



R42 Institute Fellowship

No Code AI Application for Life Science - Patent Search

+

R42 Fellows on Superbio

2

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Engineering



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Undergrad at UW-Madison



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Superbio



- A platform for biomedical AI, easy to access and use
- Provides multiple AI-powered tools to:
 - Review biomedical literature
 - Formulate genomics scripts
 - Accurately design proteins
 - And more

+ Patenting is very hard

- Multiple time consuming steps
 - Searching for related patents/applications
 - Drafting a patent
 - Waiting for feedback from US Patent and Trademark Office (USPTO)
- Artificial difficulties
 - Patent attorneys invent words to confound



Hard for USPTO Attorneys too

From the Patent Attorney's side:

- 35 USC
 - Can it be patented?
 - Is it similar to prior art?
 - Is it obvious?
- ANY ONE OF THE ABOVE CAUSES REJECTION



Searches are used everywhere



- USPTO patent attorneys must search
 - For relevant keywords
 - Across multiple documents
 - To identify meaning and metadata
 - For similar semantic meanings
- Intellectual Property (IP) lawyers need to search
- Bio / life science researchers need to search



Current search tools are flawed

The screenshot displays the Patent Public Search (PPUBS) interface. On the left, the 'Patent Public Search Basic (PPUBS Basic)' section includes a 'Quick lookup' field and a 'Basic search' section with search criteria and operators. The main area shows 'Search Results' for the query 'can application patent applications give patents gives overview of you', displaying 19856645 results. The first result is highlighted: US 12056675 B1, dated 2024-08-06. On the right, the 'Document Viewer' shows the document title 'Browser Plug-in Enabling Use Of EMV Card Information' and its details, including inventor and assignee information.

| DOCUMENT ID | DATE PUBLISHED |
|----------------|----------------|
| US 12056675 B1 | 2024-08-06 |

| INVENTOR INFORMATION | CITY | STATE | ZIP CODE | COUNTRY |
|----------------------|------------|-------|----------|---------|
| NAME | Alpharetta | GA | N/A | US |
| Ulrich; Chance | | | | |

| ASSIGNEE INFORMATION | CITY | STATE | ZIP CODE | COUNTRY |
|----------------------|-----------------|-------|----------|---------|
| NAME | Symmes Township | OH | N/A | US |
| Worldpay, LLC | | | | |

| APPLICATION NO | DATE FILED |
|----------------|------------|
| 15/333931 | 2016-10-25 |

US CLASS CURRENT: 1/1



Superbio's solution: a search tool



- Patent search tool to speed up
 - Identification of prior art
 - Identification of similar patents/applications
 - Summarization of patents



Patbio: Search quickly and easily



- Features
 - Summarize multiple relevant documents at once
 - Combined Semantic + Keyword Search
 - More intuitive
 - No code needed!

+ Keyword + Semantic search is powerful

- Allows tackling of “invented” words/terms with keyword search
- But still matches similar concepts (e.g. “running” is semantically similar to “jogging”)
- Best of both worlds

+ Uniquely easy and effective

- What makes it different
 - Simplifies process down to a single search
 - Allows natural language queries
 - Quickly provides examples of existing patents
 - Summarizes patents in the search
 - Integration with teams for better collaborative work



Demo



USPTO vs PatBIO Comparison



[Provide Feedback](#)

Project:

Team:

Saved Patents:

Novartis - Kymriah

Search History:

Patented Drugs Targeting CD30

Tips:

You can save relevant patents which will show up in the saved patents list!

You 8:30:49 PM

Can you give an overview of patent applications for CD19-targeting CAR-T therapies?

Patbio.ai 8:30:51 PM

Here are some patents found based on your query

Title :TREATMENT OF CANCER USING ANTI-CD19 CHIMERIC ANTIGEN RECEPTOR

Publication Date :2019-12-26

Patent Number :US20190388471A1

[VIEW PATENT DETAILS](#)

[SEE PATENT](#)

Title :PD-1 CAR-T CELL, PREPARATION METHOD THEREFOR, AND APPLICATION THEREOF

Publication Date :2019-04-25

Patent Number :US20190117691A1

[VIEW PATENT DETAILS](#)

[SEE PATENT](#)

Title :CHIMERIC ANTIGEN RECEPTORS TARGETING CD79B AND CD19

Publication Date :2022-02-17

Patent Number :US20220047636A1

[VIEW PATENT DETAILS](#)

[SEE PATENT](#)

+ USPTO vs PatBIO Comparison

Patent Public Search 3.0.11

Search: **CarT-9 Therapy**

Default Operator: OR | Highlights: Single Color

Show Errors Plurals British Equivalents

Options: Clear PN Search

Search Results x | Search History x

Highlight: **therapy therapies therapies cart.9 cart-9s**

L1: 966310 results found. Currently displaying results 1 - 500. Filtered by Family ID (451106 families)

| Select | Res... | X | 1 | 2 | 3 | 4 | 5 | Document ID | Date Publish... | Family ID | Pages | Title |
|-------------------------------------|--------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------|-----------------|-------------|-------|---|
| <input checked="" type="checkbox"/> | 1 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | US 12057228 B1 | 2024-08-06 | 10000024... | 28 | Predicting newly incident chronic kidney disease |
| <input type="checkbox"/> | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | US 12057229 B1 | 2024-08-06 | 10000046... | 20 | System and method for analyzing cytological tissue |
| <input type="checkbox"/> | 3 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | US 12053420 B1 | 2024-08-06 | 10000052... | 34 | Smart-assistive mobility apparatus and associated |
| <input type="checkbox"/> | 4 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | US 12053247 B1 | 2024-08-06 | 10000061... | 97 | System for multi-directional tracking of head mount |
| <input type="checkbox"/> | 5 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | US 12053584 B1 | 2024-08-06 | 10000069... | 9 | Coupler |
| <input type="checkbox"/> | 6 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | US 12053446 B1 | 2024-08-06 | 10000070... | 20 | Methods for the prevention and treatment of hearin |
| <input type="checkbox"/> | 7 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | US 12053608 B1 | 2024-08-06 | 10000071... | 25 | Micro-needling array treatment assembly |
| <input type="checkbox"/> | 8 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | US 12056741 B1 | 2024-08-06 | 10000071... | 26 | Digital content matching system |

