GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN IN PUBLICA COMMODA SEIT 1737

The Library UC SAN DIEGO

NIEDERSÄCHSISCHE STAATS- UND UNIVERSITÄTSBIBLIOTHEK GÖTTINGEN | SUB

Models of support for Data Science

The perspective of two libraries

CNI Spring Meeting 2024

David Minor, UC San Diego
Jan Brase and Bela Gipp , SUB Göttingen

Content

1. Introduction
2. UC San Diego, the situation
3. GippLab: Scientific Information Analytics
4. Student and researcher exchange
5. Lessons learned – next steps

What are we talking about?

Since 2016 the UC San Diego and the State and University Library Goettingen in Germany have been actively cooperating and learned from each other through staff visits and joint projects

MOU (signed in 2016 and renewed in 2019) to compare and contrast research support organizations:

- Comparing different support models
- Relationships between our libraries and respective campuses
- Overall goals and objectives

Future work (2024 - ?)

At **CNI fall 2023** we presented our longtime Exchanges on RDM infrastructures and services.

For the next years we will additionally focus on:

- Data / research analytics
- Academic exchanges – students
- Further staff exchanges
- Re-examine technical discussions

UC San Diego, the situation

UC San Diego Data Science Program - Founded in 2015

Fall 2022: expanded to include three new graduate degrees: in person MS, online MS (joint with Computer Science & Engineering, first fully online graduate degree program offered by UC San Diego)

Fall 2023: ~1000 undergraduate majors, ~6000 students taking courses, ~200 graduate students

The Data Science Program is primarily focused on education and training students in data science.

UC San Diego

HALICIOĞLU DATA SCIENCE INSTITUTE

- Founded in 2018

Brings together faculty members and researchers from various departments across the university to work on data-driven research projects.

Offers various educational programs, including a PhD in Data Science.

Provides resources and support for data science research and education.

HDSI is focused on advancing the field of data science through research and innovation.

Data science in the Library

Hired Data Science Librarian in 2018

- Data & GIS Lab
- Wide range of services
- Bringing student data into Library Digital Collections
- Forthcoming paper in Journal of eScience Librarianship

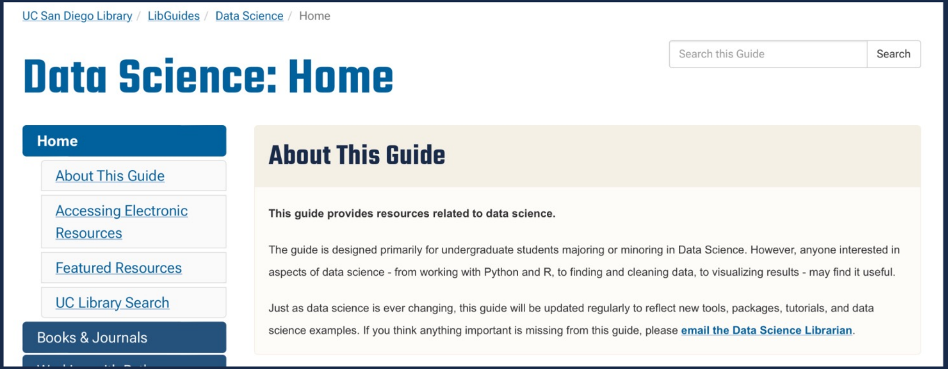
Data science support in the Library has to this point been external facing, for students and faculty. We are not yet doing work for internal Library needs.

Data science undergrad support - interactions

- Annual workshops on developing independent (outside of courses) data science projects
- 1-on-1 meetings with students to develop their independent projects, focused on scoping and finding/accessing appropriate data, as well as how to document and present their findings
- Working with capstone student groups to identify data sources for group-based projects
- Working with student groups on their capstone projects - finding and accessing licensed/subscription data; acting as liaison between vendors and student groups when needed

Data science undergrad support - materials

- Data Science LibGuide with general data science resources (Python tutorials, etc.), and content tied to course curriculum (e.g, assigned readings, direct links to purchased and open access books in library catalog)
- Sharing information about hackathons/datathons, new data resources, Library-hosted events (e.g. UC Love Data Week) and other relevant content in weekly departmental student newsletter
- Quarterly newsletter to faculty about Library updates
- Creating and maintaining a web archive of capstone projects (project websites, GitHub repositories, web-based visualizations, etc.)



UC San Diego Library / LibGuides / Data Science / Home

Search this Guide | Search

Data Science: Home

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- Accessing Electronic Resources
- Featured Resources
- UC Library Search
- Books & Journals

About This Guide

This guide provides resources related to data science.

The guide is designed primarily for undergraduate students majoring or minoring in Data Science. However, anyone interested in aspects of data science - from working with Python and R, to finding and cleaning data, to visualizing results - may find it useful.

Just as data science is ever changing, this guide will be updated regularly to reflect new tools, packages, tutorials, and data science examples. If you think anything important is missing from this guide, please **email the Data Science Librarian**.

Data science grad support

- Identifying data suitable for student-organized hackathons/datathons; purchasing requested books for new grad courses; early stages of international student exchanges
- Data Science & Engineering MAS program (not technically HDSI): working directly with students for the annual ingest of group capstone projects
- Computational Social Science grad program (not HDSI, but one of many data science-ish grad programs): working with students to access and analyze data, including leveraging the Library's Data & GIS Lab virtual machines for large data/compute Windows-based analyses

Next steps: Educational Dataset Service

- Curated datasets for student use in instruction and research:
  - Real research datasets
  - Sanitized and synthetic administrative data (e.g. Student Activity Hub, IR)
  - Datasets commonly used for training in specific disciplines
- Guidance & training for students on working w/associated datasets
  - How to re-use data
  - How to cite sources
  - How to work with metadata
- Support for instructors in developing & assessing meaningful assignments
- Usable in the student Data Science/Machine Learning Platform or elsewhere

