Max Planck Institute
for Innovation and Competition

PATENTSEMTECH
2024

Automated Patent Landscaping

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SIGIR PatSemTech Workshop - July 18, 2024 - Washington D.C.

Patent Landscaping

Patent Landscaping is a **valuable instrument for many stakeholders**:

- Patent Examiners
- Company Decision-Makers
- Researchers
- Policymakers
- …

They use this method to …

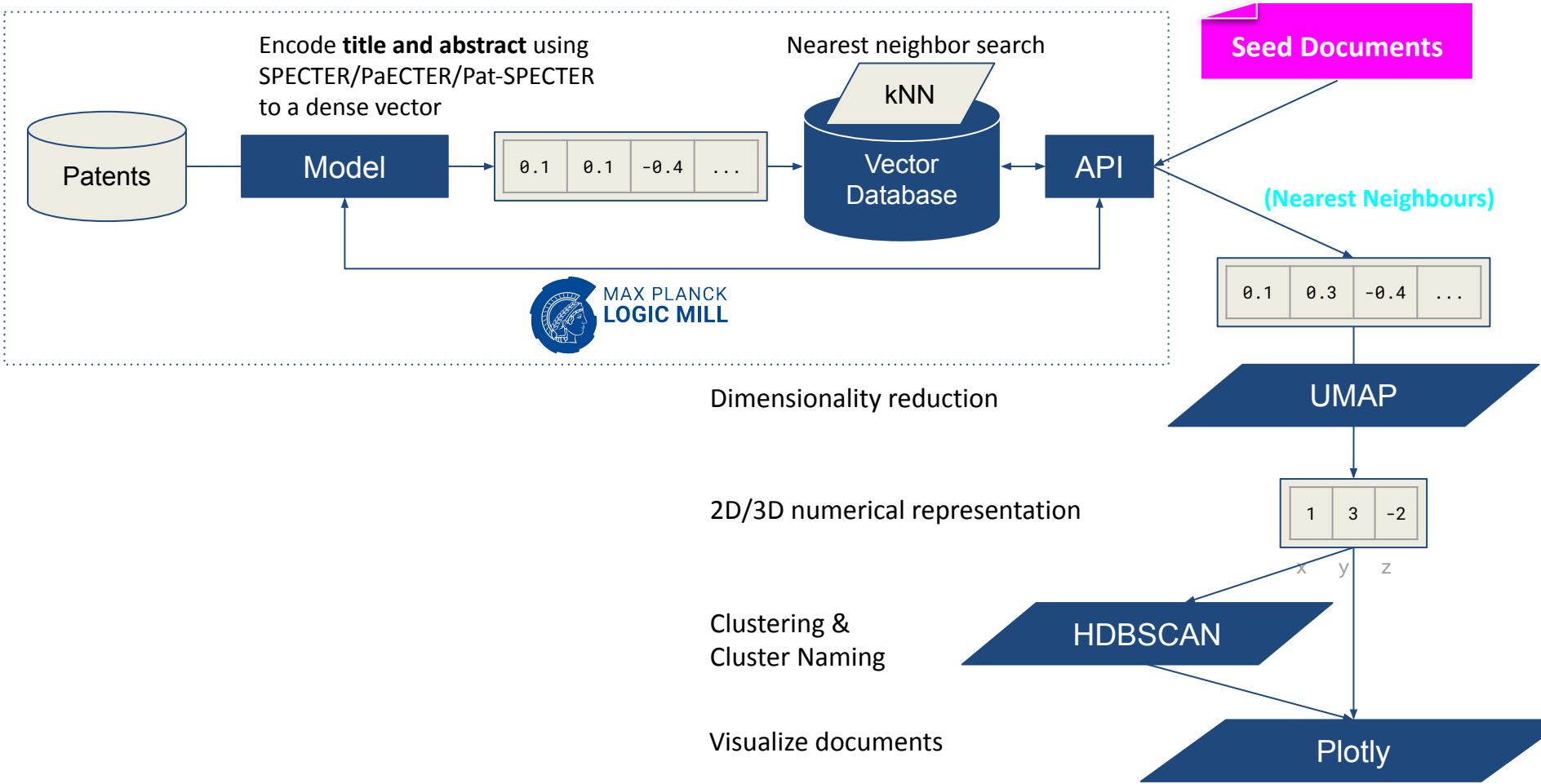
- Analyze the state-of-the-art
- Compare organizations' patenting activities
- Assess entire industries
- Identify gaps in internal / external R&D activities
- …

Motivation - Automatic Patent Portfolio Analysis

- Traditional patent portfolio analysis:
  - is a very **complex process** → requires **assessment by experts**
  - is done **manually** → **time-consuming** endeavor

- Current automated approaches are often limited to:
  - Comparing metadata (CPC, Citations, …)
  - Comparing extracted keywords
  - Word Embeddings Abood et al. (2018), Skripnikova et al. (2021)
  - Patents only

