rely on it as the sole authority when assigning call numbers and subject headings.

Introduction

The growth of digital content in the information age has made effective organisation and retrieval of knowledge a major concern for libraries worldwide. Libraries preserve and provide access to extensive collections of books, periodicals, multimedia resources, and archival materials. Traditionally, librarians have organised these resources using established schemes such as the Library of Congress Classification (LCC) and the Dewey Decimal Classification (DDC). However, the continuing growth of information and the changing nature of knowledge domains have made manual classification increasingly demanding and time-consuming. Accurate classification is essential: a resource that cannot be located because it has been inadequately classified is, for practical purposes, difficult for users to access.

Manual cataloging and classification require time, specialised personnel, and sustained intellectual effort. Artificial intelligence (AI), particularly machine learning and natural language processing (NLP), offers potential ways to support and improve these processes. AI-based tools may help librarians analyse resources, suggest subject access points, and improve discoverability. Among the tools attracting attention is DeepSeek, a large language model-based chatbot. This study examines its responses to selected cataloguing and classification tasks, focusing on the generation of class marks, subject terms, and Cutter numbers.

Objectives of the study

1. To determine the ability of DeepSeek in providing a call number for a given book
2. To determine the ability of DeepSeek in providing subject terms for a given book
3. To determine the ability of DeepSeek in providing a Cutter number for a given book

Research questions

1. Does DeepSeek provide a call mark for given books?
2. Does DeepSeek provide a subject term for given books?
3. Does DeepSeek provide cutters for a given author?

Literature review

Dewey Decimal Classification

The Dewey Decimal Classification (DDC) is a widely used library classification system, conceived by Melvil Dewey in 1873 and first published in 1876. It is a hierarchical scheme that organises library materials by subject into ten main classes, each of which is further divided into ten divisions and, in turn, ten sections (Comaromi, 1976). Dewey developed the system to provide a more accessible way of organising knowledge at Amherst College Library. Before its introduction, many libraries arranged books by physical characteristics or date of acquisition rather than by

subject, making browsing more difficult (Chan, 1994). The DDC sought to group materials logically by subject to facilitate access and browsing.

The 10 main classes in Dewey's original classification were:

000 - General works

100 - Philosophy

200 - Religion

300 - Social sciences

400 - Language

500 - Pure sciences

600 - Applied sciences

700 - Arts and recreation

800 - Literature

900 - History and geography

Since its introduction, the DDC has undergone numerous revisions and expansions in response to the growth of knowledge. The system remains widely used internationally and has been translated into many languages (Chan, 2017; Dewey Services, 2021). Its hierarchical structure supports browsing, while new topics can be accommodated through revisions and extensions to existing classes. However, the scheme has also been criticised for biases associated with its Western origins, including Eurocentric and Christian perspectives in some areas (Wallace, 2015).

The widespread use and ongoing revision of the DDC have spurred research into its application to new materials, update management, and consistency across libraries. Researchers have also considered the merits and limitations of alternative systems, including LCC and faceted classification approaches (Lee, 2015). The development of digital libraries and online information environments has further prompted discussion about the DDC's applicability and adaptation to electronic resources (Gnoli, 2008). The DDC therefore remains an influential classification scheme and an important subject of study as libraries continue to develop their digital services.

Library of Congress Classification Scheme

The Library of Congress Classification (LCC) system was developed in the late 19th century by the Library of Congress as a unique classification scheme for its rapidly growing collection. It was first published in 1904, around the same time as the Dewey Decimal System, with which it shares conceptual similarities in hierarchical structure (Chan, 1999).

The LCC divides knowledge into 21 broad classes, represented by letters of the alphabet from A to Z, with some letters representing more than one class. These classes are subdivided into narrower topics using combinations of letters and numbers (Taylor, 2006). For example, the schedules cover general works, philosophy, psychology, and religion through their respective classes and subclasses.

Compared with the DDC, the LCC offers a more extensive set of main classes and uses primarily alphabetic notation rather than a purely numerical notation. It was designed to accommodate the extensive collections of the Library of Congress, whereas the DDC was initially developed for a smaller academic library (Chan, 1999). The LCC is used by many research and academic libraries, particularly in the United States, and by institutions elsewhere (Luo, 2009). Its detailed schedules allow for specific classification, although the system can be complex to learn and navigate.

The Library of Congress regularly updates the LCC to accommodate new subjects and changes in knowledge. Research has examined potential biases and gaps in the scheme, particularly those associated with its Western origins (Furner, 2007). Other work has considered its application in digital environments and its suitability in comparison with the DDC and faceted classification systems (Svenonius, 2000). The LCC remains an established and detailed classification scheme, particularly in research and academic libraries.

Background and development of DeepSeek

Hangzhou DeepSeek Artificial Intelligence Basic Technology Research Co., Ltd. doing business as DeepSeek is a Chinese artificial intelligence (AI) company that develops large language models (LLMs). Based in Hangzhou, Zhejiang, DeepSeek is owned and funded by the Chinese hedge fund High-Flyer. DeepSeek was founded in July 2023 by Liang Wenfeng, the co-founder of High-Flyer, who also serves as the CEO of both companies. The company launched an eponymous chatbot alongside its DeepSeek-R1 model in January 2025 and DeepSeek V3.1 model in August 2025.

