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Colibri Initiatives: coli-ana & coli-conc

25. April 2023
Uma Balakrishnan





Colibri

A VZG Project
Initiated by Dr.
Ulrike Reiner in
2003

Context Generator & Linguistic Tools for Bibliographic Retrieval Interface



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Colibri Research Questions

VZG Member of
the DDC
Consortium in
2000

Is it possible to...

- Q1.** ...classify automatically bibliographic title records using DDC?
- Q2.** ...analyse automatically molecular DDC notations into atomic DDC notations?
- Q3.** ...improve automatic classification & retrieval by means of atomic DDC notations?

atomic DDC notation: a semantically indecomposable notation that represents a DDC class

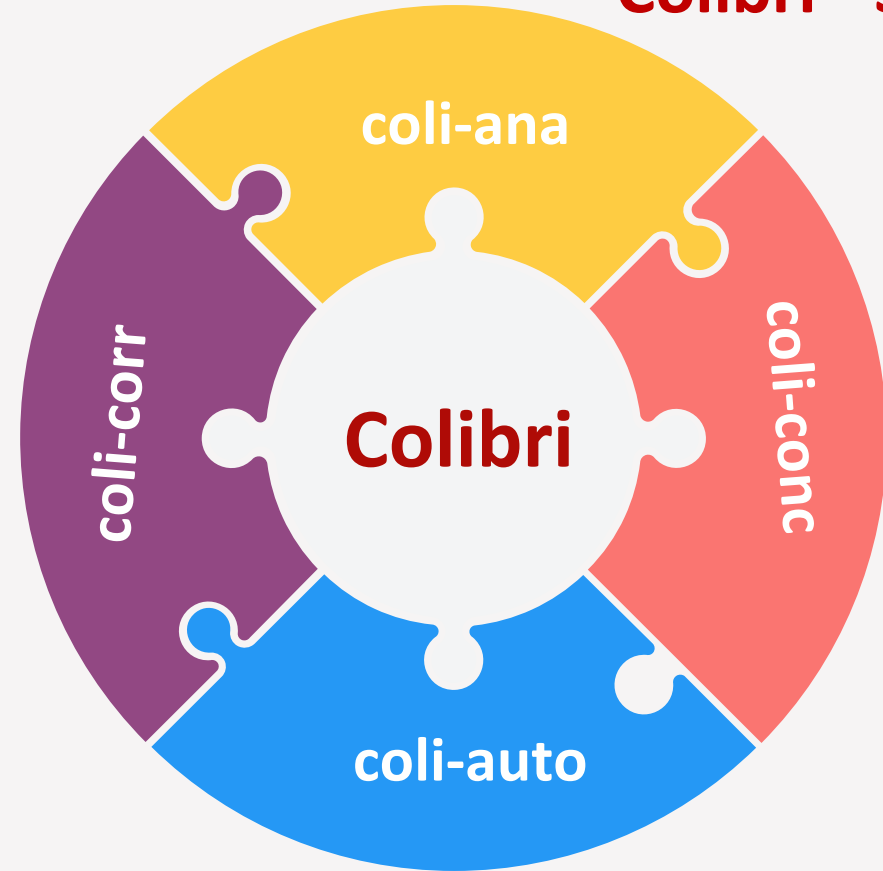
molecular DDC notation: a notation that is syntactically decomposable into atomic DDC notations





DDC notation: dno

Colibri - Subprojects



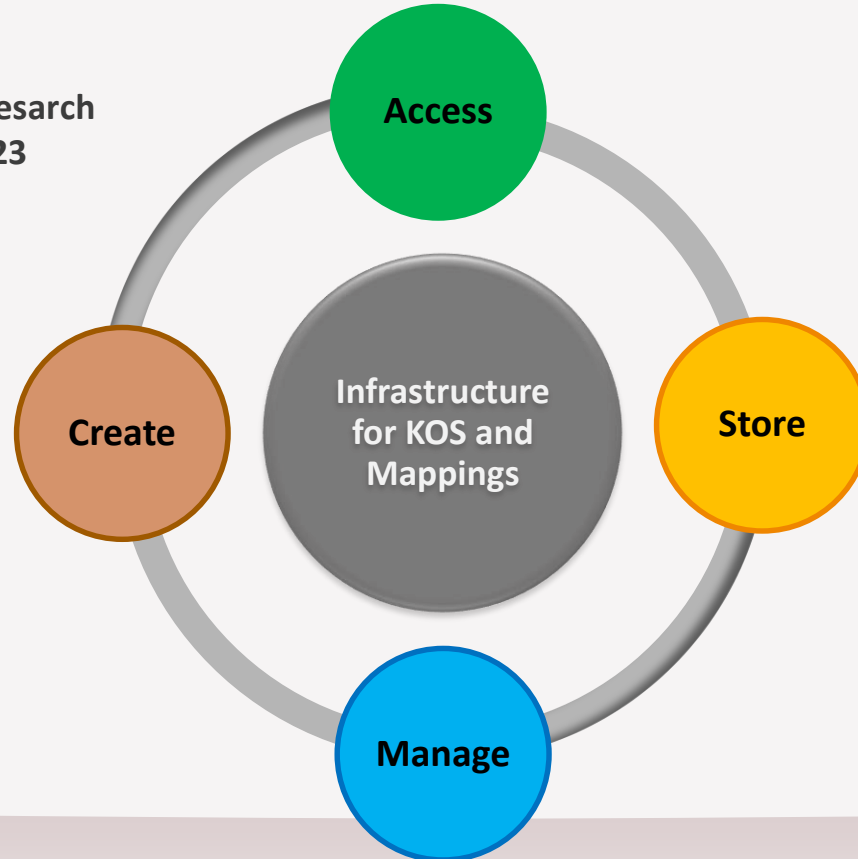
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-  coli-ana: automatic analysis
-  coli-conc: concordances
-  coli-corr: correctness
-  coli-auto: automatic classification