- Still difficult to evaluate, compare, and **explore the results**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SPECTER/PaECTER/Pat-SPECTER
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Seed Documents
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kNN
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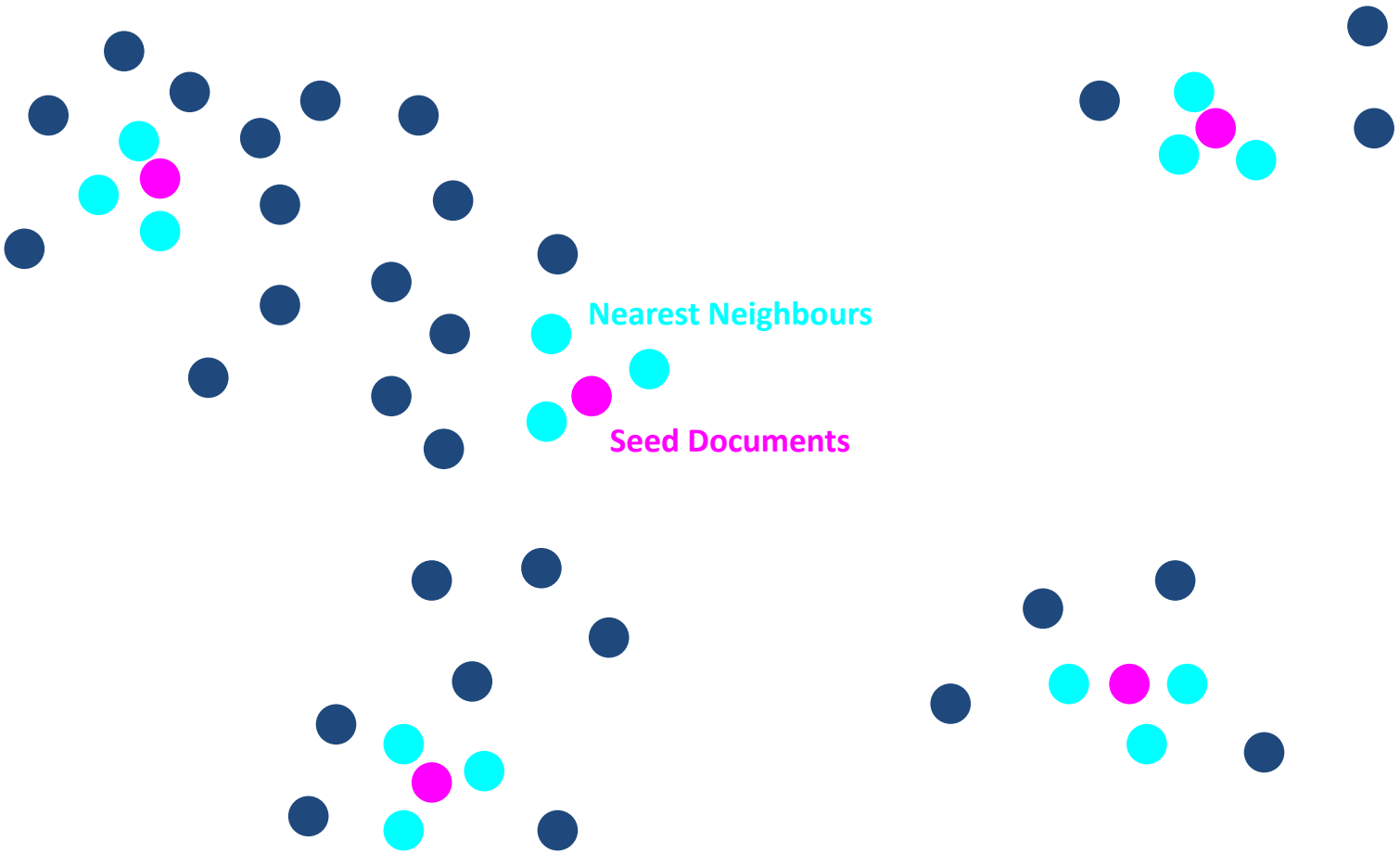

Nearest Neighbours
Seed Documents

mRNA - Use-Case

Objective:

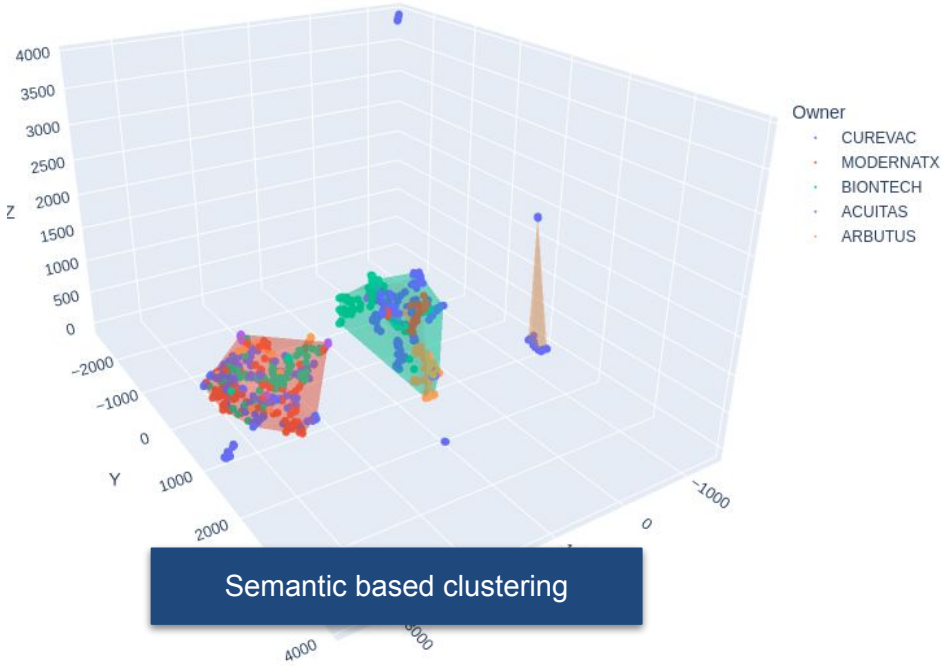
- Generate a portfolio analysis of mRNA organizations
- Generate an mRNA patent landscape

Initial-Data:

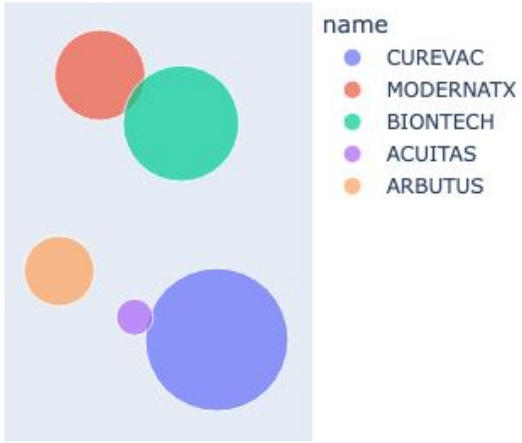
- Patent documents of **BioNTech, CureVac, Moderna, Acuitas** and **Arbutus**

mRNA - Use-Case

mRNA - Use-Case

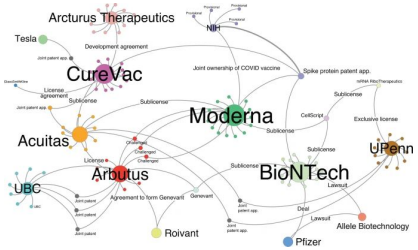


Semantic based clustering



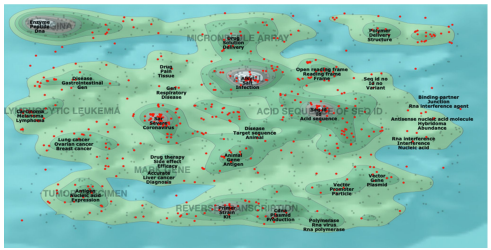
Aggregation overlap

mRNA - Comparison



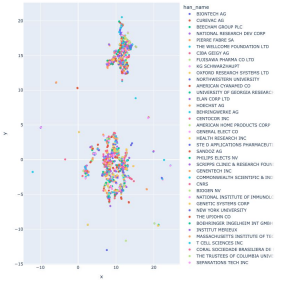
A network analysis of COVID-19 mRNA vaccine patents - 2021

Mario Gaviria & Burcu Kilic



The global mRNA vaccine patent landscape - 2022

Mengyao Li, Jianxiong Ren, Xingyong Si, Zhaocai Sun, Pingping Wang, Xiaoming Zhang, Kunmeng Liu & Benzheng Wei



Comparison:

- Substantial overlap of the identified organizations

Shortcoming:

- Some organizations could not be identified (could be because the focus was only on EPO)

Quantum - Use-Case

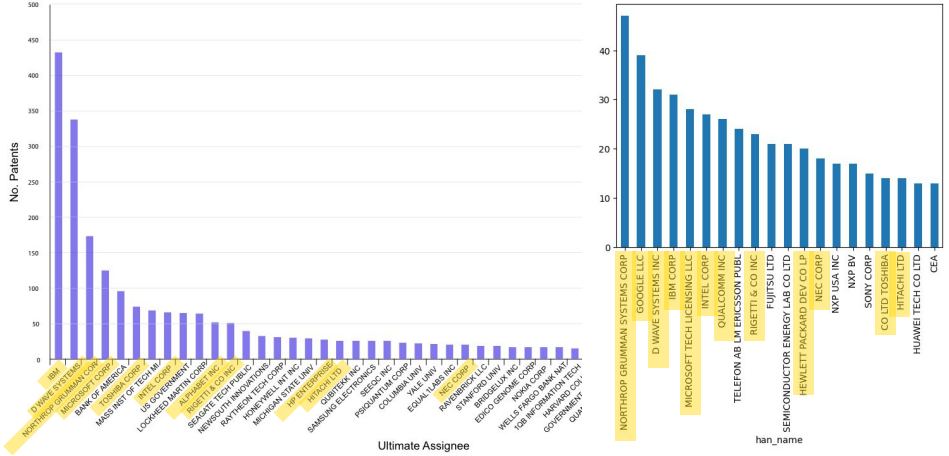
Objective:

- Identify competitors of a quantum computing company

Initial-Data:

- Patent documents of **Rigetti**

Quantum - Use-Case



Mapping the Patent Landscape of Quantum Technologies: Patenting Trends, Innovation and Policy Implications - 2022

Mateo Aboy, Timo Minssen & Mauritz Kop

Overlap:

- Substantial overlap of the identified organizations

Shortcoming:

- Some organizations could not be identified
  (could be because the focus was only on EPO)