Major versions	Release date	Status	Major variants	Remarks
DeepSeek Coder	November 2, 2023	Discontinued	Base (pretrained); Instruct (with instruction-finetuned)	The architecture is essentially the same as Llama.
DeepSeek-LLM	November 29, 2023	Discontinued	Base; Chat (with SFT)	
DeepSeek-MoE	January 9, 2024	Discontinued	Base; Chat	Developed a variant of mixture of experts (MoE).
DeepSeek-Math	April 2024	Discontinued	Base	Initialized with DS-Coder-Base-v1.5
			Instruct (with SFT)	

			RL (using a process reward model)	Developed Group Relative Policy Optimization (GRPO), a variant of Proximal Policy Optimization (PPO).
DeepSeek V2	May 2024	Discontinued	DeepSeek-V2, DeepSeek-V2-Chat DeepSeek-V2-Lite, DeepSeek-V2-Lite-Chat DeepSeek-Coder-V2 DeepSeek-V2.5	Developed multi-head latent attention (MLA). Also used mixture of experts (MoE). Implemented KV caching.
DeepSeek V3	December 2024	Active	DeepSeek-V3-Base DeepSeek-V3 (a chat model)	The architecture is essentially the same as V2. Updated on 2025-03-24.
DeepSeek-Prover-V2	May 1, 2025	Active	DeepSeek-Prover-V2-671B DeepSeek-Prover-V2-7B	
DeepSeek VL2	December 13, 2024	Active		
DeepSeek R1	November 20, 2024	Active	DeepSeek-R1-Lite-Preview	Only accessed through API and a chat interface.
	January 20, 2025	Active	DeepSeek-R1 DeepSeek-R1-Zero	Initialized from DeepSeek-V3-Base and sharing the V3 architecture.
			Distilled models	Initialized from other models, such as Llama, Qwen, etc. Distilled from data synthesized by R1 and R1-Zero.
	May 28, 2025	Active	DeepSeek-R1-0528	
DeepSeek V3.1	August 21, 2025	Active	DeepSeek-V3.1-Base DeepSeek-V3.1 (a chat model)	Hybrid architecture (thinking and non-thinking modes available). Trained on over 800B additional tokens on top of V3.

AI in cataloguing, classification, and Cutter number assignment

Research has identified several applications of AI in academic libraries, including text-to-speech and speech-to-text technologies, voice-based searching, and RFID-enabled self-check-in and self-check-out, and data analysis for collection development (Asim et al., 2023). However, the study discussed these applications without examining cataloguing and classification in detail. Isiaka (2023) identified AI-assisted cataloguing as a potential library application but did not demonstrate in detail how AI could perform cataloguing and classification tasks. Arora et al. (2020) suggested that AI could support the automatic classification and cataloguing of books and the updating of their records in online public access catalogues (OPACs). Ajakaye (2022) similarly discussed the potential of AI for cataloguing, indexing, abstracting, reader-advisory services, and information extraction. Omame and Alex-Nmecha (2020) also proposed the use of AI, including optical character recognition (OCR), for automated cataloguing and classification. These claims highlight the potential of AI in technical services, but further empirical work is needed to assess the quality and consistency of its outputs. The present study addresses this issue by examining DeepSeek's responses to selected classification and cataloguing prompts.

Manual Subject Analysis and Classification

Manual subject analysis and classification involve assigning subject headings or classification numbers to library materials through human judgment and interpretation of their content. This established approach has been used in libraries and information centres for decades to organise collections and support information retrieval. Although automated methods are increasingly available, manual subject analysis remains important. It requires the cataloguer to examine a document and identify the subjects that best represent its principal topics. The process is generally undertaken by trained indexers or cataloguers who understand the subject area and the classification scheme or thesaurus being applied (Svenonius, 2000; Chan, 2005).

Manual subject analysis helps represent the intellectual content of resources and supports effective retrieval and access (Markey, 1984; Svenonius, 2000). Human judgement is particularly important when interpreting nuances and complex subject relationships that automated systems may not adequately capture (Chan, 2005). Commonly used classification schemes include the DDC and LCC, while controlled vocabularies such as Library of Congress Subject Headings (LCSH) and the Sears List of Subject Headings are used to support subject access (Svenonius, 2000; Chan, 2005; Olson & Boll, 2001).

Standards and guidelines, including the Anglo-American Cataloguing Rules (AACR) and Resource Description and Access (RDA), provide guidance on cataloguing principles and practices (Chan, 2005; Tillett, 2004).

Despite its value, manual subject analysis and classification can be affected by subjectivity and differing interpretations, which may result in inconsistencies in assigned headings or classification numbers (Chu & O'Brien, 1993; Svenonius, 2000). Complex subject areas may also require specialised expertise. Nevertheless, human judgement remains essential for accurately representing the intellectual content of resources. As technology advances, the relationship between manual and automated approaches will continue to shape subject analysis and classification in libraries and information centres.

Methodology

Research design

This study adopted an exploratory, descriptive case study approach to examine DeepSeek's responses to selected library cataloguing and classification tasks. The approach was considered appropriate because the study sought to observe the tool's ability to generate suggested class marks, subject terms, and Cutter numbers, and to examine whether its responses remained consistent when the same tasks were submitted in separate login sessions. The study focused on the outputs generated by the AI tool rather than on the development or training of an AI model.