GippLab: Scientific Information Analytics

University of Göttingen and State and University Library (SUB) Göttingen

Bela Gipp

Prof. Dr. Bela Gipp, Lehrstuhl für...
Germany
Netherlands
Poland
Czechia
Slovakia
Austria
Luxembourg
France
ENGLAND
Hamburg
Bremen
Hanover
Berlin
Bielefeld
Magdeburg
Potsdam
Kassel
Leipzig
Dresden
Dortmund
Essen
Düsseldorf
Cologne
Frankfurt
Nuremberg
Stuttgart
Regensburg
Augsburg
Strasbourg
Freiburg im Breisgau
Basel
Zürich
Innsbruck
Salzburg
Linz
Graz
Bratislava
Prague
Wrocław
Poznań
Szczecin
Gdańsk
Bydgoszcz
Łódź
Częstochowa
Amsterdam
Rotterdam
Antwerp
Brussels
Liège
Lille
London
Sheffield
Norwich
Cambridge
Oxford
Kiel
Lübeck
Rostock
Stralsund
Flensburg
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Caen
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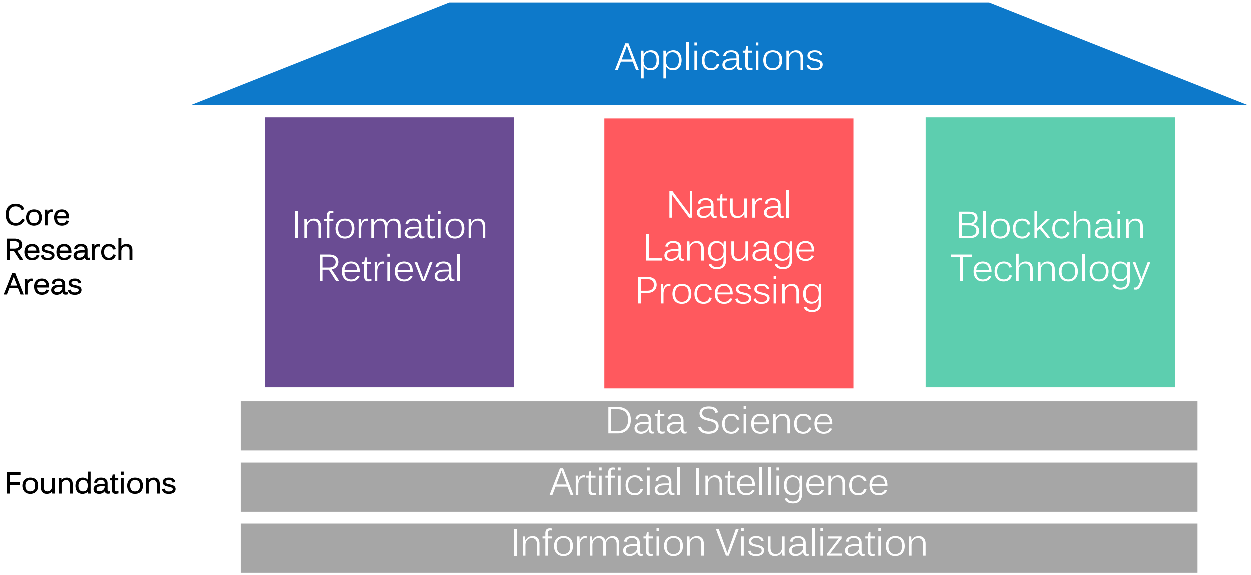
Le Mans
Angers
Tours
Nantes
Dijon
Poitiers
Versailles
English Channel

GippLab
Sci. Info. Analytics

www.gipplab.org/team

Our Research

Natural Language Processing



Applications

Core Research Areas

Information Retrieval

Natural Language Processing

Blockchain Technology

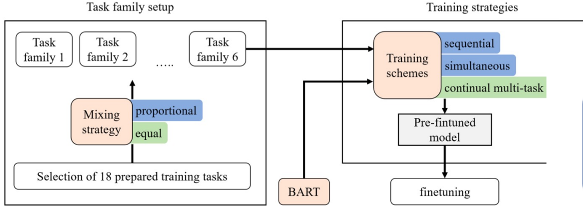
Foundations

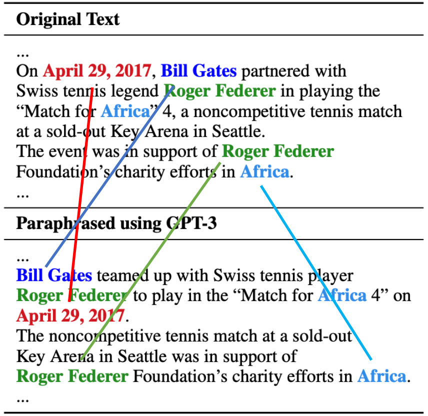
Data Science

Artificial Intelligence

Information Visualization

Natural Language Processing



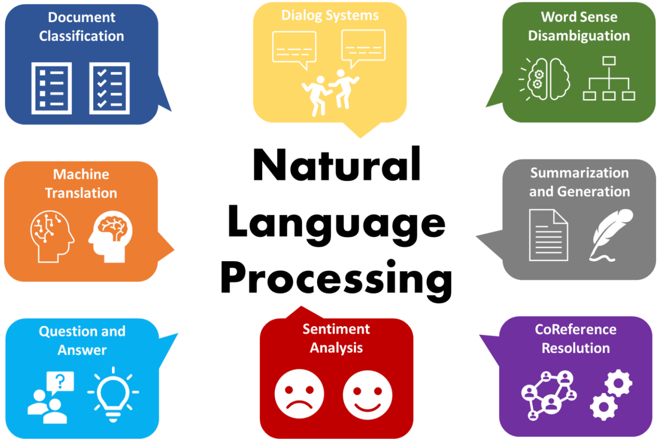


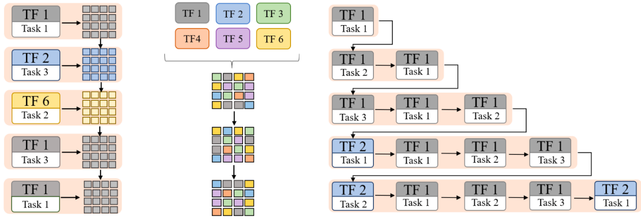
Original Text

...
On April 29, 2017, Bill Gates partnered with Swiss tennis legend Roger Federer in playing the "Match for Africa" 4, a noncompetitive tennis match at a sold-out Key Arena in Seattle.
The event was in support of Roger Federer Foundation's charity efforts in Africa.
...