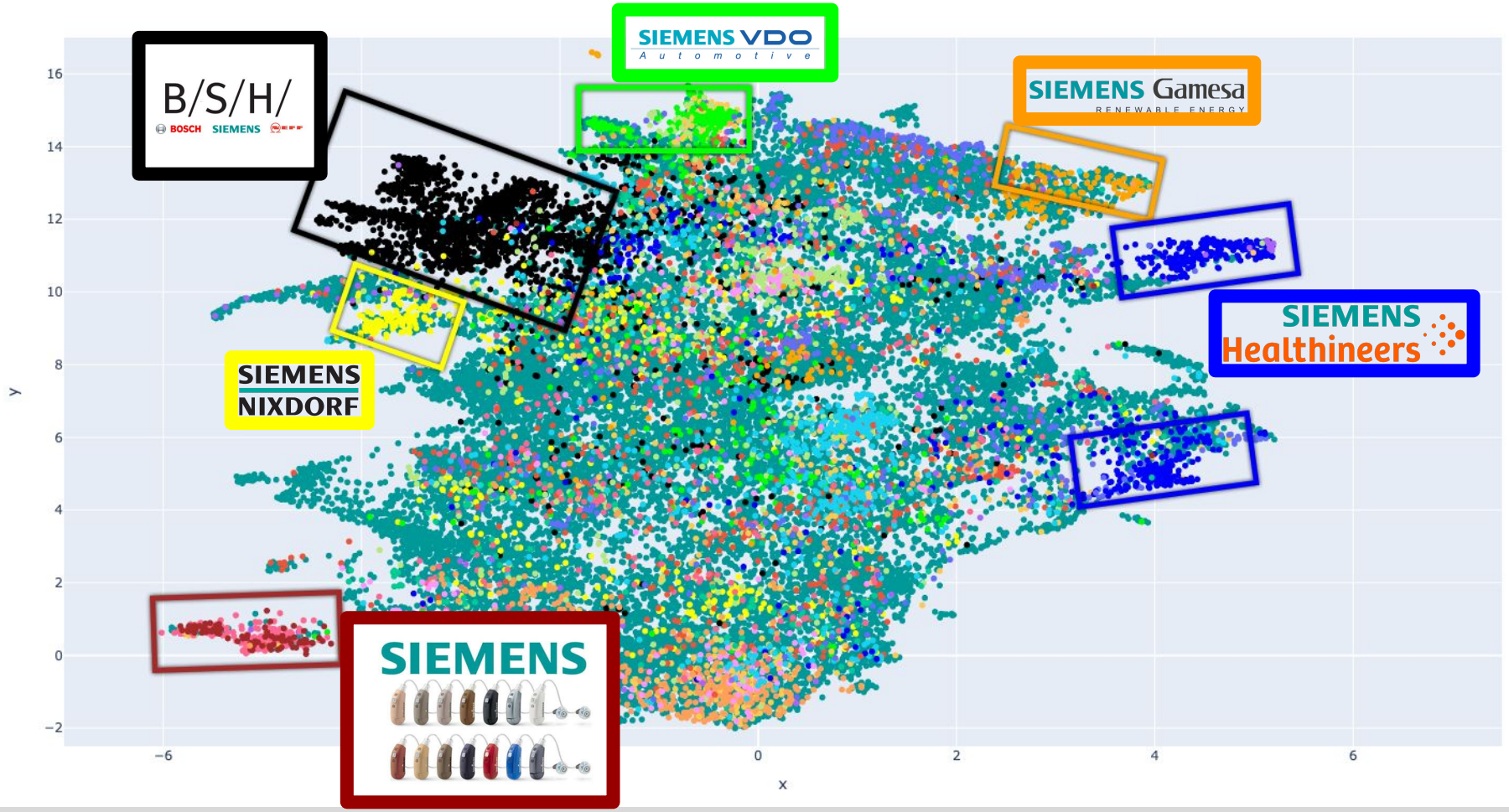
Big Corp (Siemens) - Use-Case

Objective:

- Identify business units / subsidiaries of a large corporation company

Initial-Data:

- Patent documents where the name of the owner contains SIEMENS


B/S/H/
BOSCH SIEMENS NEFF
SIEMENS VDO
Automotive
SIEMENS Gamesa
RENEWABLE ENERGY
SIEMENS
Healthineers
SIEMENS
NIXDORF
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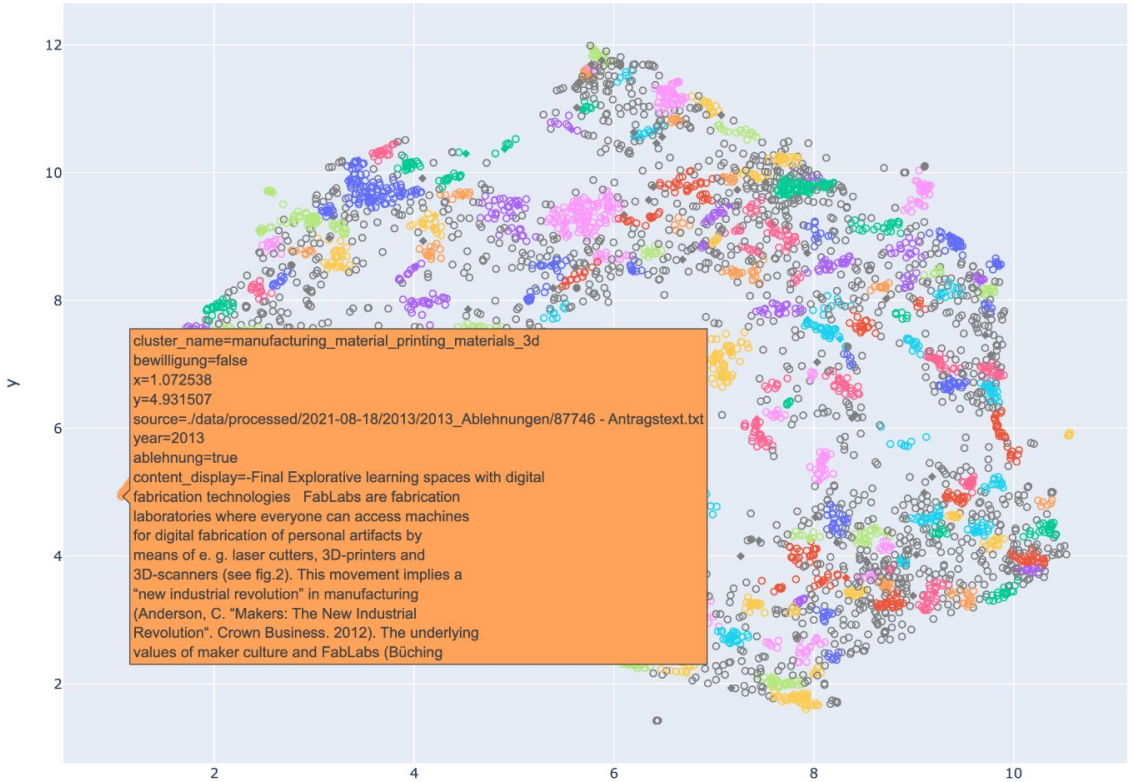
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fabrication technologies FabLabs are fabrication
laboratories where everyone can access machines
for digital fabrication of personal artifacts by
means of e. g. laser cutters, 3D-printers and
3D-scanners (see fig.2). This movement implies a
"new industrial revolution" in manufacturing
(Anderson, C. "Makers: The New Industrial
Revolution". Crown Business. 2012). The underlying
values of maker culture and FabLabs (Büching