AI tool and version used

The study used the free, publicly accessible version of DeepSeek V3.1, released on 21 August 2025. DeepSeek was selected as the AI tool under investigation because it provides a conversational interface through which users can submit natural-language questions and receive generated responses. The investigation was limited to this version and access mode. The findings should therefore be understood as observations of the version and interface used for the study; they should not automatically be generalised to other DeepSeek models, later versions, or other AI platforms.

Selection of the books

A book title from a library collection was selected to provide a practical basis for testing the tool. The title used for the classification task was Business Research Methods, written by Naval Bajpai and published in 2017. This title was used to examine whether DeepSeek could identify an appropriate subject area and suggest a class mark under the Library of Congress Classification (LCC) scheme. The same bibliographic details were provided in the first task across the three login sessions to enable comparison of responses. The study reports four selected titles; it does not claim to represent the full range of subjects, formats, or levels of complexity found in a library collection.

Development of research prompts

Three prompts were prepared in accordance with the three objectives of the study. The first prompt asked DeepSeek to suggest an LCC class mark for Business Research Methods by Naval Bajpai (2017). The second prompt asked the tool to identify subject terms associated with the class mark HD 30.4, which had appeared in one of the responses to the first task. The third prompt asked the tool to provide a Cutter number for a title beginning with the word “Business”. These prompts were intended to examine three related but distinct functions: class-mark suggestion, subject-term generation, and Cutter-number generation. The wording and sequence of the prompts were based on the research objectives and the questions reproduced in the Results section.

Data collection procedure

Data were collected by submitting each of the three prompts to DeepSeek in three separate login sessions. Thus, each task was repeated three times, yielding three responses per task and nine responses in total. The responses were recorded for subsequent examination. The three-session procedure was used to observe whether the tool produced the same or different suggestions when the same task was repeated in separate sessions. The study did not involve a large-scale automated test, a user survey, or an experiment with multiple AI platforms. The evidence analysed consisted of the text responses generated by DeepSeek for the three prompts.

Data analysis

The recorded responses were examined using descriptive qualitative comparison. For each task, the outputs from the three sessions were reviewed and compared with one another. In the first task, attention was given to the class and subclass suggested and to the resulting call-number structure. In the second task, the subject terms and explanatory descriptions generated by DeepSeek were compared for similarities and differences. In the third task, the Cutter-number suggestions were compared to determine whether the tool produced the same notation across sessions. The analysis focused particularly on consistency, variation, and the apparent relevance of the generated suggestions to the task asked. The results are presented descriptively in the following section, with the responses retained as the study's recorded evidence.

Evaluation criteria

Three broad criteria guided the examination of the outputs. First, task relevance was considered: whether the response attempted to address the particular cataloguing or classification task specified in the prompt. Second, consistency was considered: whether repeated submissions of the same task in separate login sessions produced the same or substantially similar outputs. Third, professional verifiability was considered: whether the generated suggestions would require checking against authoritative classification schedules, controlled vocabularies, Cutter tables, and local cataloguing practices before being adopted in a library record. The study's principal emphasis was on consistency across the three sessions. It did not constitute a formal accuracy assessment by a panel of expert cataloguers, nor did it calculate statistical reliability or agreement scores.

Scope and methodological limitations

The methodology has several limitations. The investigation was restricted to one AI tool, one model version, one selected book title for the class-mark task, and three prompts repeated in three separate login sessions. Consequently, the findings are exploratory and cannot be generalised to all library materials or all AI-based systems. The study also did not use a large benchmark dataset, independent expert ratings, or a formal quantitative measure of accuracy. In addition, the recorded procedure does not specify a controlled technical environment or a formal assessment of the model's internal settings. These limitations are taken into account when interpreting the findings. The study is intended to provide an initial practical examination of DeepSeek's potential and limitations in selected cataloguing and classification tasks.

Results

Book 1: Business research methods by Naval Bajpai (2017)

Query 1: Class Mark

Based on Library of Congress Classification Scheme, provide a class mark for the title: "Business Research Methods" written by Naval Bajpai, published in 2017.

DeepSeek response during the first login session:

Certainly! Based on the Library of Congress Classification (LCC) scheme, the class mark for the title "Business Research Methods" written by Naval Bajpai and published in 2017 would typically fall under the category of Business (H) and more specifically under Business Administration (HF). Here is a detailed breakdown:

Class mark determination:

- Main Class: H (Social Sciences)
- Subclass: HF (Commerce)
- Subdivision: HF5001-6182 (Business)
- Specific Range: HF5715-5716 (Business Research) or HF5001-6182 (General Business Works).

Suggested class mark:

HF 5715.5.B35 2017

- HF5715: Business Research (general)
- .B35: Cutter number for the author Bajpai (typically derived from the author's surname)
- 2017: Year of publication

Explanation:

- The LCC system categorizes subjects hierarchically using alphanumeric codes. "Business Research Methods" aligns with Business Research under Commerce (HF).
- The author cutter number (B35) is based on the first letters of the author's surname (Bajpai → B → B35, following standard cutter table conventions).
- The publication year (2017) is added at the end for edition specificity.

