Postprint: Mapping Analysis between the Cooperative Patent Classification (CPC) and International Patent Classification (IPC) Systems

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Abstract

[Purpose/Significance] Through mapping analysis and comparison between the Cooperative Patent Classification (CPC) system and the International Patent Classification (IPC) system, this study aims to provide references for patent classification using CPC and IPC. [Method/Process] Based on the hierarchical structures of CPC and IPC, a comparative analysis of mapping quantities was conducted at four levels—section, class, subclass, and group—for the commonly shared A–H sections. [Results/Conclusion] CPC maintains fundamentally consistent classification principles with IPC while offering greater granularity. It introduces the "2000 series (for indexing)" and a Y section to accommodate emerging technologies, demonstrating exceptional extensibility. As a highly compatible and finely subdivided classification system, CPC is poised to become an efficient tool for enhancing retrieval efficiency and optimizing examination quality.

Full Text

Preamble

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The Mapping Analysis Between the Cooperative Patent Classification System (CPC) and the International Patent Classification System (IPC)

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Abstract

[**Purpose/Significance**] This study conducts a detailed mapping analysis and comparison between the Cooperative Patent Classification System (CPC) and the International Patent Classification System (IPC) to provide references for patent classification using both systems. [**Method/Process**] Based on the hierarchical structures of CPC and IPC, we performed a comparative quantitative mapping analysis across their shared A-H sections at four levels: class, subclass, group, and subgroup. [**Result/Conclusion**] The classification principles of CPC and IPC are fundamentally consistent, with CPC offering greater granularity than IPC. CPC has introduced the "2000 series (for indexing)" and a new Y-section to accommodate emerging technologies, demonstrating exceptional extensibility. As a highly compatible and finely-grained classification system, CPC is poised to become an efficient tool for improving retrieval efficiency and optimizing examination quality.

Keywords: Cooperative Patent Classification (CPC); International Patent Classification (IPC); mapping analysis
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1 Introduction

With the advent of the information society, patent information has become an increasingly important topic of discussion, particularly regarding its dissemination and utilization. Effective patent classification is crucial for enhancing patent retrieval capabilities and examination quality, enabling users to conduct deep-level mining and analysis of patent data after initial acquisition to forecast future technological trends and economic benefits. Currently, major patent classification systems worldwide include the International Patent Classification (IPC), the Japanese FI/FT system, the European ECLA/ICO system, the US Patent Classification (USPC), and the Cooperative Patent Classification (CPC). The rapid global growth of patent literature has created enormous challenges for patent classification, examination, management, and utilization, while existing classification systems face ongoing needs for reform and development.

To address these challenges and improve consistency in search and classification results across intellectual property offices while enhancing access to documentation worldwide, the European Patent Office and the United States Patent and Trademark Office jointly developed a common, internationally compatible patent classification system for technical documents. The Cooperative Patent Classification System officially took effect in January 2013. Based on the European classification system, CPC maintains classification principles fundamentally consistent with IPC while integrating important keywords from both IPC

and ECLA/ICO, as well as cross-referenced technical literature and abstracts from USPC. CPC represents a comprehensive fusion of best classification practices from both offices and serves as a refined classification system built upon IPC.

This paper conducts a detailed quantitative mapping analysis between CPC and IPC across their common A-H sections at the class, subclass, group, and subgroup levels, based on their consistent formats and specifications, to provide references for patent classification using both systems.

3 Mapping Analysis and Comparison Between CPC and IPC

Both CPC and IPC employ similar five-level hierarchical structures consisting of section, class, subclass, group, and subgroup. They share essentially the same section setup, comprising eight sections A-H. CPC has added a Y-section to accommodate currently emerging and future technologies, and both systems use alphanumeric notation. In CPC, the section is represented by a capital letter (A-H, Y); the class by two digits (01-99); the subclass by a capital letter; the group by 1-4 digits; and the subgroup by 2-6 digits, with a "/" separating the group and subgroup. IPC follows a similar pattern but uses 1-3 digits for groups and 2-4 digits for subgroups, demonstrating that CPC provides finer granularity at the subgroup level. This analysis utilizes CPC's latest version from May 2017 and IPC Advanced level from January 2017 revision.