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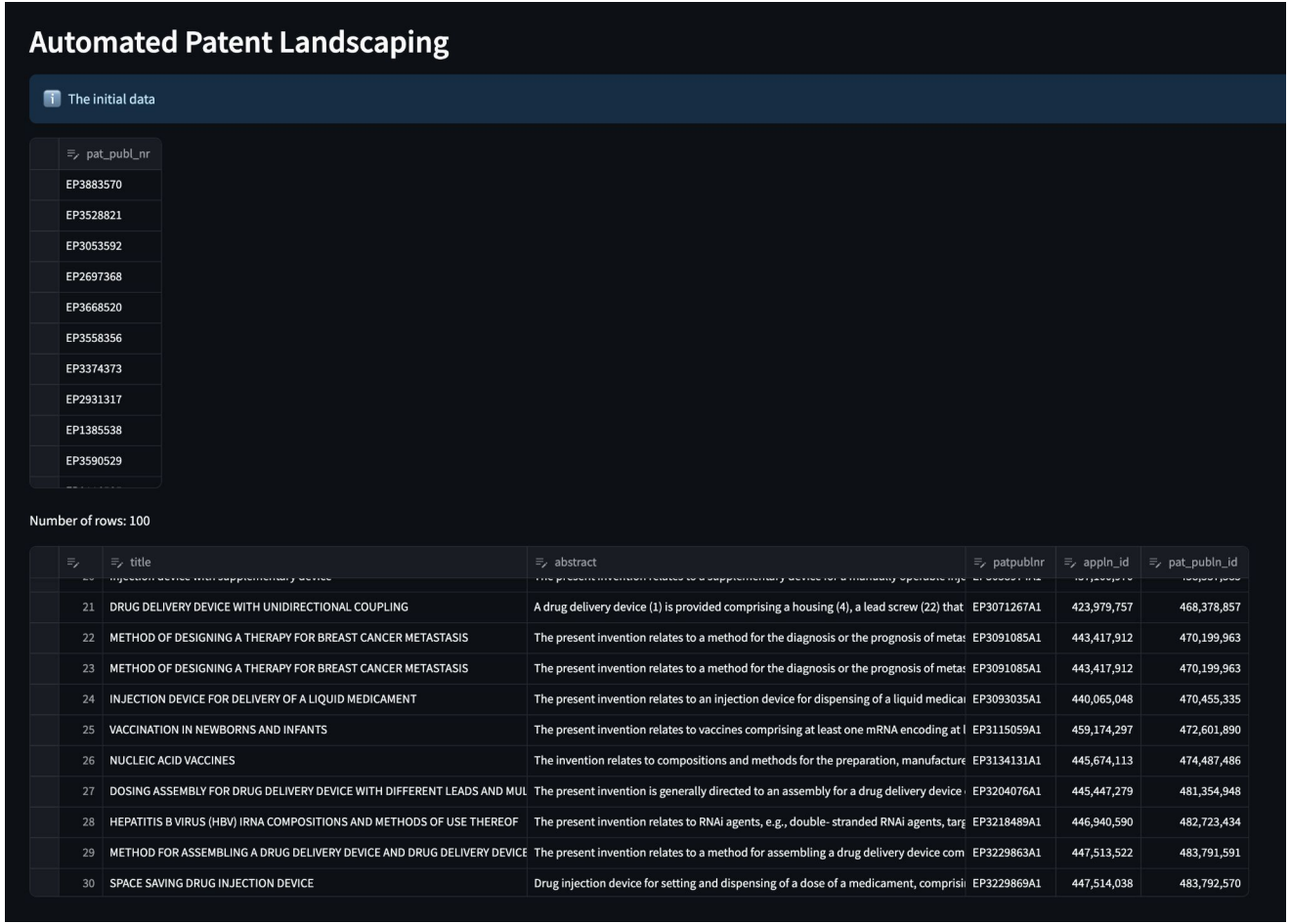
Demo