Subproject coli-conc

Funded by the German Research
Foundation 2015-2023

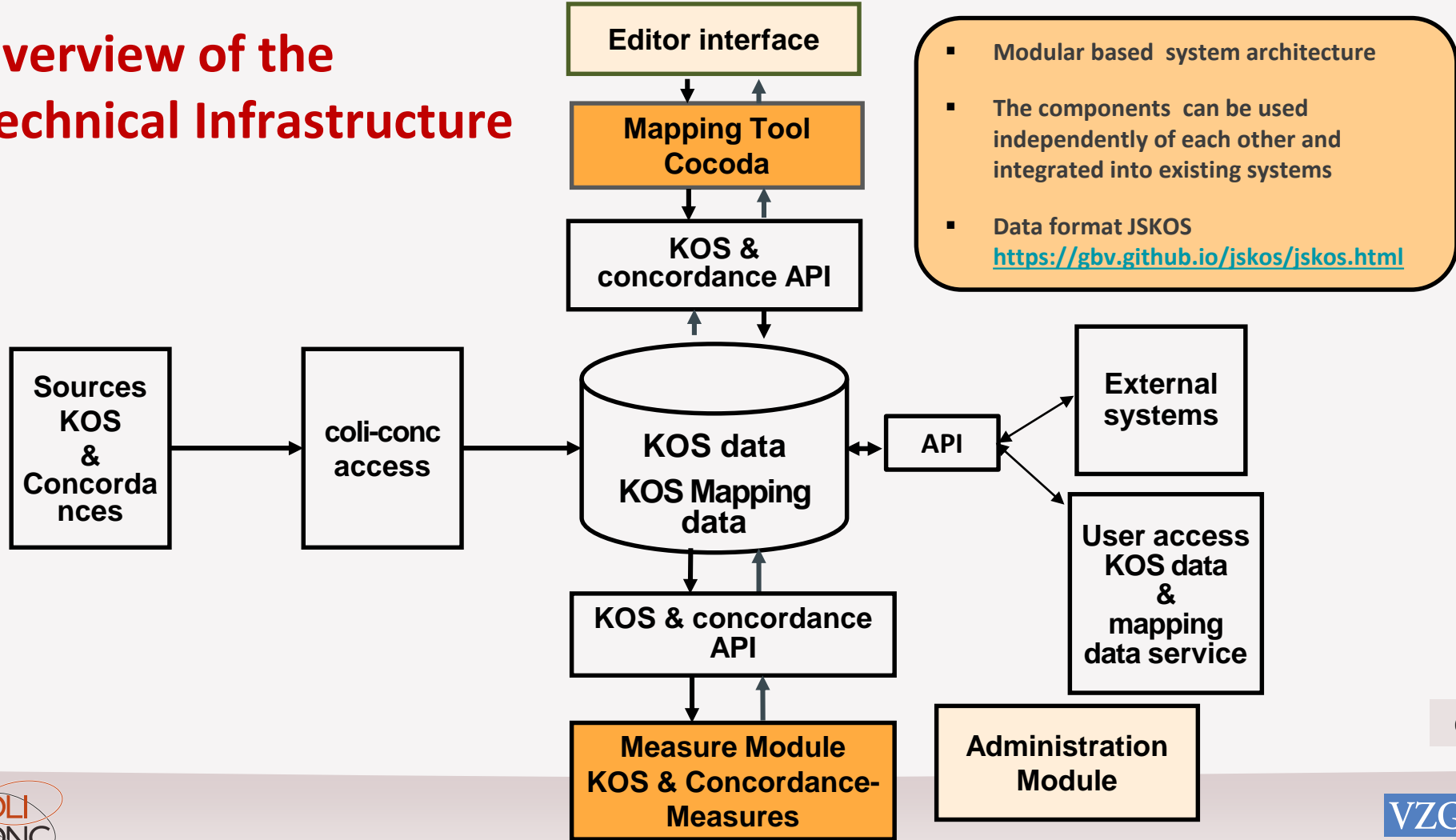


Rational

High Diversity in KOS

Need for mappings, tools and
gold standards to store and
manage KOS and mappings

Overview of the Technical Infrastructure



coli-conc Key Features

- **Open Source** Software
- KOS Registry and Concordance Registry
(BARTOC <https://bartoc.org/>)
- **Web-based Mapping Tool** Cocoda
- Free Software to import and export KOS and Mappings
- APIs to link with external portals and systems that support subject indexing such as DA-3 and WinIBW

Cocoda Web Interface

<https://coli-conc.gbv.de/cocoda/app/>

The screenshot displays the Cocoda Mapping Tool interface. At the top, the title bar reads "Cocoda Mapping Tool" and includes navigation links for "Imprint", "Accessibility", "Privacy Policy", "Feedback", "Manual", and the user "David-Benjamin Rohrer".

The main workspace is titled "Mapping Editor" and shows a mapping between "SR 760 Software-Unternehmen" (RVK) and "338.47 Dienstleistungen und einzelne Produkte" (DDC). The interface is divided into several panels:

- Left Panel (RVK):** "RVK Regensburger Association Classification". It includes a search bar and a list of categories. The selected category is "SR 760 Software-Unternehmen". Below it, there are tabs for "Concept", "Meta", and "Links".
- Right Panel (DDC):** "DDC Dewey Decimal Classification". It also has a search bar and a list of categories. The selected category is "338.47 Dienstleistungen und einzelne Produkte".
- Center Panel:** "Concordance Registry: saved". It features a "Search" bar and a "Navigator" section. Below this is a table of mappings.
- Bottom Left Panel:** "Hierarchy". It shows a tree view of the RVK classification, with "SR 760 Software-Unternehmen" selected.
- Bottom Right Panel:** "Hierarchy". It shows a tree view of the DDC classification, with "338.1-338.4 Einzelne Arten von Industrien (Wirtschaftszweige)" selected.

