

From Idea to Patent: Prior Art Searching with IEEE *Xplore* & *More*

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Agenda

- What is “prior art?”
- Objective of prior art searching
- Prior Art Searching with IEEE Xplore
- Prior Art Searching with InnovationQ Plus
- Other patent resources

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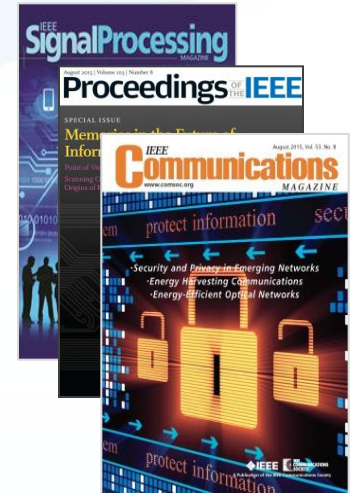
- *IEEE **Communications Standards** Magazine*
- *IEEE Journal of **Electromagnetics, RF and Microwaves in Medicine and Biology***
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More than 60 new journals added in the last ten years

IEEE Quality Makes an Impact

- Top cited publications in the world are from IEEE*
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- IEEE information is cited in patents 3x more than any other publisher (Source – 1790 Analytics)
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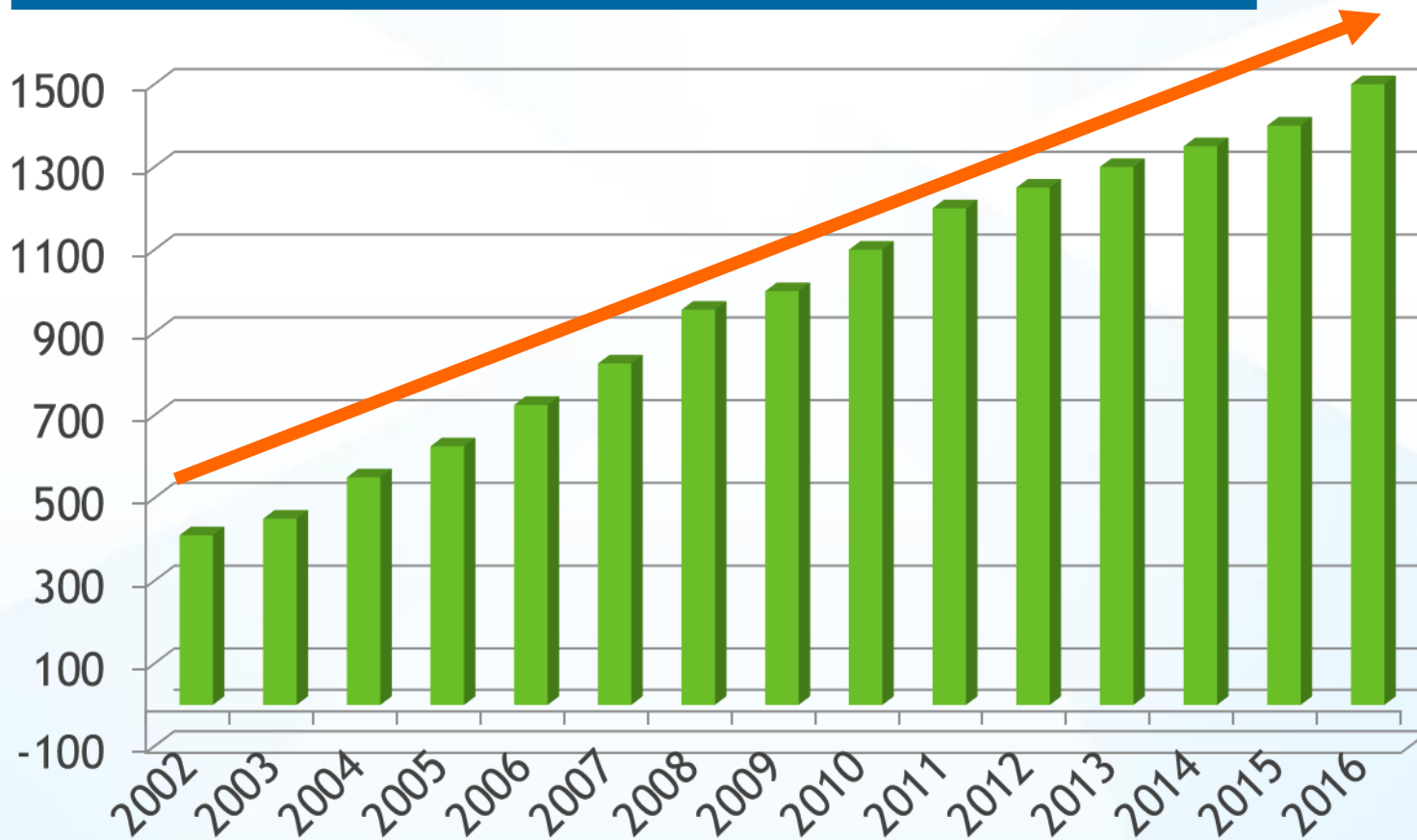
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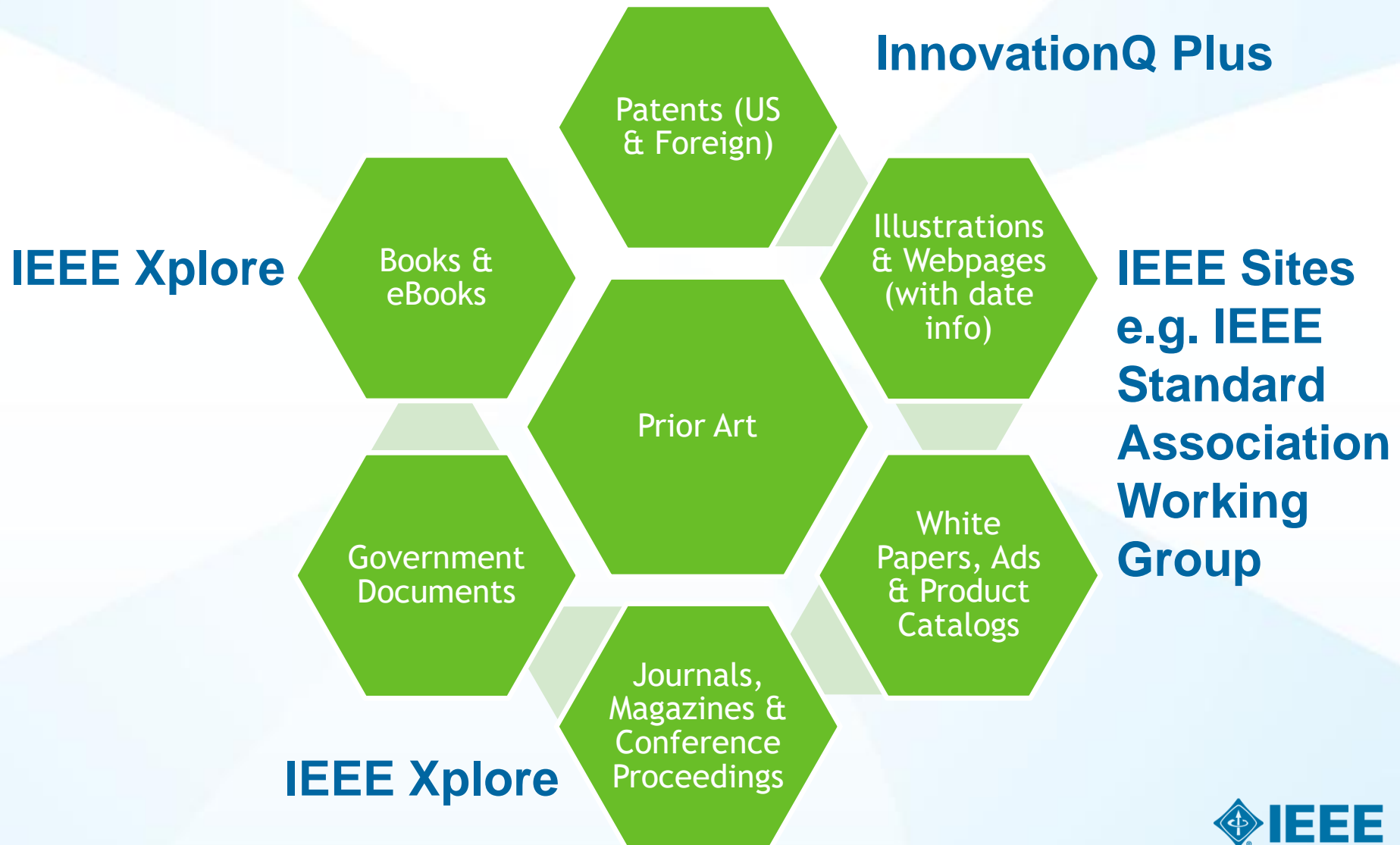
Prior Art