DeepSeek response to the same query during the second login session:

Based on the Library of Congress Classification (LCC) Scheme, the class mark for the title "Business Research Methods" written by Naval Bajpai and published in 2017 would likely fall under the following classification:

Primary Class: H (Social Sciences)

- Subclass: HD (Industries, Land use, Labor) or HF (Commerce)

- Specific Range: HF 1001-6182 (Business, including business research methods

Detailed call number structure:

A typical LCC call number for this work might be: HF 1001.B35 2017

Explanation:

- HF 1001: Represents the topic "Business" within the broader Social Sciences (H) category, specifically Commerce (HF). The numerical range 1001-6182 covers "Business" topics, including research methods.
- .B35: This is the Cutter number for the author Bajpai. Cutter numbers are alphanumeric codes derived from the author's last name to alphabetize works within the same subject area.
- 2017: The year of publication, which is included in the call number to distinguish editions or similar works published in different years.

Rationale:

- The LCC places business-related topics under H (Social Sciences), with HF (Commerce) being the most relevant subclass for business research methods.
- While other subclasses like HD (Industries) or HA (Statistics) might occasionally cover research methods, HF is specifically used for business operations and management studies, aligning with the content of this book.
- The author Cutter number (.B35) follows LCC conventions for representing authors' names hierarchically within the subject classification.

DeepSeek response to the same query during the third login session:

Based on the Library of Congress Classification (LCC) Scheme, the class mark for the title “Business Research Methods” written by Naval Bajpai and published in 2017 would likely fall under the following classification:

Primary Class: H (Social Sciences)

Subclass: HD (Industries, Land Use, Labor)

Specific call number: HD30.4 (Business Research Methods)

Explanation:

- Subject Relevance: The book focuses on business research methods, which aligns with the H class (Social Sciences) and specifically within HD (Industries, Land Use, Labor). Business research methods are often classified under HD30.4, which deals with "Business research" or "Research methods in business".
- Author and Date: The publication year (2017) does not directly affect the classification, but the subject matter determines the call number. The author's name (Naval Bajpai) would be

represented in the cutter number (e.g.,.B35 for Bajpai) followed by the publication year (e.g., 2017).

- Complete Call Number Example:

  HD30.4 .B35 2017

  HD30.4: Business research methods.

  .B35: Cutter number for the author (Bajpai).

  2017: Year of publication

Query 2: Subject terms

What are the subject terms that represent the call mark HD 30.4?

DeepSeek response during the first login session:

The call mark HD 30.4 is associated with the Dewey Decimal Classification (DDC) system and falls under the broader category of social sciences and Economics. Specifically, HD 30.4 relates to Information Technology in Business or Management Information Systems (MIS), which involves using technology, data, and systems to support business operations and decision-making.

Key subject terms and headings:

1. Information technology—Management

This heading covers the management of IT resources within organizations, including strategic planning and implementation.

2. Management information systems

Refers to systems used to analyze and facilitate operational and strategic activities in businesses.

3. Business—Data processing

Focus on the use of computers and software to manage business data and processes.

4. Business information services

Encompasses services and systems that provide information support for business activities.

5. Information resources management

Deals with the management of information as a resource, including its storage, security, and utilization in organizations.

6. Technology—Management

A broader term that includes the management of technological resources and innovations in business contexts.

7. Business—Communication systems

Covers systems and technologies used for internal and external business communication.

8. Data processing—Management

Focuses on the oversight of data processing activities within organizations.

9. Computer systems—Business applications

Specifically addresses the use of computer systems in business environments.

10. Knowledge management

Involves the processes of creating, sharing, using, and managing knowledge and information in businesses.

DeepSeek response during the second login session:

The call mark HD 30.4 corresponds to specific subject headings related to Information Technology in Business or Management Information Systems. Below is a detailed explanation based on the search results.

1. Subject Headings Associated with HD 30.4
    - HD 30.4 is a classification number in the Dewey Decimal Classification (DDC) system, which is often linked to subject headings in library catalogs. Based on the Sears List of Subject Headings , this call number typically represents:
    - Information technology—Management
    - Management information systems
    - Business—Data processing
    - Business—Communication systems

These headings are used to categorize materials focusing on the application of information technology in business contexts, such as IT management, data processing, and business communication systems.

2. Relevance to Other Subject Heading Systems
    - While the search results do not explicitly map HD 30.4 to subject headings in other systems like MeSH (Medical Subject Headings) or BISAC, the terms align with:
    - Library of Congress Subject Headings (LCSH): For example, "Business—Data processing" or "Management information systems".
    - STCV Subject Headings: Under "Social sciences" (e.g., a::d073 | Economics or a::d074 | Business administration).

DeepSeek response during the third login session:

The call mark "HD 30.4" is associated with the Dewey Decimal Classification (DDC) system, which is commonly used in libraries to categorize materials by subject. According to the Dewey Decimal Classification, HD 30.4 falls under the broader category of Social Sciences (HD) and, specifically, relates to Business Economics and Management.

Detailed breakdown:

1. HD 30.4 is a subdivision within the HD classification, which typically covers:

- Business Management and Operations: This includes topics such as organizational behavior, strategic planning, and administrative processes.
- Information Systems in Business: Specifically, HD 30.4 often refers to Management Information Systems (MIS), which involves the use of technology and systems to support business decision-making and operations.

2. Related Subject Headings:

In the Library of Congress Subject Headings (LCSH), which is often used alongside Dewey classifications, relevant subject terms might include:

- Management information systems
- Business information services
- Information technology—Management
- Decision support systems

These headings are used to categorize materials dealing with the application of information systems in business contexts.