3.1 Section A: Human Necessities

At the class level, CPC comprises 15 classes while IPC has 16, with CPC lacking the A99 class (technical subjects not covered elsewhere in this section). At the subclass level, both systems have 84 subclasses, though with some differences in specific categories. CPC does not include A01P, A61P, or A99Z, but introduces internal indexing subclasses A23V, A23Y, and A44D for cross-referencing related subclasses (e.g., A44D indexes A44B and A44C).

At the group level, CPC includes 1,217 groups compared to IPC's 1,087. CPC has 1,080 groups that correspond directly with IPC, 133 that are CPC-exclusive (positions greater than 2,000), and 4 that map to IPC but with different classification numbers. The CPC-exclusive groups above position 2,000 serve as additional information to main classification numbers, appearing as virtual classifications in gray font that subdivide main groups (positions 2,000-2,200) or provide cross-field additional information (positions above 2,200).

At the subgroup level, CPC further subdivides main classification numbers within subgroups, reaching up to ten hierarchical levels, with Section A containing 27,507 subgroups compared to IPC's 7,763. The mapping between CPC and IPC subgroups falls into three categories: complete correspondence at each level, CPC-exclusive subgroups, and partial correspondence (mapping to IPC

groups or higher-level subgroups). Table 1 illustrates this mapping for Section A.

3.2 Section B: Operations; Transport

Section B comprises 37 classes in CPC and 38 in IPC, with CPC lacking the B99 class. At the subclass level, CPC has 171 subclasses versus IPC's 169, excluding B99Z but adding internal indexing subclasses B41P, B42P, and B60Y.

At the group level, CPC includes 2,631 groups compared to IPC's 1,992, with 1,783 groups corresponding directly, 670 being CPC-exclusive (positions above 2,000), and 178 mapping to IPC with different classification numbers.

At the subgroup level, CPC's subdivision reaches ten levels, with 53,647 subgroups in Section B compared to IPC's 14,930. The mapping distribution is shown in Table 2 .

3.3 Section C: Chemistry; Metallurgy

Section C contains 20 classes in CPC and 21 in IPC, with CPC lacking the C99 class. CPC has 88 subclasses versus IPC's 87, excluding C99Z but adding internal indexing subclass C01P and a new subclass C12Y (enzymes).

At the group level, CPC includes 1,769 groups compared to IPC's 1,321, with 1,285 groups corresponding directly, 442 being CPC-exclusive (positions above 2,000), and 42 mapping to IPC with different classification numbers.

At the subgroup level, CPC's ten-level subdivision yields 36,287 subgroups in Section C compared to IPC's 13,187. The mapping distribution is shown in Table 3 .

3.4 Section D: Textiles; Paper

Both CPC and IPC have 9 classes in Section D, with CPC lacking the D99 class but adding class D10 for indexing the section. CPC has 40 subclasses versus IPC's 39, adding internal indexing subclasses D05D and D10B while excluding D99Z.

At the group level, CPC includes 406 groups compared to IPC's 350, with 348 groups corresponding directly, 53 being CPC-exclusive (positions above 2,000), and 5 mapping to IPC with different classification numbers.

At the subgroup level, CPC's ten-level subdivision results in 5,227 subgroups in Section D compared to IPC's 2,700. The mapping distribution is shown in Table 4 .

3.5 Section E: Fixed Constructions

Section E comprises 7 classes in CPC and 8 in IPC, with CPC lacking the E99 class. Both systems have 31 subclasses, though CPC adds internal indexing

subclass E05Y and excludes E99Z.

At the group level, CPC includes 355 groups compared to IPC's 323, with 319 groups corresponding directly, 29 being CPC-exclusive (positions above 2,000), and 7 mapping to IPC with different classification numbers.

At the subgroup level, CPC's ten-level subdivision yields 8,809 subgroups in Section E compared to IPC's 3,116. The mapping distribution is shown in Table 5 .

3.6 Section F: Mechanical Engineering; Lighting; Heating; Weapons; Blasting

Section F contains 18 classes in both CPC and IPC, with CPC lacking the F99 class but adding class F05 to index classes F01-F04. CPC has 101 subclasses versus IPC's 97, excluding F99Z but adding internal indexing subclasses F02W, F27M, F05B, F05C, and F05D.