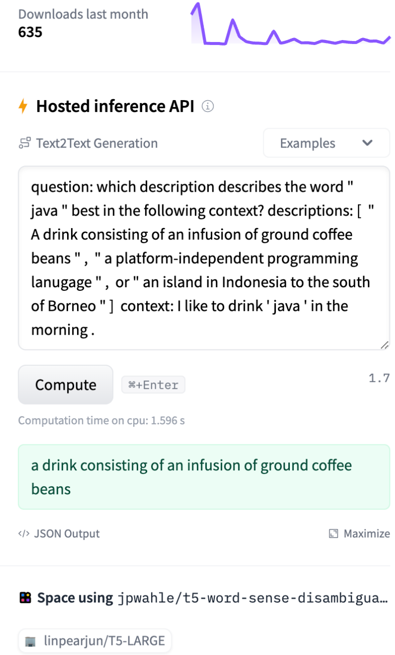
Paraphrased using GPT-3

...
Bill Gates teamed up with Swiss tennis player Roger Federer to play in the "Match for Africa 4" on April 29, 2017.
The noncompetitive tennis match at a sold-out Key Arena in Seattle was in support of Roger Federer Foundation's charity efforts in Africa.
...





(a) Sequential learning. (b) Simultaneous learning. (c) Continual multi-task learning.



Downloads last month
635

Hosted inference API

Text2Text Generation — Examples

question: which description describes the word " java " best in the following context? descriptions: [" A drink consisting of an infusion of ground coffee beans " , " a platform-independent programming lanugage " , or " an island in Indonesia to the south of Borneo "] context: I like to drink ' java ' in the morning .

Compute ⌘+Enter 1.7

Computation time on cpu: 1.596 s

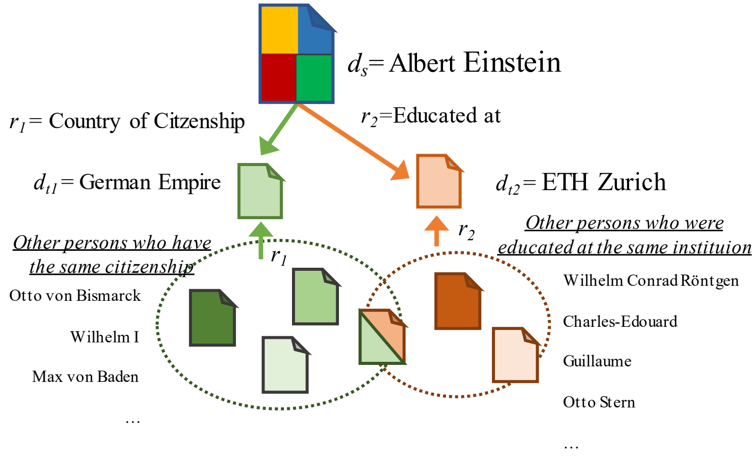
a drink consisting of an infusion of ground coffee beans

JSON Output Maximize

Space using `jpwahle/t5-word-sense-disambigua...`

linpearjun/T5-LARGE

Applications



d_s= Albert Einstein

r_1= Country of Citzenship

r_2=Educated at

d_{t1}= German Empire

d_{t2}= ETH Zurich

r_1

r_2

Other persons who have the same citizenship

Otto von Bismarck

Wilhelm I

Max von Baden

…

Other persons who were educated at the same institution

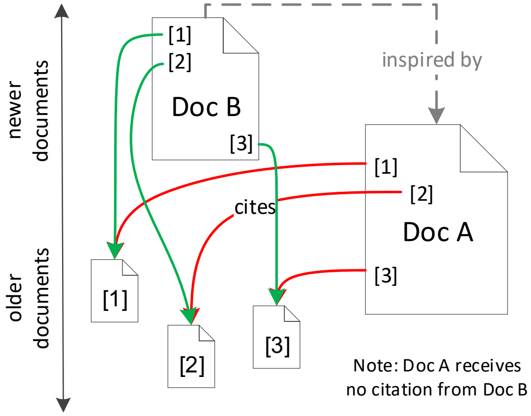
Wilhelm Conrad Röntgen

Charles-Edouard

Guillaume

Otto Stern

…



newer documents

older documents

Doc B

Doc A

[1]

[2]

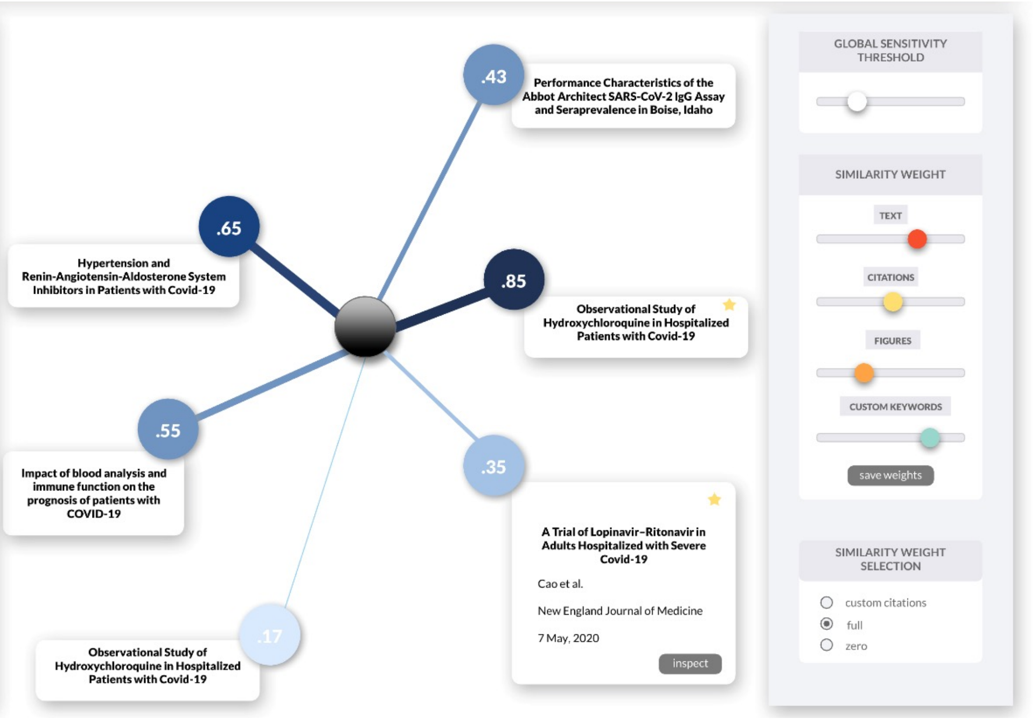
[3]

inspired by

cites

Note: Doc A receives no citation from Doc B

Literature Recommendation



Performance Characteristics of the Abbot Architect SARS-CoV-2 IgG Assay and Seraprevalence in Boise, Idaho

Hypertension and Renin-Angiotensin-Aldosterone System Inhibitors in Patients with Covid-19

Observational Study of Hydroxychloroquine in Hospitalized Patients with Covid-19

Impact of blood analysis and immune function on the prognosis of patients with COVID-19

A Trial of Lopinavir–Ritonavir in Adults Hospitalized with Severe Covid-19

Cao et al.