The central table lists the following mappings:

Local	Wikidata-Mappings	Suggestions
Concordance Registry		
RVK	SR 760 Software-Unternehmen	< DDC 338.47 Dienstleistungen und einzelne Produkte David-Benja... 2022-05-09
Local		
Wikidata-Mappings		
Suggestions		
coll-conc Suggestions		
RVK	SR 760 Software-Unternehmen	DDC 005.0684 Softwareberater
RVK	SR 760 Software-Unternehmen	DDC 005.15 Erstellung von Programmdokumentationen
RVK	SR 760 Software-Unternehmen	DDC 005.16 Programmwartung
RVK	SR 760 Software-Unternehmen	DDC 005.1092 Programmierer
RVK	SR 760 Software-Unternehmen	DDC 364.1662 Urheberrechtsverletzung
coll-conc Suggestions (experimental)		
Co-Occurrences		
RVK	SR 760 Software-Unternehmen	DDC 338.76102504 18
RVK	SR 760 Software-Unternehmen	DDC 330 Wirtschaft 12
cmapper Mapping Suggestions		

Cocoda Key Features

- **Multi-user System**
- **Integration of any kind of KOS** with uniform browsing and searching functionality (Access to over 70 KOS currently)
- **Deep-Links to subject indexing** in the K10plus Catalogue
- **Look up** for und **Evaluate** existing mappings
- **Mapping-Suggestions** generated based on multiple algorithms and from multiple sources
- **Assigning Mapping types:** = exact, ≈ close, < narrower, > broader, ~ related
- **Store and Manage** own und common mappings
- **Colloborative work**
- Feedback Function for amendments
- Display and dowload of Mapping details in various formats

On-going Mapping Work

- Regensburger Verbund Classification (RVK) -> Basic Classification (BK)
- 22 concordances in different subject fields
- About 14.000 Mappings

Total No. of Mappings in Concordance Registry: over 380.000

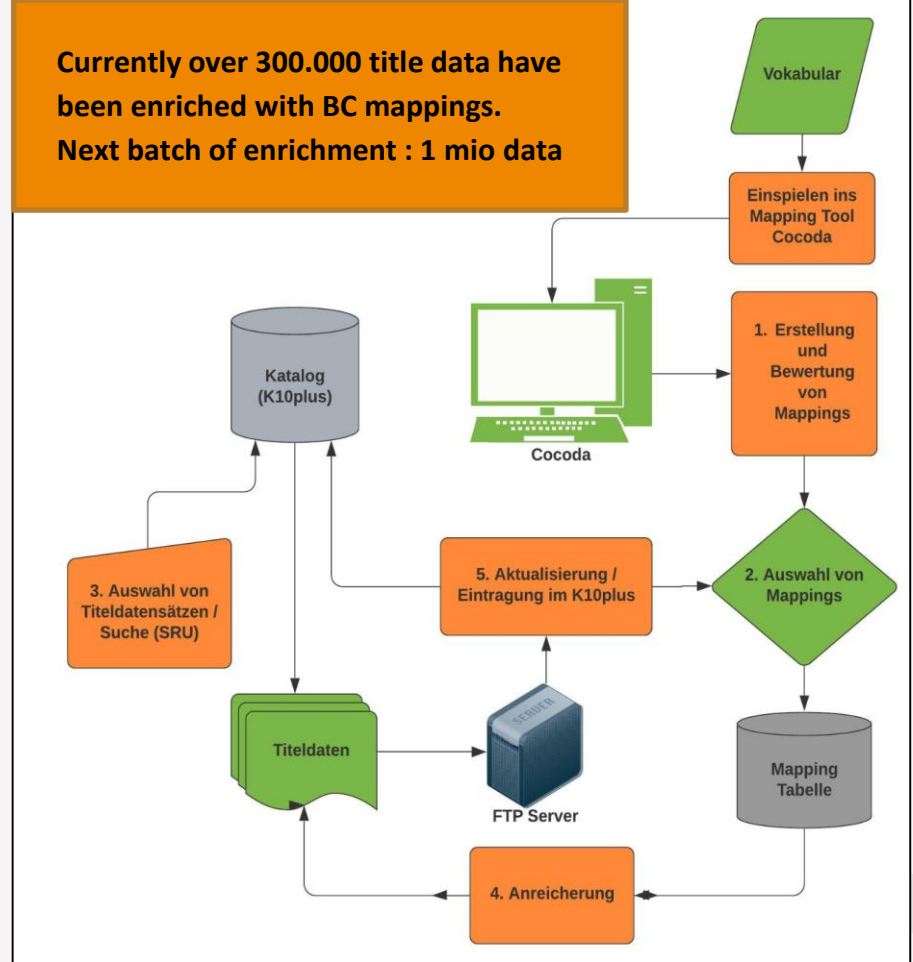
Methods of Enrichment

- Automatic process: coli-rich Module
- Semi-automatic process:
 - coli-rich Web
 - Display of mappings and Integration of the infrastructure with the external systems (Digitaler Assistent DA-3 , WinIBW cataloguing Software)



coli-rich Workflow

1. Creation and Evaluation of Mappings with Cocoda
2. Examination of the completeness and correctness
3. Transfer of the selected mappings into a mapping table
4. Copy of title data to be enriched
5. Update the catalog with the enriched titles



Integration into the DA-3 – Subject Indexing Tool

DA-3-Suggestions

Mappings in Concordance-Registry

Mapping-Editor

Konzept ziehen und hier ablegen.

Konzept ziehen und hier ablegen.