Automated Patent Landscaping
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EP3528821
EP3053592
EP2697368
EP3668520
EP3558356
EP3374373
EP2931317
EP1385538
EP3590529
Number of rows: 100
title
abstract
patpublnr
appln_id
pat_publn_id
21 DRUG DELIVERY DEVICE WITH UNIDIRECTIONAL COUPLING A drug delivery device (1) is provided comprising a housing (4), a lead screw (22) that EP3071267A1 423,979,757 468,378,857
22 METHOD OF DESIGNING A THERAPY FOR BREAST CANCER METASTASIS The present invention relates to a method for the diagnosis or the prognosis of metas EP3091085A1 443,417,912 470,199,963
23 METHOD OF DESIGNING A THERAPY FOR BREAST CANCER METASTASIS The present invention relates to a method for the diagnosis or the prognosis of metas EP3091085A1 443,417,912 470,199,963
24 INJECTION DEVICE FOR DELIVERY OF A LIQUID MEDICAMENT The present invention relates to an injection device for dispensing of a liquid medica EP3093035A1 440,065,048 470,455,335
25 VACCINATION IN NEWBORNS AND INFANTS The present invention relates to vaccines comprising at least one mRNA encoding at l EP3115059A1 459,174,297 472,601,890
26 NUCLEIC ACID VACCINES The invention relates to compositions and methods for the preparation, manufacture EP3134131A1 445,674,113 474,487,486
27 DOSING ASSEMBLY FOR DRUG DELIVERY DEVICE WITH DIFFERENT LEADS AND MUL The present invention is generally directed to an assembly for a drug delivery device EP3204076A1 445,447,279 481,354,948
28 HEPATITIS B VIRUS (HBV) IRNA COMPOSITIONS AND METHODS OF USE THEREOF The present invention relates to RNAi agents, e.g., double- stranded RNAi agents, targ EP3218489A1 446,940,590 482,723,434
29 METHOD FOR ASSEMBLING A DRUG DELIVERY DEVICE AND DRUG DELIVERY DEVICE The present invention relates to a method for assembling a drug delivery device com EP3229863A1 447,513,522 483,791,591
30 SPACE SAVING DRUG INJECTION DEVICE Drug injection device for setting and dispensing of a dose of a medicament, comprisi EP3229869A1 447,514,038 483,792,570