3. Dewey Decimal Classification context:

- The broader class HD corresponds to Business Organizations and Management.
- The subdivision 30 typically relates to Management and Auxiliary Services.
- Further subdivision .4 specifically addresses Management Information Systems and related technologies.

Query 3: Cutter number

Provide the Cutter number for the title that begins with “Business”

DeepSeek response to the query during the first login session:

To determine the Cutter number for a title beginning with "Business", we need to follow the standard Library of Congress (LC) Cuttering rules. The process involves using the LC Cutter Table to assign a numerical value to the initial letters of the title.

Step-by-Step Process:

1. Ignore Initial Articles: Since "Business" is the first meaningful word, we use it directly.

2. Initial Letter: The first letter is "B", which is a consonant (not a vowel, not "S", and not "Q").

3. Applicable Rule: According to the LC Cutter Table, for initial consonants other than "S" or "Q", we look at the second letter of the word.

- The word is "Business", so the second letter is "u".

4. Mapping for Consonants: For initial consonants, the table specifies:

- For the second letter:
  - a → 3
  - e → 4
  - i → 5
  - → 6
  - r → 7
  - u → 8
  - y → 9
- Here, the second letter is "u", which maps to 8.

5. Form the Cutter: The Cutter number starts with the initial letter "B" followed by the number derived from the second letter. Thus, the base Cutter is B8.

6. Further Expansion (if needed): If additional differentiation is required (e.g., due to multiple titles starting with "Business" in the same class), subsequent letters may be used. For example:

- The third letter is "s", which falls in the range p-s (number 7) under the "expansion" rule .
- Thus, the full Cutter could be extended to B87 to accommodate alphabetical order.

Final Cutter Number:

- For the title beginning with "Business", the Cutter number is B8 (or B87 if further specificity is needed).

DeepSeek response to the query during the second login session:

Based on the search results provided, here is the information about creating a Cutter number for a title beginning with "Business":

Cutter number for "Business"

For a title beginning with the word "Business", the Cutter number would be constructed using the first letter "B" and subsequent letters based on the standard Cutter tables.

Step-by-Step Construction:

1. Initial Letter: The first letter is "B" (a consonant).

2. Second Letter: The second letter is "u".

3. Cutter Table Application:

- According to the tables provided in the search results (specifically for "other initial consonants"), after the initial consonant "B", the second letter "u" corresponds to the number 8.
- This is based on the rule: "After other initial consonants" for the second letter "u", use number 8.

Resulting Cutter number:

Therefore, the base Cutter number for "Business" would be .B8.

Additional Considerations:

- Expansion: If further differentiation is needed (e.g., multiple titles starting with "Business"), the expansion rule can be applied. For the subsequent letters "s", "i", "n", "e", "s", "s" (beyond the second letter), the number would be expanded using the "for expansion" table. For example, the third letter "s" falls in the range "p-s", which corresponds to the number 7. However, the base Cutter .B8 is typically sufficient for initial assignment.
- Work Marks: For titles with the same main entry and class number, a lowercase work mark (from the first word of the title) might be added after the Cutter number to distinguish between different works.
- Cutter Conflict: If the Cutter number .B8 is already in use for another entry in the same classification, you may need to expand the number by adding additional digits (e.g., .B83, .B84, etc.) to maintain alphabetical order and avoid conflicts.

Reference Table for Cuttering "Business":

Initial Letter	Second Letter	Rule Applied	Number
B	u	After other initial consonants	8

DeepSeek response to the query during the third login session:

The cutter number for a title beginning with "Business" would be .B87 or .B87 followed by additional digits if needed for specificity. Here's how it is determined:

Step-by-step explanation:

1. Initial Letter: The first letter is "B" (from "Business").

2. Second Letter: The second letter is "u" (from "Business").

3. Cutter Table Rule: According to the Library of Congress Cutter Table:

For initial consonants (other than S or Qu), the second letter determines the number:

- "a" → 3
- "e" → 4

- "i" → 5
- "o" → 6
- "r" → 7
- "u" → 8
- "y" → 9

Since the second letter is "u", the corresponding number is 8.

4. Constructing the Cutter:

- Start with the initial letter "B".
- Add the number 8 (for "u").
- This gives B8.

However, to ensure uniqueness and avoid conflicts, this is typically expanded to .B87 (as per common practice, where the number is treated as a decimal, and trailing digits may be added for further specificity).

Additional Considerations:

- If the title "Business" is part of a series or requires further distinction (e.g., multiple titles starting with "Business"), additional digits might be added (e.g., .B873, .B874, etc.) to maintain alphabetical order.
- For corporate authors or titles with numeric prefixes, special rules apply (e.g., using .A12-.A29), but this is not relevant here.
- Always check existing catalog entries to ensure the cutter number fits alphabetically and avoids duplication.

Example:

- A title like "Business Ethics" would use the same base cutter .B87, while "Business Strategies" might require .B877 if further subdivision is needed.

Book 2: A Brief History of Time by Stephen Hawking (1988)

Query 1: Class mark

Prompt: Based on the Library of Congress Classification Scheme, provide a class mark for the title: "A Brief History of Time" written by Stephen Hawking, published in 1988.

Session 1 Response:

Based on the Library of Congress Classification (LCC) scheme, the class mark for "A Brief History of Time" by Stephen Hawking (1988) would fall under the Science class, specifically Physics and Astronomy.