Konkordanzen Suche Navigator

Mappings

Source	Target	Author	Date	Score
RVK VW 6100 - VW 6109 Nutzpflanzen der Tropen und Subtropen	BK 44.41 Pharmazeutische Biologie	David-Benja...	2022-04-07	+1
RVK VW 6100 - VW 6109 Nutzpflanzen der Tropen und Subtropen	BK 44.73 Geomedizin	Melanie Jan...	2022-04-22	±0

Lokal keine Ergebnisse </>

Wikidata-Mappings keine Ergebnisse </>

KonSys Mappings keine Ergebnisse </>

Vorschläge

- Co-Occurrences keine Ergebnisse </>
- ccmapper Mapping-Vorschläge keine Ergebnisse </>

Info #

Vorschläge Status | Rohdaten | Einstellungen #

Filtern Aktualisieren Erweitern

BK

- 44.41 Pharmazeutische Biologie @rvk-narrow/cc
- 44.73 Geomedizin @rvk-related/cc

DDC

- 615.321 slsp, sudoc
- 615.32109/16 [23] bvb
- 615.321096 [23] bvb, obv, slsp
- 615.321 [23] bnf
- 615.321 hebis

Freie Schlagwörter

- Electronic books. [Form] obv
- Electronic books [Form] reblun
- HEALTH & FITNESS / Herbal Medications. [Sach] reblun

GND

- Afrika [Geo] bvb, slsp
- Forschung [Sach] slsp
- Heilpflanzen [Sach] bvb, slsp
- Pflanzeninhaltsstoff [Sach] bvb, slsp
- Phytochemie [Sach] slsp
- Aufsatzsammlung [Form] slsp

LCC

- QK99 A53 obv

LCSH

- Botany, Medical – Research – Africa. obv, slsp
- Materia medica, Vegetable -- Research -- Africa. slsp
- Medicinal plants – Research – Africa. obv, slsp
- Materia medica, Vegetable – Research – Africa. obv, slsp
- Medicinal plants – Research – Africa. slsp
- Botany, Medical – Research – Africa. slsp

Rameau

- Phytothérapie – Afrique bnf, sudoc
- Plantes médicinales – Chimie bnf, sudoc
- Plantes médicinales – Afrique bnf, sudoc

1. Search Title

The screenshot shows a search interface with a menu bar (Suche, Bearbeiten, Exportliste, [Testsystem], Optionen, Hilfe, Info, Abmelden) and two main panels. The left panel, 'Datensatzsuche', has sub-sections 'Nummernsuche', 'Erweiterte Suche', and 'Verlauf'. The 'Erweiterte Suche' section contains a search input field with '757423949' and a 'Suche ausführen' button. Below are buttons for 'Neue Liste', 'Liste löschen', 'Liste hochladen', and 'Liste hochladen und bearbeiten'. The right panel, 'Suchergebnisse', shows '1 bis 1 von 1' and a search result: 'Medicinal plant research in Africa : pharmacology and chemistry / ed. by Victor Kuete 1. ed. Amsterdam [u.a.] : Elsevier, 2013'.

2. Look up suggestions

The screenshot shows a suggestions interface with a menu bar (Vorschläge, Status | Rohdaten | Einstellungen #) and buttons for 'Filtern', 'Aktualisieren', and 'Erweitern'. The results are filtered by 'BK' and show two suggestions: '44.41 Pharmazeutische Biologie' and '44.73 Geomedizin'. The source for the first suggestion is 'Quelle: via RVK (eng) VW 6100 «Allgemeines» [coli-conc]'. A red dashed arrow points from the '[coli-conc]' link in this suggestion to the 'Mapping-Editor' screenshot in step 3.

3. Create new Mappings in Cocoda

The screenshot shows the 'Mapping-Editor' interface. At the top, it displays 'RVK' and 'BK'. The main content shows a mapping: 'VW 6100 - VW 6109 Nutzpflanzen der Tropen und Subtropen' mapped to '44.39 Toxikologie'. Below this, there is a 'Konkordanz-Register: nicht gespeichert' message and a search input field containing 'V Chemie und Pharmazie (David-Benjamin Ro...'. A table of mappings is shown below, with the first row highlighted in red. A red dashed arrow points from the '44.41 Pharmazeutische Biologie' suggestion in step 2 to the first row of this table.


RVK	BK	Suche	Navigator
VW 6100 - VW 6109 Nutzpflanzen der Tropen und Subtropen	44.39 Toxikologie	David-Benja...	2022-11-15
VW 6100 - VW 6109 Nutzpflanzen der Tropen und Subtropen	44.41 Pharmazeutische Biologie	David-Benja...	2022-11-15
VW 6100 - VW 6109 Nutzpflanzen der Tropen und Subtropen	44.73 Geomedizin	Melanie Jan...	2022-04-22

4. Import

The screenshot shows a suggestions interface with a menu bar (Vorschläge, Status | Rohdaten | Einstellungen #) and buttons for 'Filtern', 'Aktualisieren', and 'Erweitern'. The results are filtered by 'BK' and show three suggestions: '44.39 Toxikologie', '44.41 Pharmazeutische Biologie', and '44.73 Geomedizin'. The source for the first suggestion is 'Quelle: via RVK (eng) VW 6100 «Allgemeines» [coli-conc]'. A red dashed arrow points from the 'Aktualisieren' button to the first suggestion.



coli-rich Web

coli-rich-web← zurück zur coli-conc WebseiteISIL: 12345▼ENDE


Semi-automatische Eintragung von Sacherschließungsdaten in PICA-Datenbanken.

Mit folgendem Formular können Titeldaten aus PICA-Datenbanken abgerufen werden, um diese mit Sacherschließungsdaten (auf Basis von coli-conc Mappings) anzureichern.

Datenbankauswahl

Titel laden

Titelangaben

PPN 1830228498 

Titel: Estimating Ore Grade Using Evolutionary Machine Learning Modelsinfo / Ehteram, Mohammad. - 1st ed. 2023.. - Singapore : Springer Nature Singapore, 2023

DDC: 549

Sacherschließung bicssc: RBGG ; bisacsh: SCI048000
LOC-SH: Mineralogy. ; Machine learning. ; Artificial intelligence--Data processing. ; Artificial intelligence.

Mögliche Anreicherung

Vokabular	Notation	Quelle	<input type="checkbox"/>
BK	38.30 Mineralogie	DDC: 549 Mineralogie = BK: 38:30 Mineralogie (Autor, Datum) Details DDC: 549 Mineralogie -> BK: 38:30 Mineralogie (Autor, Datum) Details	<input checked="" type="checkbox"/>

Eintragung erfolgreich! ✓

coli-rich-web ist Teil des coli-conc Projekts. Der Quellcode und die technische Dokumentation werden über [GitHub](#) bereitgestellt. Dieses Tool ist noch in der Entwicklungsphase.

coli-conc ist ein Projekt der [Verbundzentrale des GBV \(VZG\)](#). Es wird gefördert von der Deutschen Forschungsgemeinschaft (DFG) 2015-2019 und 2021-2023.