New England Journal of Medicine

7 May, 2020

Observational Study of Hydroxychloroquine in Hospitalized Patients with Covid-19

GLOBAL SENSITIVITY THRESHOLD

SIMILARITY WEIGHT

TEXT

CITATIONS

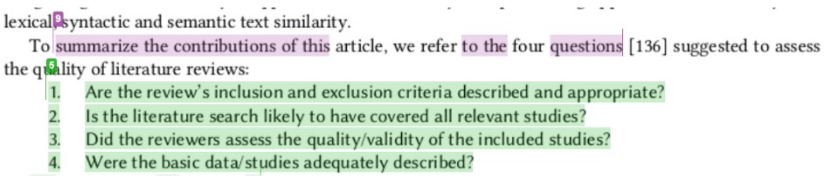
FIGURES

CUSTOM KEYWORDS

SIMILARITY WEIGHT SELECTION

○ custom citations
● full
○ zero

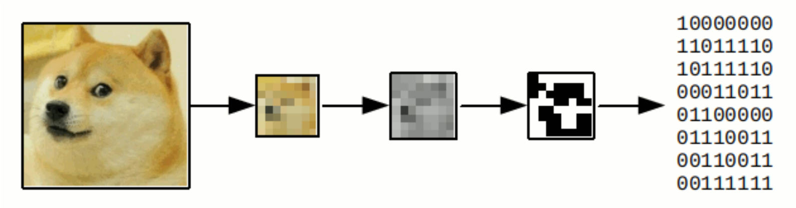
Applications



lexical syntactic and semantic text similarity.

To summarize the contributions of this article, we refer to the four questions [136] suggested to assess the quality of literature reviews:

1. Are the review's inclusion and exclusion criteria described and appropriate?
2. Is the literature search likely to have covered all relevant studies?
3. Did the reviewers assess the quality/validity of the included studies?
4. Were the basic data/studies adequately described?



10000000
11011110
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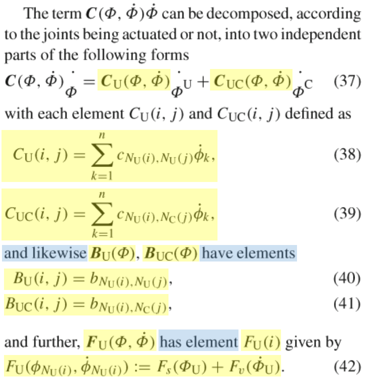
01100000
01110011
00110011
00111111



The term $\boldsymbol{C}(\Phi, \dot{\Phi})\dot{\Phi}$ can be decomposed, according to the joints being actuated or not, into two independent parts of the following forms

$$\boldsymbol{C}(\Phi, \dot{\Phi})\dot{\Phi} = \boldsymbol{C}_{\mathrm{U}}(\Phi, \dot{\Phi})\dot{\Phi}^{\mathrm{U}} + \boldsymbol{C}_{\mathrm{UC}}(\Phi, \dot{\Phi})\dot{\Phi}^{\mathrm{C}} \tag{37}$$

with each element $C_{\mathrm{U}}(i, j)$ and $C_{\mathrm{UC}}(i, j)$ defined as

$$C_{\mathrm{U}}(i, j) = \sum_{k=1}^{n} c_{N_{\mathrm{U}}(i), N_{\mathrm{U}}(j)}\dot{\phi}_k, \tag{38}$$

$$C_{\mathrm{UC}}(i, j) = \sum_{k=1}^{n} c_{N_{\mathrm{U}}(i), N_{\mathrm{C}}(j)}\dot{\phi}_k, \tag{39}$$

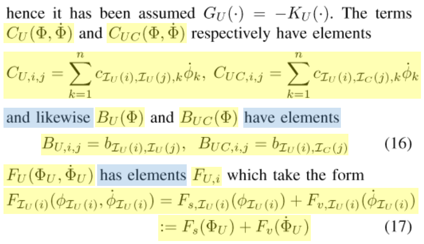
and likewise $\boldsymbol{B}_{\mathrm{U}}(\Phi)$, $\boldsymbol{B}_{\mathrm{UC}}(\Phi)$ have elements

$$B_{\mathrm{U}}(i, j) = b_{N_{\mathrm{U}}(i), N_{\mathrm{U}}(j)}, \tag{40}$$

$$B_{\mathrm{UC}}(i, j) = b_{N_{\mathrm{U}}(i), N_{\mathrm{C}}(j)}, \tag{41}$$

and further, $\boldsymbol{F}_{\mathrm{U}}(\Phi, \dot{\Phi})$ has element $F_{\mathrm{U}}(i)$ given by

$$F_{\mathrm{U}}(\phi_{N_{\mathrm{U}}(i)}, \dot{\phi}_{N_{\mathrm{U}}(i)}) := F_s(\Phi_{\mathrm{U}}) + F_v(\dot{\Phi}_{\mathrm{U}}). \tag{42}$$



hence it has been assumed $G_U(\cdot) = -K_U(\cdot)$. The terms $C_U(\Phi, \dot{\Phi})$ and $C_{UC}(\Phi, \dot{\Phi})$ respectively have elements

$$C_{U,i,j} = \sum_{k=1}^{n} c_{\mathcal{I}_U(i),\mathcal{I}_U(j),k}\dot{\phi}_k,\; C_{UC,i,j} = \sum_{k=1}^{n} c_{\mathcal{I}_U(i),\mathcal{I}_C(j),k}\dot{\phi}_k$$