At the group level, CPC includes 1,499 groups compared to IPC's 1,072, with 1,045 groups corresponding directly, 368 being CPC-exclusive (positions above 2,000), and 36 mapping to IPC with different classification numbers.

At the subgroup level, CPC's ten-level subdivision results in 26,128 subgroups in Section F compared to IPC's 7,705. The mapping distribution is shown in Table 6 .

3.7 Section G: Physics

Section G comprises 13 classes in CPC and 14 in IPC, with CPC lacking the G99 class. Both systems have 81 subclasses, though CPC excludes G99Z and adds internal indexing subclass G21Y.

At the group level, CPC includes 846 groups compared to IPC's 696, with 692 groups corresponding directly, 151 being CPC-exclusive (positions above 2,000), and 3 mapping to IPC with different classification numbers.

At the subgroup level, CPC's subdivision reaches eleven levels, with 36,262 subgroups in Section G compared to IPC's 7,426. The mapping distribution is shown in Table 7 .

3.8 Section H: Electricity

Section H contains 5 classes in CPC and 6 in IPC, with CPC lacking the H99 class. Both systems have 51 subclasses, though CPC excludes H99Z and adds internal indexing subclass H04T for subclasses under class H04.

At the group level, CPC includes 703 groups compared to IPC's 548, with 534 groups corresponding directly, 145 being CPC-exclusive (positions above 2,000), and 24 mapping to IPC with different classification numbers.

At the subgroup level, CPC's subdivision reaches twelve levels, with 38,616 subgroups in Section H compared to IPC's 8,326. The mapping distribution is shown in Table 8 .

3.9 Section Y: Emerging and Cross-Sectional Technologies

CPC's new Section Y classifies emerging technologies and cross-sectional technologies that cannot be categorized in the previous eight sections. At the class level, it comprises 3 classes (Y02 for climate change mitigation technologies, Y04 for ICT affecting other fields, and Y10 for topics covered by USPC). At the subclass level, it includes 9 subclasses; at the group level, 340 groups; and at the subgroup level, it reaches a depth of 11 levels. The distribution is detailed in Table 9 .

4 Conclusion

Although CPC has existed for only three years and undergone multiple revisions with room for improvement, it is undoubtedly evolving into the world's premier patent classification system. Through mapping analysis with IPC, we find that CPC not only encompasses all main classification numbers from IPC but also provides finer granularity, incorporating the "2000 series" for indexing. Additionally, the new Section Y accommodates emerging technologies and cross-sectional applications, demonstrating exceptional extensibility and rapid update cycles (28 updates to date). As more patent offices adopt and promote this system, CPC-classified documentation will grow substantially, providing increasingly rich searchable resources for global users. As a highly compatible and finely-grained classification system, CPC will become an efficient tool for improving retrieval efficiency and optimizing examination quality.

References

[1] Lu Huisheng, Lin Xiaolu. Development and Application Status of the Cooperative Patent Classification System [J]. China Invention and Patent, 2015(4): 47-53.
[2] Five IP offices homepage [EB/OL]. [2017-05-25]. http://www.fiveipoffices.org/index.html.
[3] Cooperative Patent Classification - Objectives [EB/OL]. [2017-05-26]. http://www.cooperativepatentclassification.org/obj.html.
[4] Liao Jiajia, Gao Fei, Lü Liang. Research on the Cooperative Patent Classification System [J]. Modern Information, 2014, 34(1): 64-68.
[5] Li Peng. The Dilemma and Future of International Patent Classification—Development and Prospects of IPC [J]. China Invention and Patent, 2009(8): 76-79.
[6] PCT – The International Patent System [EB/OL]. [2017-05-28]. http://www.wipo.int/pct/en/.
[7] Li Zhenwei, Qiao Lian. Introduction to the Cooperative Patent Classification CPC System [J]. Patent Documentation Research, 2014(2): 10-13.

[8] Zhu Xinchao, Huo Cuiting, Liu Huijing. Comparative Analysis of the Cooperative Patent Classification System (CPC) and Traditional Patent Classification Systems [J]. Digital Library Forum, 2013(9): 38-44.

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Bai Linlin: Responsible for data acquisition, outline development, and manuscript writing;
Zhu Zhongming: Responsible for manuscript revision.

Note: Figure translations are in progress. See original paper for figures.