[Impressum](#) | [Barrierefreiheit](#) | [Datenschutz](#)

Integration into Cataloguing Software - WinIBW

The screenshot shows the WinIBW 3.7 software interface. The main window displays a catalog entry for PPN 1667549030. The entry details include:

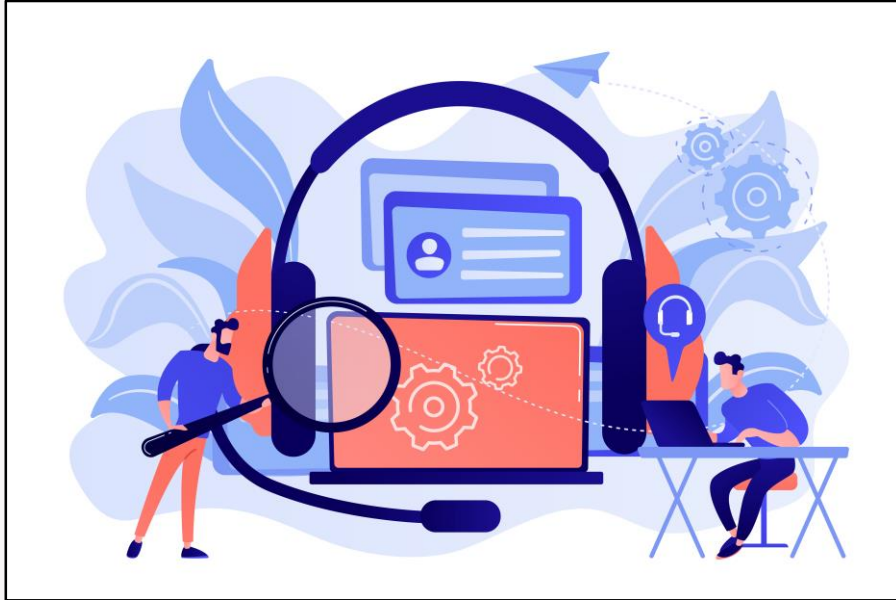
- Set 1 | Setgröße 1 | Datensatz 1 | PPN 1667549030 | Format P
- Eingabe: KALB:17-06-19 Änderung: KALB:17-06-19 16:04:41 Status:
- 001@ f02008, 2018
- 001A f0KALB:17-06-19
- 001B f0KALB:17-06-19ft16:04:41.000
- 001D f0KALB:17-06-19
- 001U f0utf8
- 001X f00
- 002@ f0Aau
- 002C faTextfbtxt
- 002D faohne Hilfsmittel zu benutzenfhn
- 002E faBandfbnc
- 003@ f01667549030
- 004A f0978-3-608-96167-6
- 007@ fiKXPf01667549030
- 010@ fager
- 010E ferda
- 011@ fa2019
- 019@ faXA-DE-BW
- 021A faAmerika verstehenfdGeschichte, Politik und Kultur der US
- 028A f9077526112 f8Gerste, Ronald D. *1957-* ; ID: gnd/11587256
- 032@ faDritte, durchgesehene Auflage
- 033A fpStuttgartfnKlett-Cotta
- 034D fa202 Seiten
- 034M faKarten
- 041A/00 f9106076612 f8USA ; ID: gnd/4078704-7
- 041A/01 f9104152206 f8Politik ; ID: gnd/4046514-7
- 041A/02 f9104470348 f8Kultur ; ID: gnd/4125698-0
- 041A/03 fzGeschichte
- 041A/09 fADE-101
- 044Z/00 fihisfaUSA
- 044Z/00 fihisfaGeschichte

A context menu is open over the entry, listing various actions such as 'Cocoda öffnen', 'GND Linking', and 'Reziprok linken'. A dialog box titled 'Passende Mappings' is overlaid on the right, showing the following mappings:

- GND 4125698-0 --> LCSH sh85026423 [DNB,2016]
- GND 4046514-7 --> LCSH sh85104466 [DNB,2016]
- GND 4125698-0 --> LCSH sh85034755 [DNB,2016]
- RVK AA 27000 --> GND 4078704-7 [UB Regensburg,...]

The dialog box has 'OK' and 'Abbrechen' buttons.