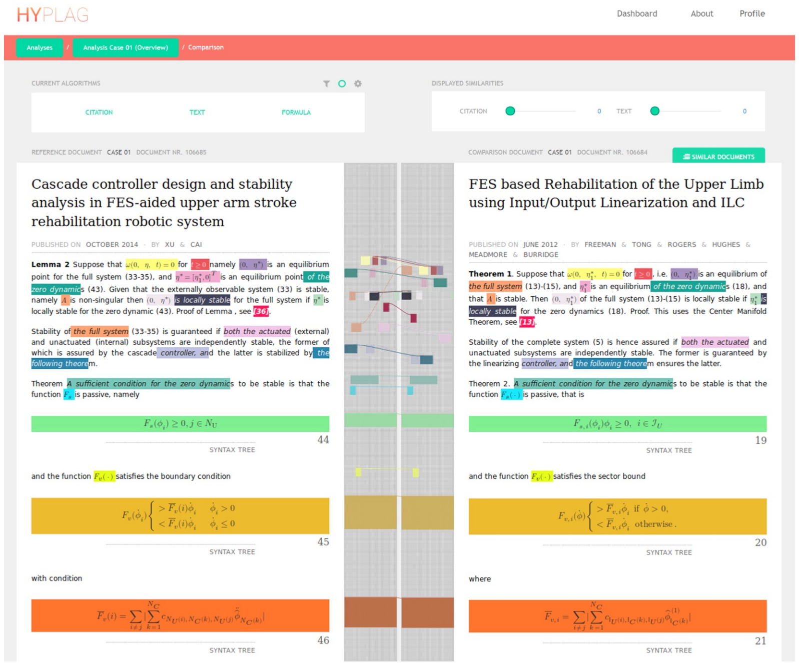
and likewise $B_U(\Phi)$ and $B_{UC}(\Phi)$ have elements

$$B_{U,i,j} = b_{\mathcal{I}_U(i),\mathcal{I}_U(j)},\quad B_{UC,i,j} = b_{\mathcal{I}_U(i),\mathcal{I}_C(j)} \tag{16}$$

$F_U(\Phi_U, \dot{\Phi}_U)$ has elements $F_{U,i}$ which take the form

$$F_{\mathcal{I}_U(i)}(\phi_{\mathcal{I}_U(i)}, \dot{\phi}_{\mathcal{I}_U(i)}) = F_{s,\mathcal{I}_U(i)}(\phi_{\mathcal{I}_U(i)}) + F_{v,\mathcal{I}_U(i)}(\dot{\phi}_{\mathcal{I}_U(i)})$$
$$:= F_s(\Phi_U) + F_v(\dot{\Phi}_U) \tag{17}$$

Plagiarism Detection



REFERENCE DOCUMENT CASE 01 DOCUMENT NR. 106685

Cascade controller design and stability analysis in FES-aided upper arm stroke rehabilitation robotic system

PUBLISHED ON OCTOBER 2014 · BY XU & CAI

Lemma 2 Suppose that $\omega(0,\ \eta,\ t) = 0$ for $t \geq 0$ namely $(0,\ \eta^*)$ is an equilibrium point for the full system (33-35), and $\eta^* = [\eta_1^*, 0]^T$ is an equilibrium point of the zero dynamics (43). Given that the externally observable system (33) is stable, namely A is non-singular then $(0,\ \eta^*)$ is locally stable for the full system if η^* is locally stable for the zero dynamic (43). Proof of Lemma , see [36].

Stability of the full system (33-35) is guaranteed if both the actuated (external) and unactuated (internal) subsystems are independently stable, the former of which is assured by the cascade controller, and the latter is stabilized by the following theorem.

Theorem A sufficient condition for the zero dynamics to be stable is that the function F_s is passive, namely

$$F_s(\phi_i) \geq 0, j \in N_{\mathrm{U}} \tag{44}$$

SYNTAX TREE

and the function $F_v(\cdot)$ satisfies the boundary condition

$$F_v(\dot{\phi}_i)\begin{cases} > \overline{F}_v(i)\dot{\phi}_i & \dot{\phi}_i > 0 \\ < \overline{F}_v(i)\dot{\phi}_i & \dot{\phi}_i \leq 0 \end{cases} \tag{45}$$

SYNTAX TREE

with condition

$$\overline{F}_v(i) = \sum_{i \neq j}|\sum_{k=1}^{N_C} c_{N_U(i),N_C(k),N_U(j)}\hat{\ddot{\phi}}_{N_C(k)}| \tag{46}$$

SYNTAX TREE

COMPARISON DOCUMENT CASE 01 DOCUMENT NR. 106684

FES based Rehabilitation of the Upper Limb using Input/Output Linearization and ILC

PUBLISHED ON JUNE 2012 · BY FREEMAN & TONG & ROGERS & HUGHES & MEADMORE & BURRIDGE

Theorem 1. Suppose that $\omega(0,\ \eta_1^*,\ t) = 0$ for $t \geq 0$, i.e. $(0,\ \eta_1^*)$ is an equilibrium of the full system (13)-(15), and η_1^* is an equilibrium of the zero dynamics (18), and that A is stable. Then $(0,\ \eta_1^*)$ of the full system (13)-(15) is locally stable if η_1^* is locally stable for the zero dynamics (18). Proof. This uses the Center Manifold Theorem, see [13].

Stability of the complete system (5) is hence assured if both the actuated and unactuated subsystems are independently stable. The former is guaranteed by the linearizing controller, and the following theorem ensures the latter.

Theorem 2. A sufficient condition for the zero dynamics to be stable is that the function $F_s(\cdot)$ is passive, that is

$$F_{s,i}(\phi_i)\phi_i \geq 0,\ i \in \mathcal{I}_U \tag{19}$$

SYNTAX TREE

and the function $F_v(\cdot)$ satisfies the sector bound

$$F_{v,i}(\dot{\phi})\begin{cases} > \overline{F}_{v,i}\dot{\phi}_i \text{ if } \dot{\phi} > 0, \\ < \overline{F}_{v,i}\dot{\phi}_i \text{ otherwise}. \end{cases} \tag{20}$$