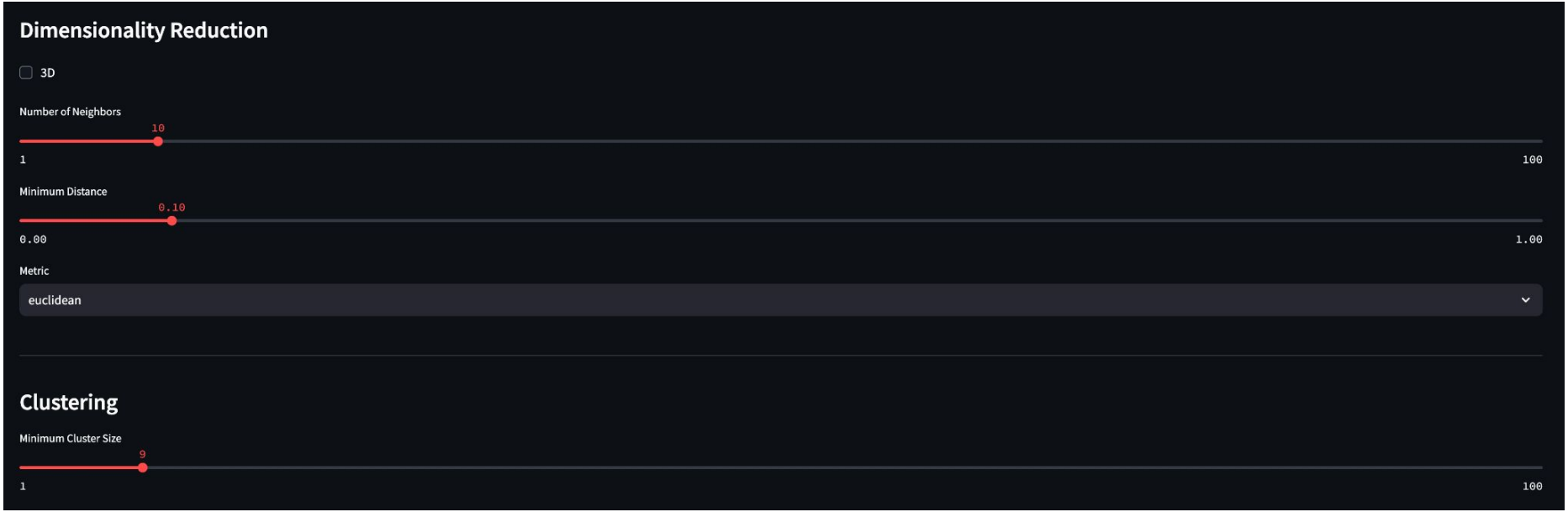
Expanding

Number of Nearest Neighbors

5

0 100

	title	abstract	patpublnr	appln_id	pat_publn_id	embedding
0	REPLICATION-DEFICIENT RNA VIRUSES AS VACCINES	The invention relates to a genome replication-deficient and transcription-competent	EP1851239A1	16,326,773	280,821,016	0.27944323 0.015171835 -0.0942924 -0.1233087 0.023071935 0.466
1	RNA Vaccines	The present invention relates to an RNA vaccine comprising an RNA molecule encodi	EP2042193A1	16,414,948	56,813,598	-0.0052395994 0.15540482 0.11364456 0.06387318 -0.44158688 0.1
2	Replication deficient RNA viruses as vaccines	Recombinant negative-strand RNA virus (I) comprises a viral genome with a mutation	EP2045260A1	56,550,722	56,868,117	0.2782432 -0.25261006 0.018860385 0.084892295 -0.06234601 0.16
3	RNA VACCINES	The present invention relates to an RNA vaccine comprising an RNA molecule encodi	EP2200646A1	56,880,784	323,151,949	-0.0052395994 0.15540482 0.11364456 0.06387318 -0.44158688 0.1
4	Medicament delivery device and actuation mechanism for a drug delivery device	Described is an actuation mechanism for a medicament delivery device (1) having a r	EP2572741A1	337,169,074	387,885,845	-0.54207766 -0.032860175 0.4037874 -0.28436056 -0.2393204 -0.10
5	PROCESS FOR EXTRACTING MATERIALS FROM BIOLOGICAL MATERIAL	The invention is directed to a process for extracting materials from biological materia	EP2575993A1	335,135,284	405,584,798	0.14556672 -0.06027105 0.5088816 -0.5394046 -0.35877275 0.1461
6	DELIVERY OF RNA TO DIFFERENT CELL TYPES	RNA encoding an immunogen is co-delivered to non-immune cells at the site of deliv	EP2591103A1	336,014,473	406,670,767	0.3776066 0.3541309 0.48900837 0.33111376 -0.56630045 -0.06870
7	DRUG DELIVERY DEVICE AND METHOD FOR A DRUG DELIVERY DEVICE	A drug delivery device (1) is provided comprising a container (4), a first product (13A)	EP2637717A1	339,248,559	409,609,409	-0.14265266 0.44449162 0.756927 -0.67057925 -0.58601433 -0.3564
8	VACCINATION IN NEWBORNS AND INFANTS	The present invention relates to vaccines comprising at least one mRNA encoding at l	EP2680880A1	352,023,027	413,102,011	0.29808828 -0.094516315 0.15551494 0.063691236 -0.15828641 -0.2
9	JOINING TECHNOLOGY OF A DISPENSE INTERFACE	The present invention inter alia relates to an apparatus and a method. The apparatus	EP2701776A1	353,691,697	414,690,475	0.43260387 0.6038225 0.46442145 -0.34673253 -0.29445672 -0.091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Metric
euclidean
Clustering
Minimum Cluster Size
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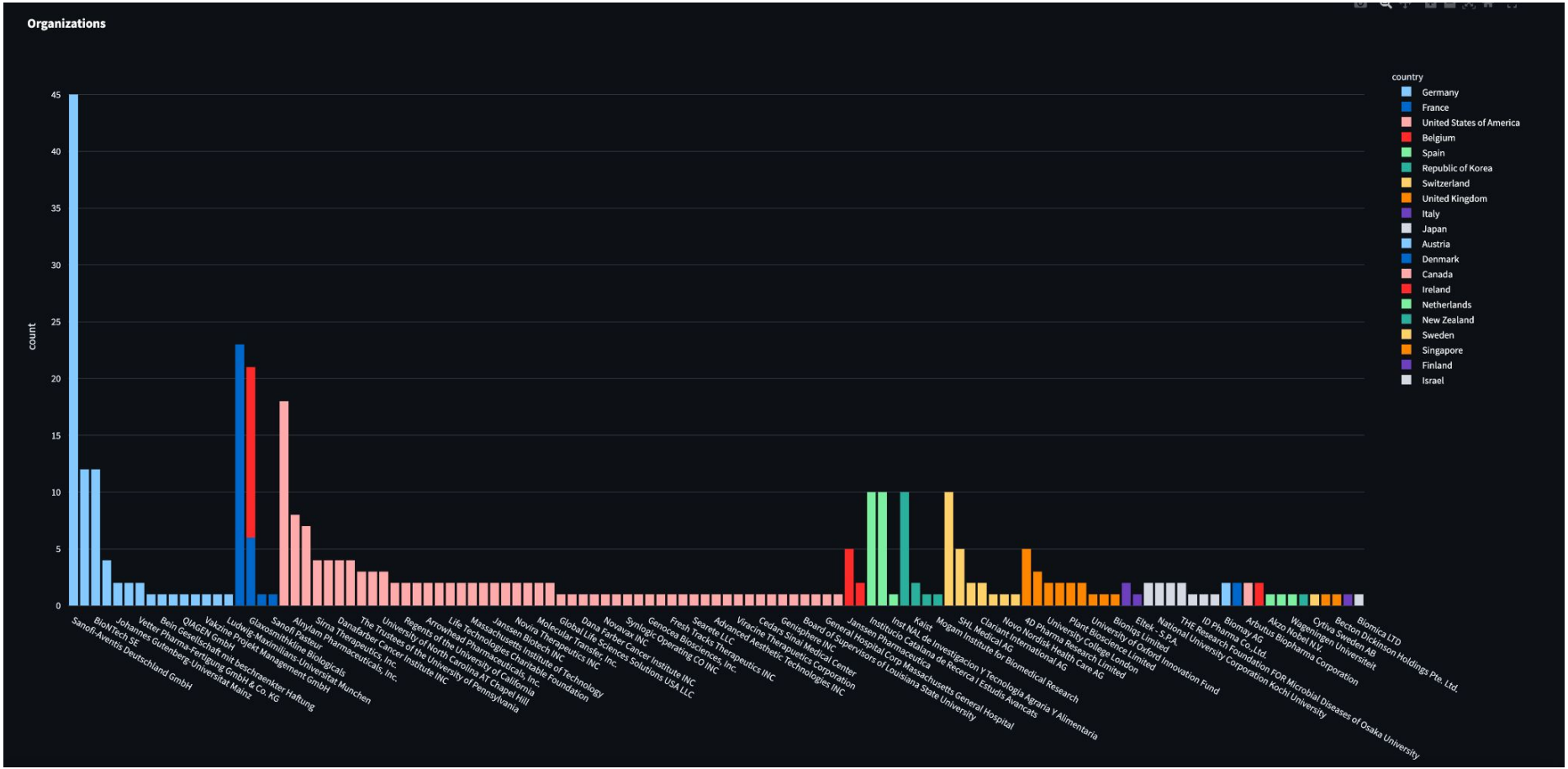
Organizations