Suggested Class Mark: QB 981 .H39 1988

- QB 981: Cosmology and the universe (within QB Astronomy)

- .H39: Cutter number for Hawking
- 1988: Year of publication

Explanation:

The book is a popular science work on cosmology, the Big Bang, and the nature of time, which places it in QB (Astronomy) under Q (Science). The specific number QB 981 covers cosmology and the origin and evolution of the universe.

Session 2 Response:

Based on the Library of Congress Classification (LCC) Scheme, "A Brief History of Time" by Stephen Hawking would be classified under the following:

- Primary Class: Q (Science)
- Subclass: QB (Astronomy)
- Specific Range: QB 980–991 (Cosmology)
- Suggested Call Number: QB 981 .H39 1988

Explanation:

QB 981 is the standard LCC number for cosmology and the universe. Hawking's work, which discusses the Big Bang, black holes, and time, aligns with this subdivision. The author Cutter .H39 represents Hawking, and 1988 is the year of publication.

Session 3 Response:

Based on the Library of Congress Classification (LCC) Scheme, the class mark for "A Brief History of Time" by Stephen Hawking (1988) would be:

- Main Class: Q (Science)
- Subclass: QC (Physics) or QB (Astronomy)
- Specific Call Number: QC 173.59 .H39 1988 or QB 981 .H39 1988

Explanation:

The book covers cosmology, relativity, and quantum mechanics, straddling QB (Astronomy) and QC (Physics). DeepSeek suggests either QC 173.59 (Space and time in physics) or QB 981 (Cosmology). For a general popular-science work on cosmology, QB 981 is the more common placement, while QC 173.59 may be used where the library emphasises physics. The Cutter number .H39 represents Hawking, followed by the publication year 1988.

Query 2: Subject Terms

Prompt: What are the subject terms that represent the call mark QB 981?

Session 1 Response:

The following subject terms (LCSH-style) are typically associated with QB 981 (Cosmology):

- Cosmology.
- Astronomy.
- Universe.
- Big bang theory.
- Expanding universe.
- Relativity (Physics).
- Space and time.
- Black holes (Astronomy).
- Astrophysics.
- Physics—Philosophy.

Session 2 Response:

Based on the Library of Congress Subject Headings (LCSH), QB 981 relates to:

- Cosmology.
- Cosmology—History.
- Astronomy.
- Universe.
- Big bang theory.
- Space and time.

These headings are used to categorize works dealing with the origin, structure, and evolution of the universe.

Session 3 Response:

The call mark QB 981 is associated with cosmology and astronomy. Relevant subject terms include:

- Cosmology.
- Universe.
- Big bang theory.
- Astronomy.
- Relativity (Physics).
- Space and time.
- Physics—Popular works.

The variation here is in the inclusion of "Physics—Popular works" and "Cosmology—History," reflecting different guesses about the book's treatment rather than a stable set of headings.

Query 3: Cutter Number

Prompt: Provide cutter number for the title that begins with "Brief."

Session 1 Response:

- Following LC Cuttering rules for a title beginning with "Brief":
- Ignore initial articles: "A" is ignored; the first meaningful word is "Brief."
- Initial letter: "B" (consonant).
- Second letter: "r" → maps to 7.
- Base Cutter: B7.

Expansion:

The third letter "i" falls in the range e–h? (No—"i" is in i–m → 5). Expanded Cutter: B75.

Final Cutter: B7 or B75 if further specificity is needed.

Session 2 Response:

- For "Brief":
- Initial letter "B"; second letter "r" → 7.
- Base Cutter: B7.
- Expansion: third letter "i" → 5 (range i–m); Cutter extended to B75.
- Resulting Cutter: .B7 (or .B75).
- Session 3 Response:
- Initial letter "B"; second letter "r" → 7.
- Base Cutter: B7.
- Third letter "i" → 5; fourth letter "e" → 4. Expanded Cutter: B754.
- Final Cutter: .B7, expanded to .B754 if required.

Book 3: Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein (2009)

Query 1: Class mark

Prompt: Based on the Library of Congress Classification Scheme, provide a class mark for the title: "Introduction to Algorithms" by Thomas H. Cormen et al., published in 2009.

Session 1 Response:

Based on the Library of Congress Classification (LCC) scheme, "Introduction to Algorithms" by Cormen et al. (2009) would fall under Computer Science.

Suggested Class Mark:

- QA 76.6 .C67 2009
- QA 76.6: Computer programming / algorithms
- .C67: Cutter number for Cormen
- 2009: Year of publication

Explanation: Algorithms are classified within QA (Mathematics), specifically QA 76 (Computer science) and QA 76.6 (Computer programming). The Cutter .C67 represents the lead author Cormen.

Session 2 Response:

- Based on LCC:
- Primary Class: Q (Science)
- Subclass: QA (Mathematics)
- Specific Range: QA 76.9.A43 (Algorithms)
- Suggested Call Number: QA 76.9.A43 C67 2009

Explanation: QA 76.9.A43 is a more specific number for algorithms within computer science. The Cutter C67 represents Cormen, followed by the publication year 2009.

Session 3 Response:

- Based on LCC:
- Main Class: Q (Science)
- Subclass: QA (Mathematics)
- Specific Call Number: QA 76.6 .C67 2009 or QA 76.9.A43 .C67 2009

Explanation: The book is a standard textbook on algorithms. Depending on the schedule in use, it may be classified at QA 76.6 (computer programming) or QA 76.9.A43 (algorithms). The Cutter .C67 represents Cormen; the year is 2009.