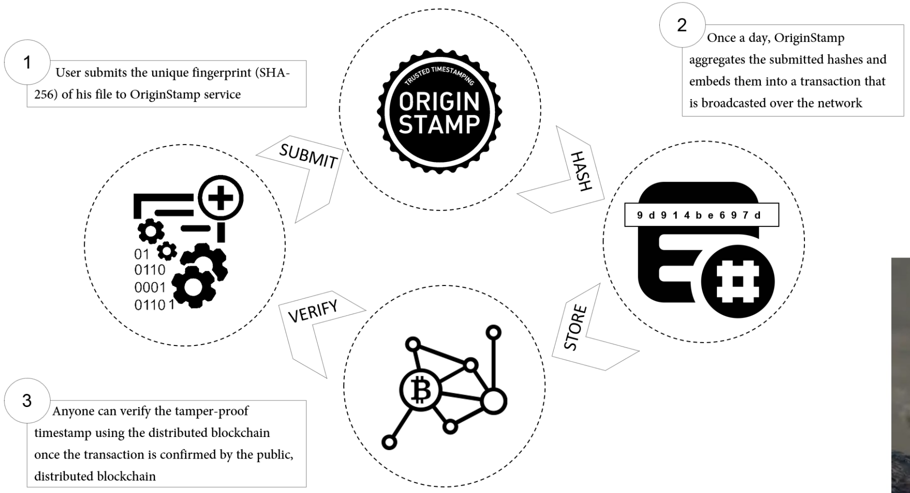
SYNTAX TREE

where

$$\overline{F}_{v,i} = \sum_{i \neq j}|\sum_{k=1}^{N_C} c_{\mathrm{I}_U(i),\mathrm{I}_C(k),\mathrm{I}_U(j)}\hat{\phi}^{(1)}_{\mathrm{I}_C(k)}| \tag{21}$$

SYNTAX TREE

Applications

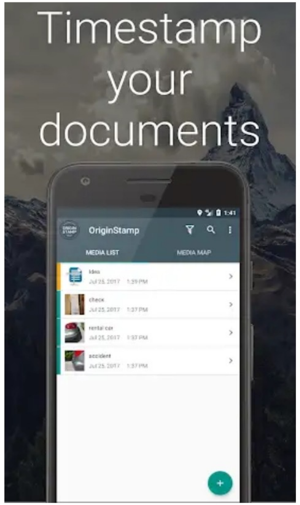


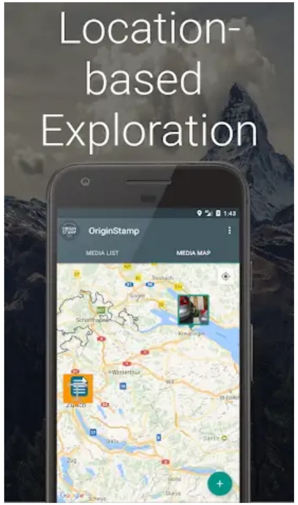
1 User submits the unique fingerprint (SHA-256) of his file to OriginStamp service

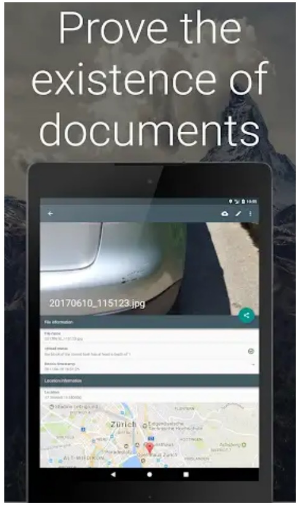
2 Once a day, OriginStamp aggregates the submitted hashes and embeds them into a transaction that is broadcasted over the network

3 Anyone can verify the tamper-proof timestamp using the distributed blockchain once the transaction is confirmed by the public, distributed blockchain

IP Protection

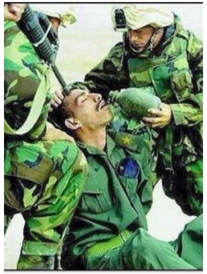




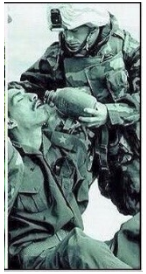


Applications

News Analysis

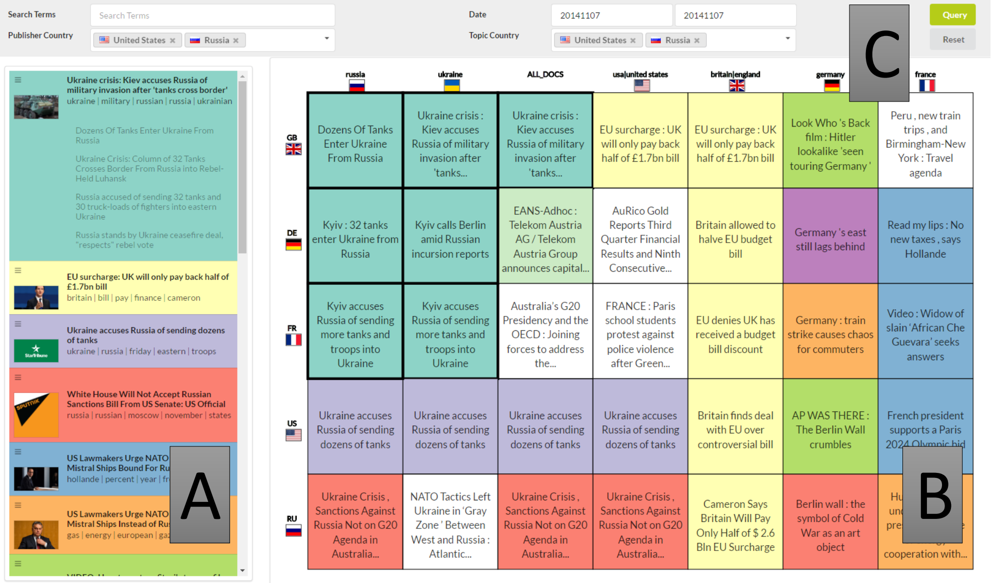


Objective



Frame 1

Frame 2



Search Terms: Search Terms

Publisher Country: United States × Russia ×

Date: 20141107 20141107

Topic Country: United States × Russia ×

Query

Reset

Ukraine crisis: Kiev accuses Russia of military invasion after 'tanks cross border'
ukraine | military | russian | russia | ukrainian

Dozens Of Tanks Enter Ukraine From Russia

Ukraine Crisis: Column of 32 Tanks Crosses Border From Russia into Rebel-Held Luhansk

Russia accused of sending 32 tanks and 30 truck-loads of fighters into eastern Ukraine

Russia stands by Ukraine ceasefire deal, "respects" rebel vote

EU surcharge: UK will only pay back half of £1.7bn bill
britain | bill | pay | finance | cameron

Ukraine accuses Russia of sending dozens of tanks
ukraine | russia | friday | eastern | troops