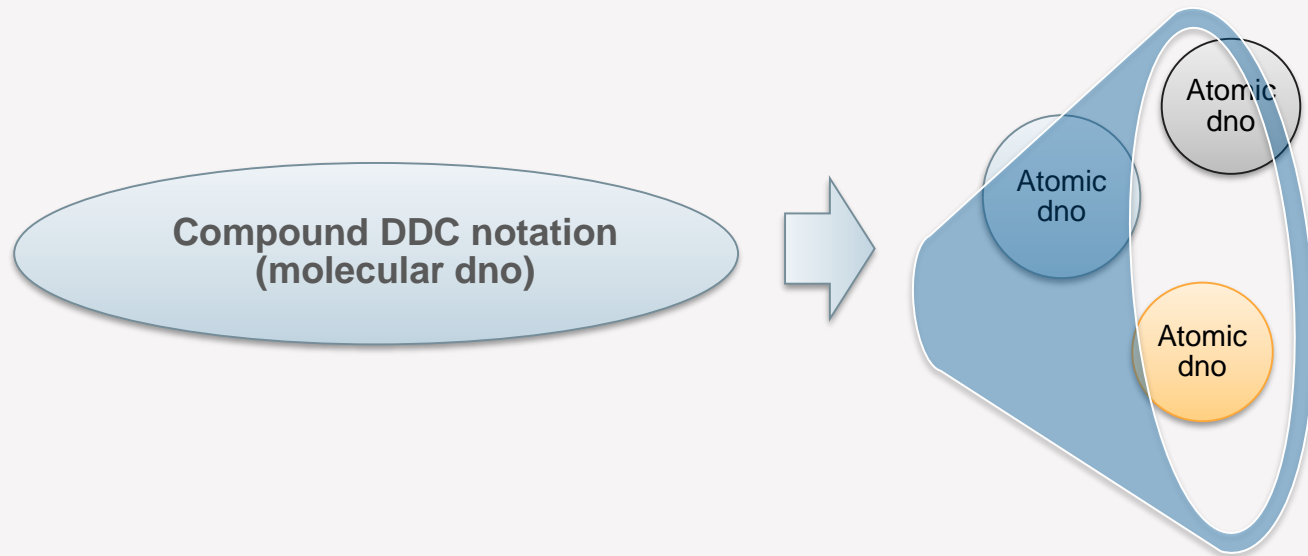
Future Services



- **Hosting and maintenance** of the Infrastructure
- **Continuation of mapping work** for large indexing systems
- **Coli-rich catalog** enrichment
- **Assist libraries** in their mapping work with cocoda and local catalog enrichment
- **Quality Control** and editorial work

Subproject coli-ana

A tool for automatic analysis of synthesized DDC notations



Rational

Huge Influx of Dewey numbers into the union catalogue K10plus from external sources (Library of Congress, Worldcat)

Over 1 mio. unique DDC built numbers in K10plus

Objectives

Improve Retrieval

- Support of search terms (atomic dnos)
Example: T1--09044 (DDf *1940-1949)
returns all titles that are in any way related to the 1940s
- Extension to full text search through captions (all captions contained in a sythesized dno)
- Assessment and ranking of similar publications

Improve the presentation in the catalogue

Analyse & enhance subject indexing

Example: DDC 700 "Arts" and T1--0901-0905:074 "Museums, collections, exhibitions" => BC 20.13 "Art exhibition".

K10plusPPN: 374538816 [Zitieren](#)

Titel: **1803 - die gelehrten Mönche und das Ende einer 1000-jährigen Tradition** : "In den Klöstern gediehen die größten Männer"; [Ausstellung vom 28. Mai bis 24. August 2003 Museum Obermünster, Regensburg / [hrsg. vom Bischöflichen Ordinariat Regensburg. Schriftleitung: Maria Baumann]

Beteiligt: Baumann, Maria

Körperschaft: Diözesanmuseum Regensburg
Diözese (Regensburg)

Erschienen: Regensburg : Schnell und Upmann, 2003

Umfang: 71 S. : Ill.

Sprache(n): Deutsch

Schriftenreihe: Kataloge und Schriften / Diözesanmuseum Regensburg

ISBN: 3-7954-1587-X

Sonstige Nummern: OCoLC: 163150381 →

RVK-Notation: G:bn S:rg | BO 1268 [Info](#) | LH 47480 [Info](#) | NS 5500 [Info](#) | NS 1925 [Info](#) → [Ähnliche Literatur](#)

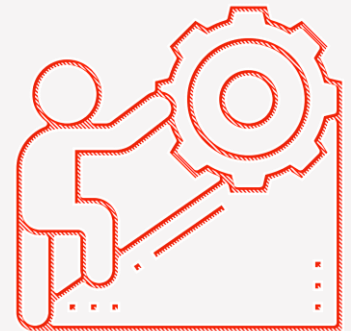
Sachgebiete: Basisklassifikation: 11.54 (Katholizismus)
SSG-Nummer(n): 8,1

Benennung der RVK-Notation "BO 1268"
Zur Navigation in RVK Online klicken Sie bitte auf den INFO-Button

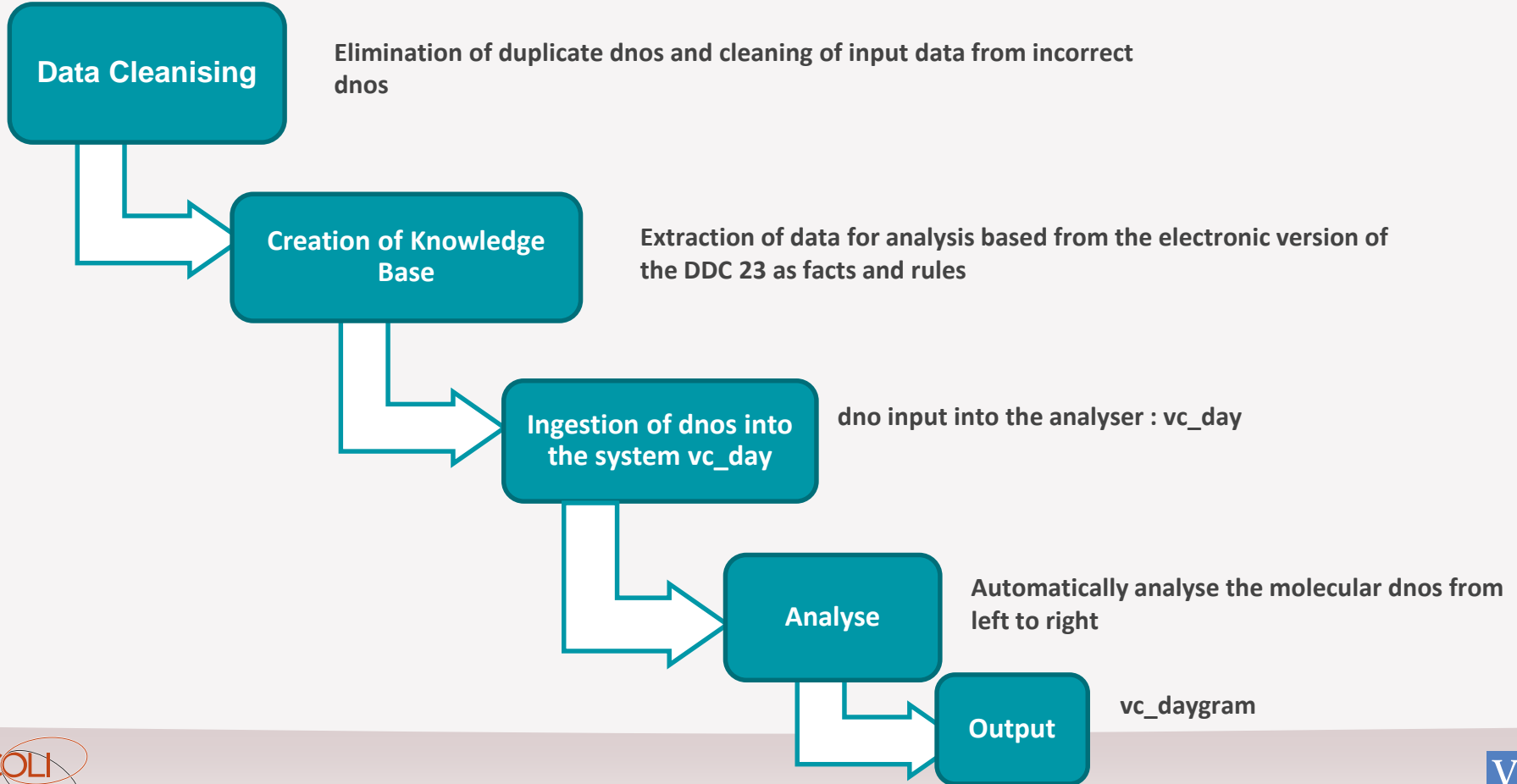
BO 1268
Theologie und Religionswissenschaften
/ Patrologie und Kirchengeschichte
/ Hand- und Lehrbücher sowie Gesamtdarstellungen
/ Bayern
/ Bayern nach Orten (CSN des Namens)
/ Regensburg (Stadt)