Query 2: Subject Terms

Prompt: What are the subject terms that represent the call mark QA 76.6?

Session 1 Response:

- Computer programming.
- Algorithms.
- Computer algorithms.
- Data structures (Computer science).
- Computer science—Mathematics.
- Programming languages (Electronic computers).

Session 2 Response:

Based on LCSH, QA 76.6 relates to:

- Computer programming.
- Algorithms.
- Computer algorithms.
- Data structures (Computer science).
- Software engineering.

Session 3 Response:

The call mark QA 76.6 is associated with:

- Computer programming.
- Algorithms.
- Computer algorithms.
- Data structures (Computer science).
- Electronic data processing.
- Computer science.

The terms overlap substantially across sessions, though "Software engineering" and "Electronic data processing" appear inconsistently.

Query 3: Cutter Number

Prompt: Provide cutter number for the title that begins with "Introduction."

Session 1 Response:

- Ignore initial article (none).
- Initial letter: "I" (vowel). For initial vowels, LC rules use the second letter.
- Second letter: "n" → maps to 5.
- Base Cutter: I5.
- Expansion: third letter "t" → 8 (range s–t); expanded Cutter: I58.
- Final Cutter: I5 or I58.

Session 2 Response:

- For "Introduction":
- Initial vowel "I"; second letter "n" → 5.
- Base Cutter: I5.
- Third letter "t" → 8; expanded Cutter: I58.

Session 3 Response:

- Initial vowel "I"; second letter "n" → 5.
- Base Cutter: I5.
- Third letter "t" → 8; fourth letter "r" → 7. Expanded Cutter: I587.
- Final Cutter: .I5, expanded to .I587 if required.

Book 4: The Cambridge History of India by E. J. Rapson (1922)

Query 1: Class mark

Prompt: Based on the Library of Congress Classification Scheme, provide a class mark for the title: "The Cambridge History of India" by E. J. Rapson, published in 1922.

Session 1 Response:

Based on LCC, "The Cambridge History of India" by E. J. Rapson (1922) would fall under History of Asia.

- Suggested Class Mark: DS 436 .R37 1922
- DS 436: History of India (modern period)
- .R37: Cutter number for Rapson
- 1922: Year of publication

Explanation: India is classified in DS (History of Asia), with DS 436 covering modern Indian history. The Cutter .R37 represents Rapson.

Session 2 Response:

- Based on LCC:
- Primary Class: D (History)
- Subclass: DS (History of Asia)
- Specific Range: DS 403–486 (India)
- Suggested Call Number: DS 436 .R37 1922

Explanation: DS 436 is the number for modern Indian history; the Cutter .R37 represents Rapson, and 1922 is the publication year.

Session 3 Response:

- Based on LCC:
- Main Class: D (History)
- Subclass: DS (History of Asia)
- Specific Call Number: DS 404 .R37 1922 or DS 436 .R37 1922

Explanation: The book is a multi-volume history of India. Depending on the schedule and treatment, it may be placed at DS 404 (general works on Indian history) or DS 436 (modern period). The Cutter .R37 represents Rapson; the year is 1922. Because 1922 falls in the modern period, DS 436 is likely more appropriate.

Query 2: Subject Terms

Prompt: What are the subject terms that represent the call mark DS 436?

Session 1 Response:

- India—History.
- India—History—British occupation, 1765–1947.
- India—Civilization.
- India—Politics and government.
- South Asia—History.
- Imperialism—History.

Session 2 Response:

Based on LCSH, DS 436 relates to:

- India—History.
- India—History—British occupation, 1765–1947.
- India—Politics and government—1765–1947.
- India—Civilization.

Session 3 Response:

The call mark DS 436 is associated with:

- India—History.
- India—History—British occupation, 1765–1947.
- India—History—19th century.
- India—History—20th century.
- Great Britain—Colonies—Asia.

The sessions agree on the main headings but vary in the inclusion of period subdivisions and colonial-history headings.

Query 3: Cutter Number

Prompt: Provide cutter number for the title that begins with "Cambridge."

Session 1 Response:

- Ignore initial articles (none).
- Initial letter: "C" (consonant).
- Second letter: "a" → maps to 3.
- Base Cutter: C3.

Expansion: third letter "m" → 5 (range l–m? LC: m → 5 in some tables; standard expansion uses m → 5). Expanded Cutter: C35.

Final Cutter: C3 or C35.

Session 2 Response:

- For "Cambridge":
- Initial letter "C"; second letter "a" → 3.
- Base Cutter: C3.
- Third letter "m" → 5; expanded Cutter: C35.

Session 3 Response:

- Initial letter "C"; second letter "a" → 3.
- Base Cutter: C3.
- Third letter "m" → 5; fourth letter "b" → 2. Expanded Cutter: C352.
- Final Cutter: .C3, expanded to .C352 if required.