name_internat	website_address	country	count
Sanofi-Aventis Deutschland GmbH	https://www.sanofi-aventis.de	Germany	45
Sanofi	https://www.sanofi.com	France	23
Modernatx INC	https://www.modernatx.com	United States of America	18
Glaxosmithkline Biologicals	https://www.gsk.com	Belgium	15
CureVac SE	https://www.curevac.com	Germany	12
BioNTech SE	https://www.biontech.de	Germany	12
Institucio Catalana de Recerca I Estudis Avancats	https://www.icrea.es	Spain	10
Fundacio Institut de Recerca Biomedica IRB Barcelona	https://www.irbbarcelona.org	Spain	10
Gemvax & Kael Co.,Ltd	https://www.gemvax.com	Republic of Korea	10
Novartis AG	https://www.novartis.com	Switzerland	10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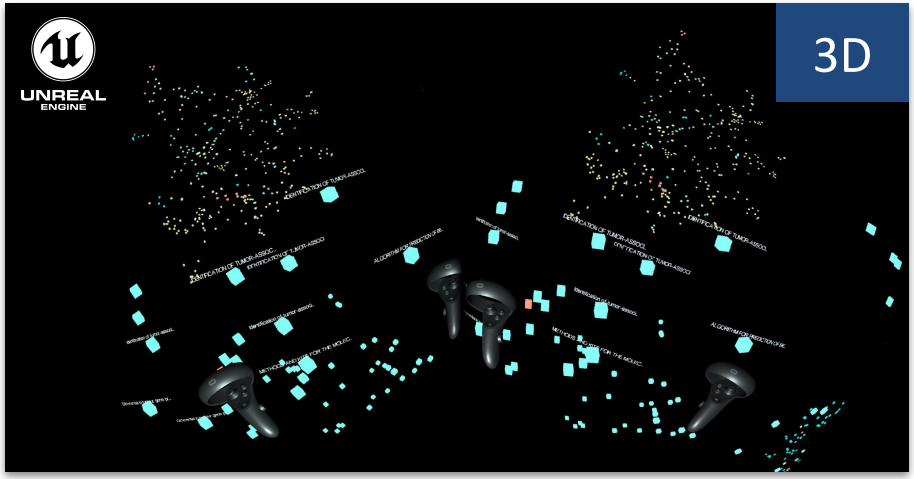
Switzerland
United Kingdom
Italy
Japan
Austria
Denmark
Canada
Ireland
Netherlands
New Zealand
Sweden
Singapore
Finland
Israel
Sanofi-Aventis Deutschland GmbH
BioNTech SE
Johannes Gutenberg-Universitat Mainz
Vetter Pharma-Fertigung GmbH & Co. KG
Bein Gesellschaft mit beschraenkter Haftung
QIAGEN GmbH
Vakzine Projekt Management GmbH
Ludwig-Maximilians-Universitat Munchen
Glaxosmithkline Biologicals
Sanofi Pasteur
Alnylam Pharmaceuticals, Inc.
Sirna Therapeutics, Inc.
Dana-farber Cancer Institute INC
The Trustees of the University of Pennsylvania
Regents of the University of California At Chapel Hill
Arrowhead Pharmaceuticals, Inc.
Life Technologies Corporation
Massachusetts Institute of Technology
Janssen Biotech INC
Novira Therapeutics INC
Molecular Transfer, Inc.
Global Life Sciences Solutions USA LLC
Dana Farber Cancer Institute INC
Novavax INC
Synologic Operating CO INC
Genocea Biosciences, Inc.
Fresh Tracks Therapeutics INC
Seattle LLC
Advanced Aesthetic Technologies INC
Viracine Therapeutics Corporation
Cedars Sinai Medical Center
Genisphere INC
Board of Supervisors of Louisiana State University
General Hospital Corp Massachusetts General Hospital
Janssen Pharmaceutica
Instituto Catalana de Recerca I Estudis Avancats
Inst Nal. de Investigacion Y Tecnologia Agraria Y Alimentaria
Kalst
Mogam Institute for Biomedical Research
SHL Medical AG
Clariant International AG
Novo Nordisk Health Care AG
4D Pharma Research Limited
Plant Bioscience Limited
University College London
Bionlqs Limited
University of Oxford Innovation Fund
Eltek - S.P.A.
National University Corporation Kochi University
THE Research Foundation FOR Microbial Diseases of Osaka University
ID Pharma Co.,Ltd.
Biomay AG
Arbutus BioPharma Corporation
Akzo Nobel N.V.
Wageningen Universiteit
Cytiva Sweden AB
Becton Dickinson Holdings Pte. Ltd.
Biomica LTD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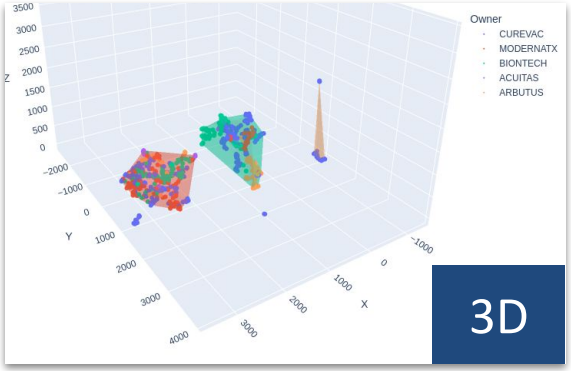
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CUREVAC
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ACUITAS
ARBUTUS
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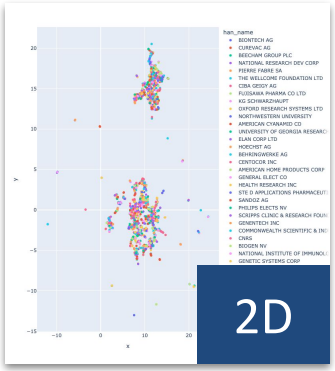
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