Challenges in Automatic Analysis

- **Extensive System** with over **51.700** classes
- **Complex number building** system
 - Main schedule, six tables and other auxiliary tables
 - Standard subdivisions, notes
 - **Over 9.987 instructions** (e.g. add note, authorisation, discontinuation, include note, class here, class elsewhere, revision,...)
 - Bundled into 60 rule parts
- **Possibility to build** fine and accurate DDC numbers that can get very lengthy Example:



coli-ana Workflow



Example vc_daygram

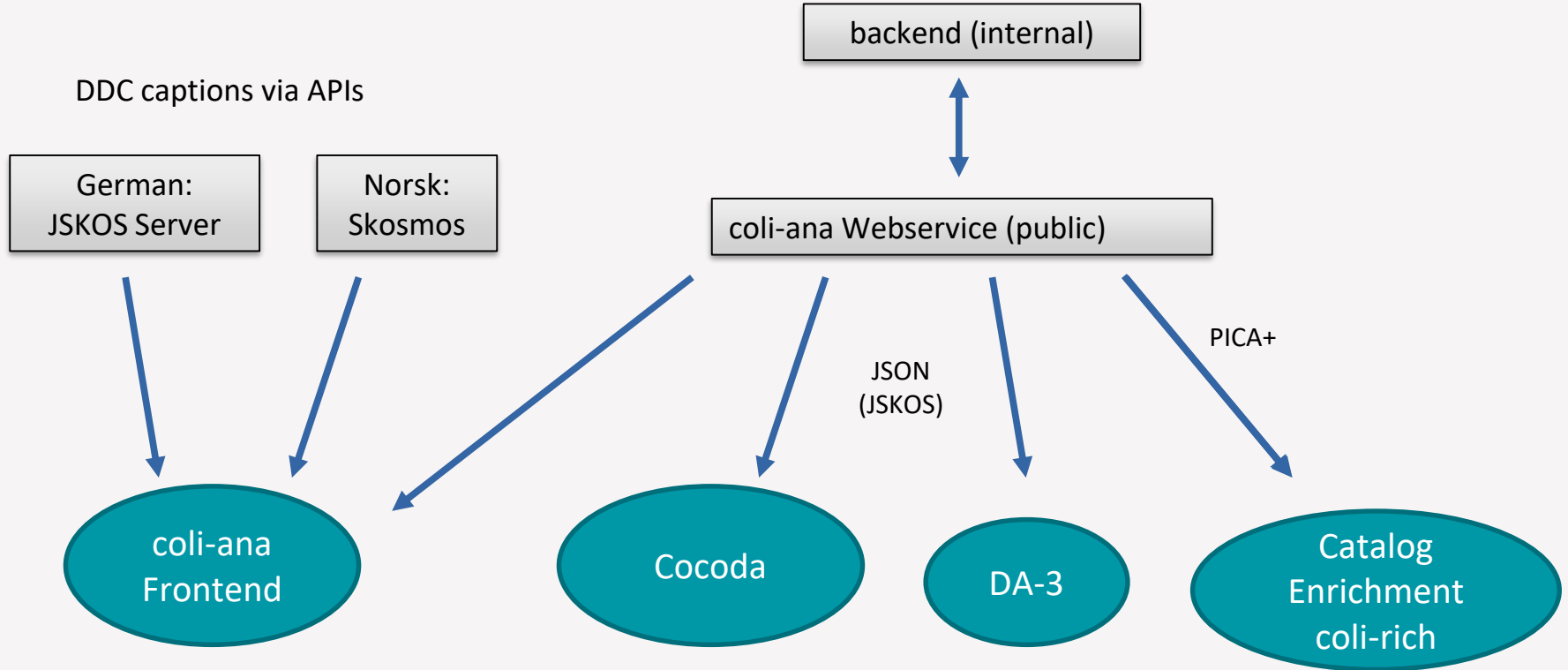
```
700.90440747471 <liu_2_to_analyze; length: 15>
7----- Arts & recreation <dno_main>
70----- Arts <dno_div>
700----- The arts <dno_sec>
700.9----- Standard subdivisions of the arts #dno_span_cen# <dno_sub_span:700.1-700.9>
700.9----- History, geographic treatment, biography of the arts #dno_syn#
700.904----- Modern arts <RI_bui>
700.904----- Modern arts <dno_bui>
-0----- <Facet Indicator> <0>
--0----- Table 1. Standard Subdivisions <tabno:T1--0>
--0.9----- History, geographic treatment, biography <tabno:T1--09>
--0.9----- Regional treatment <RI:T1--09>
--0.904----- *20th century, 1900-1999 <tabno:T1--0904>
--0.904----- Historical periods #dno_span_cen# <tabno_span:T1--0901-T1--0905>
--0.904----- Twentieth century <RI:T1--0904>
--0.9044----- *1940-1949 <tabno:T1--09044>
--0.9044----- World War II, 1939-1945 <RI:T1--09044>
---.----07----- Museums, collections, exhibits; collecting objects <p9->tabno_span_1:T1--0901-T1--0905:07>
---.----074---- Museums, collections, exhibits <p9->tabno_span_1:T1--0901-T1--0905:074>
---.-----7---- North America <p20_5->tabno:T2--7>
---.-----7---- Modern world; extraterrestrial worlds #dno_span_cen# <p20_5->tabno_span:T2--4-T2--9>
---.-----7---- North America <p20_5->RI:T2--7>
---.-----74-- Northeastern United States (New England and Middle Atlantic states) <p20_5->tabno:T2--74>
---.-----74-- Specific states of United States #dno_span_cen# <p20_5->tabno_span:T2--74-T2--79>
---.-----74-- Northeastern States <p20_5->RI:T2--74>
---.-----747- New York <p20_5->tabno:T2--747>
---.-----747- Middle Atlantic states #dno_span_cen# <p20_5->tabno_span:T2--747-T2--749>
---.-----747- New York (State) <p20_5->RI:T2--747>
---.-----7471 New York <p20_5->tabno:T2--7471>
---.-----7471 New York Metropolitan Area <p20_5->RI:T2--7471>
```