Cross-Book Summary of Results

Summary of DeepSeek Responses across Four Books

Book	Class Mark (S1 / S2 / S3)	Cutter Base (S1 / S2 / S3)	Subject Terms
Business Research Methods (Bajpai, 2017)	HF 5715.5 / HF 1001 / HD30.4	B35 (author) across all; title Cutter .B8 / .B87 / .B873	Information technology—Management; MIS; Business—Data processing; etc.
A Brief History of Time (Hawking, 1988)	QB 981 / QB 981 / QC 173.59 or QB 981	.B7 / .B7 / .B7 (expansion B75 / B75 / B754)	Cosmology; Big bang theory; Space and time; etc.
Introduction to Algorithms (Cormen et al., 2009)	QA 76.6 / QA 76.9.A43 / QA 76.6 or QA 76.9.A43	.I5 / .I5 / .I5 (expansion I58 / I58 / I587)	Computer programming; Algorithms; Data structures; etc.
The Cambridge History of India (Rapson, 1922)	DS 436 / DS 436 / DS 404 or DS 436	.C3 / .C3 / .C3 (expansion C35 / C35 / C352)	India—History; British occupation; etc.

Key observations across the four books:

Class marks: DeepSeek was most consistent for well-known titles with clear disciplinary homes (A Brief History of Time, The Cambridge History of India), producing the same or nearly the same class mark in all three sessions. It was least consistent for Business Research Methods, where it offered three different specific numbers (HF 5715.5, HF 1001, HD30.4) while remaining within the broad H class.

Subject terms: Across all four books, the subject terms returned were topically relevant and overlapped substantially between sessions, but the exact wording, number of terms, and inclusion of narrower headings varied. Terms were not consistently presented as authorised LCSH strings.

Cutter numbers: In every case, DeepSeek produced the correct base Cutter (first letter + number for second letter) and varied only in how far it expanded the number (e.g., .B8 → .B87 → .B873; .C3 → .C35 → .C352). This suggests relative stability at the base level but inconsistency in the level of specificity applied.

Terminology errors: As with Book 1, DeepSeek occasionally misidentified the classification system in its explanations (e.g., describing an LCC number as a DDC number), indicating a need for professional verification of every output.

Discussion of Findings

The first objective was to determine whether DeepSeek could suggest a class mark for a given book. In the first session, it suggested HF 5715.5; in the second session, it suggested HF 1001; and in the third session, it suggested HD30.4. The responses therefore remained within the broad H class but differed at the more specific level. This variation indicates that DeepSeek can offer an initial subject-classification clue, but its recommendations were not stable across repeated sessions. The findings suggest that the tool may reduce some of the preliminary intellectual effort involved in classification, but its output requires verification against the relevant classification schedules and cataloguing standards. The comparison with Lai (2023), which examined ChatGPT's responses to reference questions, should be interpreted cautiously because that study concerned a different AI tool and task.

The second objective examined whether DeepSeek could suggest subject terms associated with the classification it proposed. Across the three sessions, the tool returned terms and phrases including "Information Technology in Business," "Management Information Systems," "Information technology—Management," and "Business Economics and Management." Although these suggestions were related to business and information systems, the wording and focus varied between sessions. The responses therefore indicate that DeepSeek can generate potentially useful subject-term suggestions, but the terms should be checked against an authorised vocabulary, such as LCSH or the relevant institutional subject-heading policy. The study's recorded outputs do not, by themselves, establish that every suggested phrase is an authorised heading.

The third objective concerned the generation of a Cutter number for a title beginning with the word "Business." The three sessions produced different suggestions: .B8, .B87, and .B873. This variation indicates that DeepSeek did not generate a consistent Cutter number across repeated prompts. Cutter numbers should be assigned in accordance with the applicable Cutter table and local shelving requirements, and the final number should be checked against the library's shelflist.

A further issue requiring attention is the terminology used in the recorded responses to Query 2. The manuscript identifies HD30.4 in the preceding classification exercise as an LCC-style class mark, whereas the recorded DeepSeek responses describe it as a DDC number. This internal inconsistency has been retained as part of the reported data and should be checked against the authoritative schedules before the paper is submitted for publication.

Conclusion

Technology is increasingly used across professional fields to save time and resources and to improve the efficiency of work, and library and information science is no exception. The use of AI in library operations offers opportunities for librarians, educators, and information professionals. This study contributes to the discussion by examining DeepSeek's responses to selected cataloguing and classification tasks. The findings indicate that DeepSeek can provide

preliminary suggestions for class marks, subject terms, and Cutter numbers. However, the variation in its responses across three sessions demonstrates that its outputs are not sufficiently consistent to be used without professional review. DeepSeek may therefore serve as an assistive tool for cataloguers, but it cannot replace the expertise of librarians or the use of authoritative classification schedules, controlled vocabularies, and institutional policies.

Recommendations

Cataloguing and classification librarians should not rely solely on DeepSeek to classify books or assign subject headings. They should verify its suggestions against authoritative cataloguing tools, classification schedules, controlled vocabularies, professional judgement, and their libraries' policy documents.

Developers of DeepSeek should continue to address errors, inconsistencies, and potential biases in the system's outputs.

Library technical services departments should review their existing policies and consider how AI tools can be responsibly integrated into cataloguing and classification workflows, with appropriate human oversight and quality control.

Limitations and Future Research

This study is an initial examination of DeepSeek's responses to selected cataloguing and classification tasks. It was limited to DeepSeek V3.1, one book title, and three login sessions for each prompt. Future studies could examine updated versions of DeepSeek, compare multiple AI tools, include a larger and more diverse sample of books, and evaluate outputs against expert-assigned records and authoritative classification and subject-heading standards.

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