Document Viewer x

Highlight: **therapies therapy**

Predicting Newly Incident Chronic Kidney Disease

DOCUMENT ID
US 12057228 B1

DATE PUBLISHED
2024-08-06

INVENTOR INFORMATION

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|--------------------|---------|-------|----------|---------|
| McNair, Douglas S. | Leawood | KS | N/A | US |

ASSIGNEE INFORMATION

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|-------------------------|-------------|-------|----------|---------|
| Cerner Innovation, Inc. | Kansas City | MO | N/A | US |

APPLICATION NO
15/392040

DATE FILED
2016-12-28

DOMESTIC PRIORITY (CONTINUITY DATA)
us-provisional-application US 62272677 20151230

US CLASS CURRENT:
1/1

CPC CURRENT

| TYPE | CPC | DATE |
|------|----------------|------------|
| CPCI | G 06 Q 10/1095 | 2013-01-01 |
| CPCI | G 16 H 20/30 | 2018-01-01 |
| CPCI | G 16 H 50/50 | 2018-01-01 |
| CPCI | G 16 H 50/30 | 2018-01-01 |
| CPCI | G 16 H 50/20 | 2018-01-01 |
| CPCA | G 16 H 10/60 | 2018-01-01 |

Abstract

Systems, methods and computer-readable media are provided for identifying patients having an elevated near-term risk of chronic kidney disease including predicting an individual's risk of progression to Stage 3 CKD within a future time interval, which may be up to 36 months. Base care providers may be notified so that the risk of CKD progression may be mitigated. In an embodiment, measurements of physiological serial measurements for uric acid levels from a longitudinal time series of serum or plasma samples spanning the previous velocity of the patient is determined and used to generate a multivariable mathematical model for determining a likelihood months.

+ Patent Quality AI (PQAI)

The screenshot shows the PQAI website homepage. At the top left is the 'pqai' logo. To its right are navigation links: 'Vision', 'Get Involved', 'Resources', and 'Blog'. In the top right corner, there is a red button labeled 'Try Patent Searching'. The main content area features a large yellow circle highlighting the text: 'Shaping the future of patent searching through AI'. Below this, a paragraph reads: 'A collaborative, not-for-profit initiative to build an open-source ecosystem of AI components to drive innovation and improve patent quality.' At the bottom center, there is another red button labeled 'Try Patent Search'.

pqai

Vision Get Involved Resources Blog

Try Patent Searching

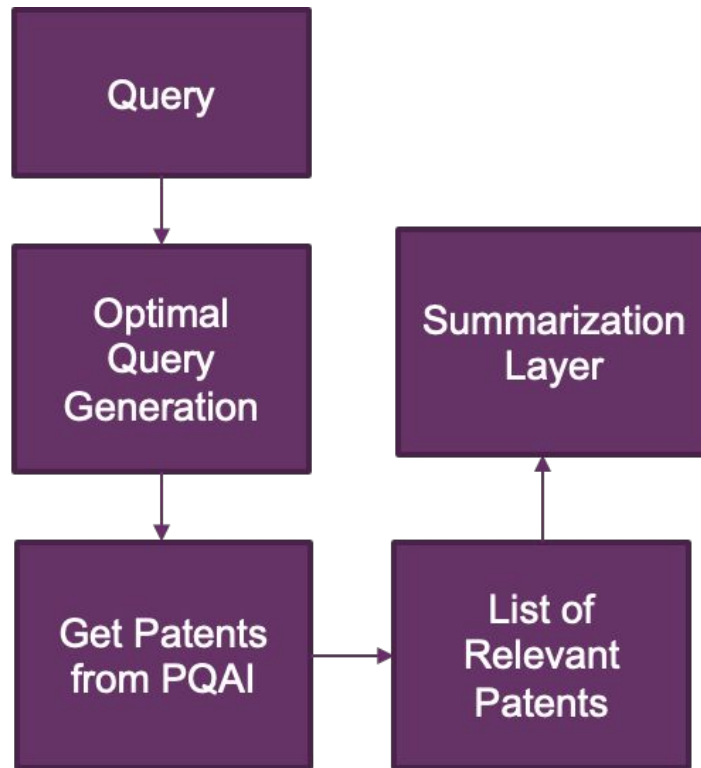
Shaping the future of patent searching through AI

A collaborative, not-for-profit initiative to build an open-source ecosystem of AI components to drive innovation and improve patent quality.

Try Patent Search

+ Technical Specifications

- Front end was coded with React/Node.js
- Backend - Python, Google Cloud, Postgres
- Patent dataset powered by PQAI
- Use OpenAI for response summarization



+ Project challenges

- Identifying scale of the data
- Identifying what parts of the patent are
 - Useful
 - Not exceptionally large
- Figuring out what kind of model/backend to use
- How to improve search results
- Figuring out the needs of the users
- Developing an intuitive frontend

+ Further Refinements

- Improving and beta-testing UX
- Benchmarking against other patent search tools
- Patent Classification search (Search by topic)
- Include WIPO data (World Intellectual Property Organization)
- Integration on the superbio.ai platform

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For the guidance
and support

PQAI

For providing
access to their
search backend

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