Use Cases

- **Catalogue Enrichment** : entry into the Catalogues for instance K10plus) and other bibliographic retrieval systems
- **Extend** search functionality
- **Analyse and Re-use** (coli-ana webservice)
- **Map** semantic components (Mapping Tool Cocoda)
- **Digitaler Assistent** Subject Indexing tool
- **Quality** Control: improve the quality of DDC notations in catalogues



coli-ana Technical Implementation



coli-ana Webservice

<https://coli-conc.gbv.de/coli-ana/app/>



← back to coli-conc website

coli-ana

DDC Analysis

analyze

Language: Deutsch, Norsk

Examples: 700.23, 700.90440747471, 666.444, 555.55, 641.50902, 341.4202664304409443835

666.444	Glasieren--Töpferhandwerk	{}	Q	...
6-----	Technik, Medizin, angewandte Wissenschaften (600)		Q	...
↳ 66-----	Chemische Verfahrenstechnik (660)		Q	...
↳ 666-----	Keramiktechnologie und zugeordnete Technologien (666)		Q	...
↳ 666.4--	Materialien, Ausstattung, Verfahren im Töpferhandwerk (666.4)		Q	...
↳ 666.444	Glasieren--Töpferhandwerk (666.444)		Q	...
---,-4-	Techniken und Verfahren (738.14)		Q	...
↳ ---,-44	Glasieren (738.144)		Q	...

<http://dewey.info/class/738.144/e23/>

Analyze

WebDewey (de)

Cocoda

deep links to the title data in K10plus

analysis in the catalog record

PICA+ 045H/20 \$eDDC23ger\$a666.444\$c666.4\$d738.144\$Acoli-ana {} ?

Pica3 5420 [DDC23ger]666.444-G--666.4-H--738.144\$Acoli-ana

Integration into Cocoda

<https://coli-conc.gbv.de/cocoda/app/>

The screenshot shows a web browser window with the title "DDC Dewey Decimal Classification" and a Creative Commons license "CC BY-NC-ND". A search bar contains the text "Type to search...". Below the search bar, a tree view of DDC classes is shown, with "666.444 Glasieren" selected and highlighted in orange. Below the tree view, there are tabs for "Info", "Labels", "Search Links", and "coli-ana". The "coli-ana" tab is active, showing a breadcrumb trail: "666.444" > "6 - - - - - Technik (600)" > "↳ 66 - - - - - Chemische Verfahrenstechnik (660)" > "↳ 666 - - - - - Keramiktechnologie und zugeordnete Technologien (666)" > "↳ 666.4 - - - Materialien, Ausstattung, Verfahren im Töpferhandwerk (666.4)" > "666.444 Glasieren (666.444)" > "- - - .-4- Techniken und Verfahren (738.14)" > "↳ - - - .-44 Glasieren (738.144)". At the bottom, there is a link: "Go to the [coli-ana web interface](#) for more details and information."


Create and manage mappings between atomic DDC notations and entries of other vocabularies (Wikidata, LCSH, GND)

coli-ana in Digitaler Assistent (DA -3)

The screenshot displays the Digital Assistant (DA-3) interface. The top navigation bar includes 'Suche', 'Bearbeiten', 'Exportliste', and 'Testsystem'. The main content area is divided into several sections:

- Tools:** Includes 'Gemeinsame Normdatei (GND)', 'Regensburger Verbundklassifikation (RVK)', 'Basisklassifikation (BK)', 'Standard-Thesaurus Wirtschaft (STW)', 'ixTheo', 'SSG Nummern / FID Kennzeichen (SSG/FID)', and 'Staatsbibliothek zu Berlin - Regionalcodes (SBBRC)'. A red box highlights the 'DCC Analysis' button in this section.
- Metadaten:** Shows details for 'Revolutionary Teamsters : The Minneapolis Truckers' Strikes of 1934' by Palmer, Bryan D. It includes fields for 'Personen', 'Ausgabe', 'Publ.', 'Reihe', 'ISBN', 'Sprache', and 'STW'.
- Abstracts:** Provides a summary of the work, mentioning 'Can workers win?' and 'The Early Depression-Years'.
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