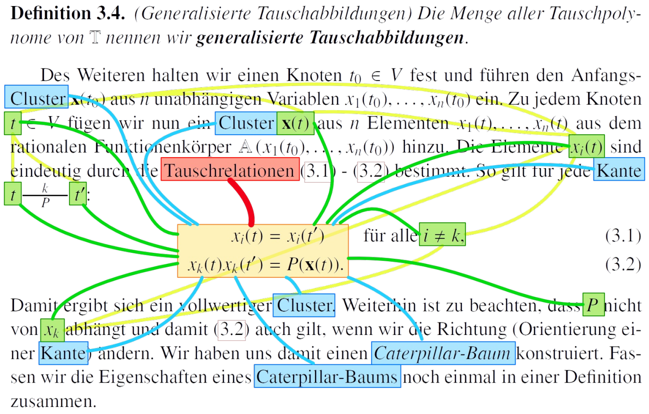
White House Will Not Accept Russian Sanctions Bill From US Senate: US Official
russia | russian | moscow | november | states

US Lawmakers Urge NATO Mistral Ships Bound For Ru
hollande | percent | year | fr

US Lawmakers Urge NATO Mistral Ships Instead of Ru
gas | energy | european | ga

	russia	ukraine	ALL_DOCS	usa|united states	britain|england	germany	france
GB	Dozens Of Tanks Enter Ukraine From Russia	Ukraine crisis : Kiev accuses Russia of military invasion after 'tanks...	Ukraine crisis : Kiev accuses Russia of military invasion after 'tanks...	EU surcharge : UK will only pay back half of £1.7bn bill	EU surcharge : UK will only pay back half of £1.7bn bill	Look Who 's Back film : Hitler lookalike 'seen touring Germany '	Peru , new train trips , and Birmingham-New York : Travel agenda
DE	Kyiv : 32 tanks enter Ukraine from Russia	Kyiv calls Berlin amid Russian incursion reports	EANS-Adhoc : Telekom Austria AG / Telekom Austria Group announces capital...	AuRico Gold Reports Third Quarter Financial Results and Ninth Consecutive...	Britain allowed to halve EU budget bill	Germany 's east still lags behind	Read my lips : No new taxes , says Hollande
FR	Kyiv accuses Russia of sending more tanks and troops into Ukraine	Kyiv accuses Russia of sending more tanks and troops into Ukraine	Australia's G20 Presidency and the OECD : Joining forces to address the...	FRANCE : Paris school students protest against police violence after Green...	EU denies UK has received a budget bill discount	Germany : train strike causes chaos for commuters	Video : Widow of slain 'African Che Guevara' seeks answers
US	Ukraine accuses Russia of sending dozens of tanks	Ukraine accuses Russia of sending dozens of tanks	Ukraine accuses Russia of sending dozens of tanks	Ukraine accuses Russia of sending dozens of tanks	Britain finds deal with EU over controversial bill	AP WAS THERE : The Berlin Wall crumbles	French president supports a Paris 2024 Olympic bid
RU	Ukraine Crisis , Sanctions Against Russia Not on G20 Agenda in Australia...	NATO Tactics Left Ukraine in 'Gray Zone ' Between West and Russia : Atlantic...	Ukraine Crisis , Sanctions Against Russia Not on G20 Agenda in Australia...	Ukraine Crisis , Sanctions Against Russia Not on G20 Agenda in Australia...	Cameron Says Britain Will Pay Only Half of $ 2.6 Bln EU Surcharge	Berlin wall : the symbol of Cold War as an art object	Hu un pre e cooperation with...

Applications



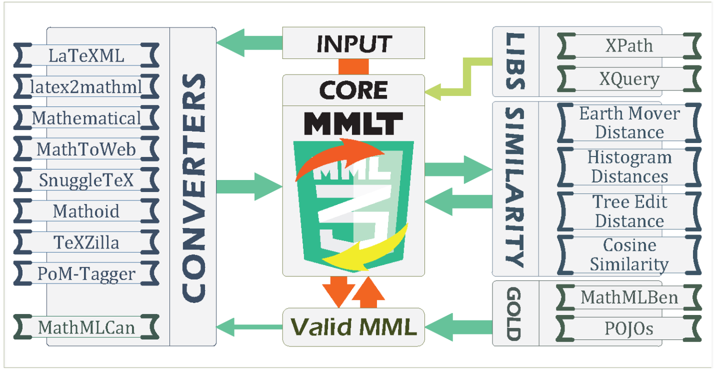
Definition 3.4. *(Generalisierte Tauschabbildungen) Die Menge aller Tauschpolynome von $\mathbb{T}$ nennen wir **generalisierte Tauschabbildungen**.*

Des Weiteren halten wir einen Knoten $t_0 \in V$ fest und führen den Anfangs-Cluster $\mathbf{x}(t_0)$ aus n unabhängigen Variablen $x_1(t_0), \ldots, x_n(t_0)$ ein. Zu jedem Knoten $t \in V$ fügen wir nun ein Cluster $\mathbf{x}(t)$ aus n Elementen $x_1(t), \ldots, x_n(t)$ aus dem rationalen Funktionenkörper $\mathbb{A}(x_1(t_0), \ldots, x_n(t_0))$ hinzu. Die Elemente $x_i(t)$ sind eindeutig durch die Tauschrelationen (3.1) - (3.2) bestimmt. So gilt für jede Kante $t \overset{k}{\underset{P}{\text{———}}} t'$:

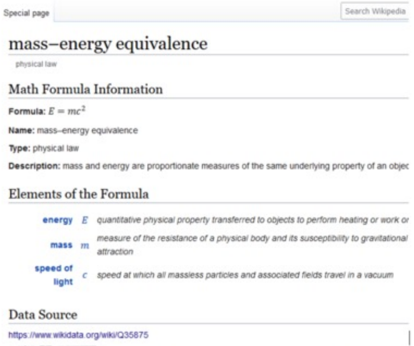
$$x_i(t) = x_i(t') \quad \text{für alle } i \neq k, \tag{3.1}$$

$$x_k(t)x_k(t') = P(\mathbf{x}(t)). \tag{3.2}$$

Damit ergibt sich ein vollwertiger Cluster. Weiterhin ist zu beachten, dass P nicht von x_k abhängt und damit (3.2) auch gilt, wenn wir die Richtung (Orientierung einer Kante) ändern. Wir haben uns damit einen *Caterpillar-Baum* konstruiert. Fassen wir die Eigenschaften eines Caterpillar-Baums noch einmal in einer Definition zusammen.



Math Information Retrieval



Special page

Search Wikipedia

mass–energy equivalence

physical law

Math Formula Information

Formula: $E = mc^2$

Name: mass–energy equivalence

Type: physical law

Description: mass and energy are proportionate measures of the same underlying property of an objec

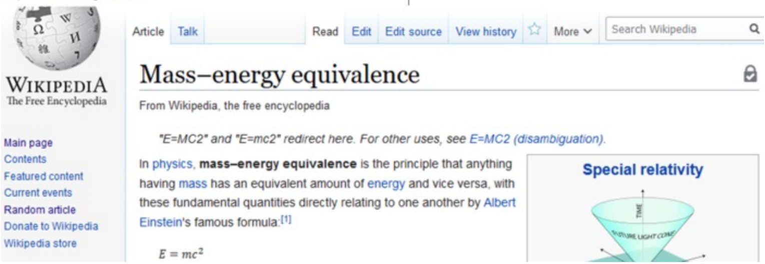
Elements of the Formula

energy	E	*quantitative physical property transferred to objects to perform heating or work or*
mass	m	*measure of the resistance of a physical body and its susceptibility to gravitational attraction*
speed of light	c	*speed at which all massless particles and associated fields travel in a vacuum*

Data Source

https://www.wikidata.org/wiki/Q35875

WIKIMEDIA
Community User Group
<math>



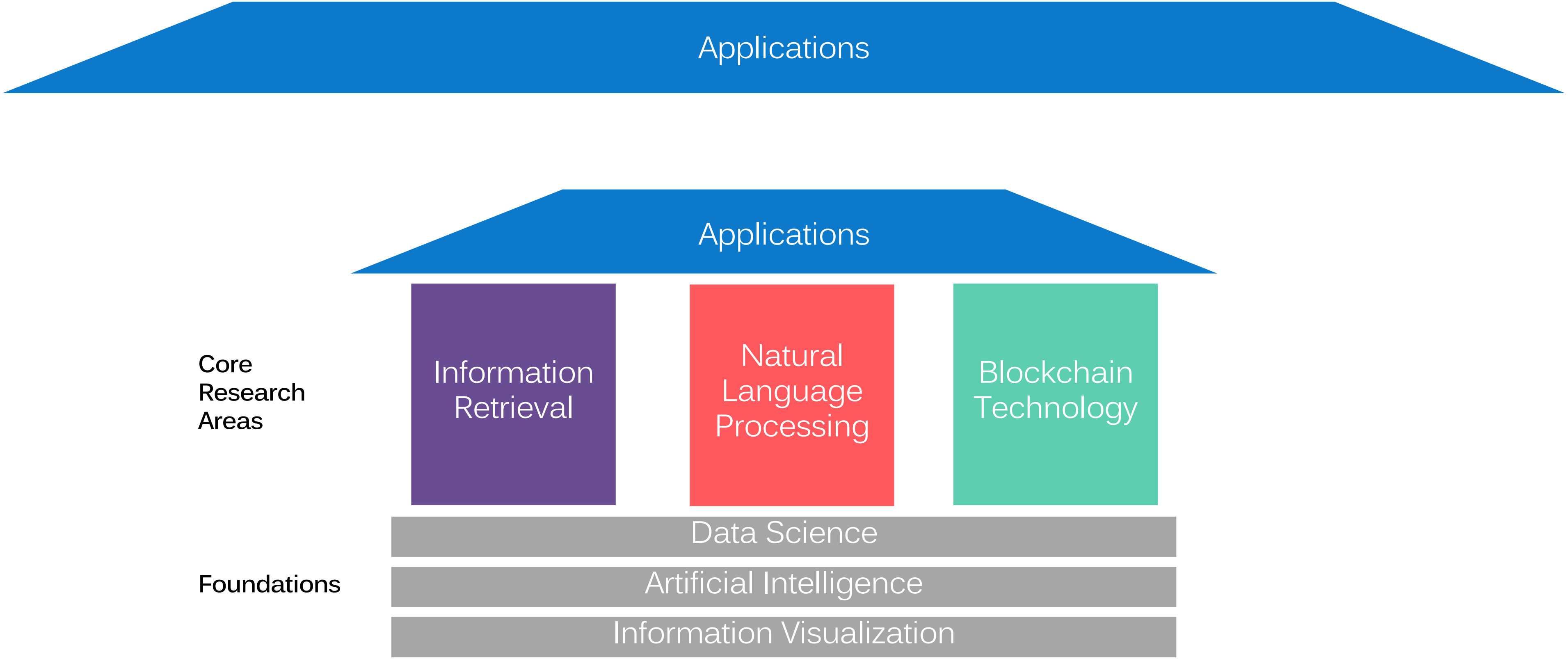
Mass–energy equivalence

From Wikipedia, the free encyclopedia

"E=MC2" and "E=mc2" redirect here. For other uses, see E=MC2 (disambiguation).

In physics, **mass–energy equivalence** is the principle that anything having mass has an equivalent amount of energy and vice versa, with these fundamental quantities directly relating to one another by Albert Einstein's famous formula:[1]

$E = mc^2$



Applications

Applications

Core Research Areas

Information Retrieval

Natural Language Processing

Blockchain Technology

Foundations

Data Science

Artificial Intelligence

Information Visualization

Researcher and Student exchange

- Academic exchanges – students
    - UCSD students mandatory have to work on a project for their data science master - SUB and University of Goettingen have many projects
    - Uni Goettingen students are encouraged to spend a semester abroad and work on projects – Extrensiv motivtation for excellent students.

- Further staff exchanges
    - Walk in each others shoes, looking over the shoulder in understanding daily work
    - Networking

Funding Programms for Exchange

There are several scholarships by the DAAD for:

- Undergraduates: LINK
- Graduates, PhDs, Postdocs from the US
  - up to 6 months: LINK
  - up to 12 months: LINK
- For jointly supervised PhD candidates: LINK
- For academics & scientists (up to 3 months): LINK

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Lessons learned- Next steps

UCSD library and SUB Göttingen have benefitted from learning from each other through staff visits.

Additionally UCSD and University of Göttingen will cooperate in data science research and teaching, this time fueled by researchers and student exchanges.

We aim at having the first exchanges in 2024-2025

Thank you

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www.gipplab.org

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