What is “Prior Art?”



- Prior art is **information publicly available** which is **relevant to a patent or patent application’s claim of originality**
- Must be published in print or electronically **before the filing date of the patent application in question**
- Encompasses technology that was known before and relevant to a patent’s claims of originality
- Earlier filed and unpublished patent applications can qualify as prior art

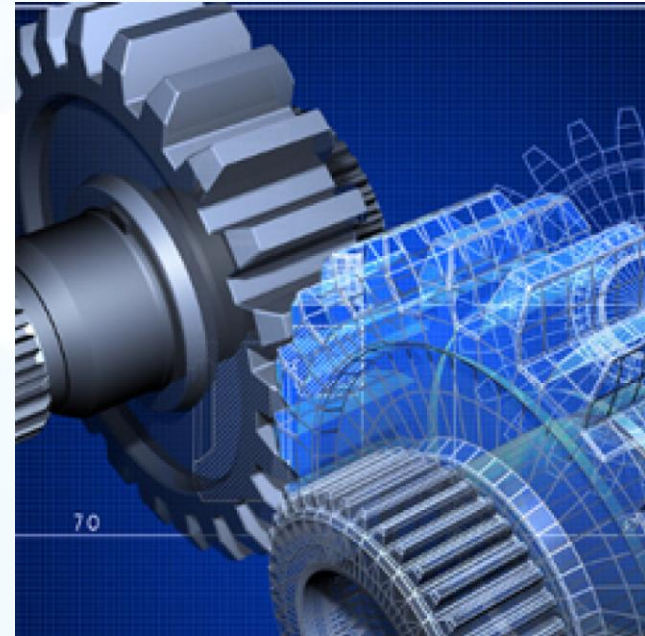
Examples of Prior Art



What is Patentable?

Criteria for an invention to be patentable:

- **Novelty:** invention should be new and not a part of prior art
- **Utility:** capable of use for at least one industrial purpose
- **Non-obvious:** invention should have a technical advance or economic significance



Reasoning For Prior Art Searching

- Ensure the idea is new
- Prepare for the application process
- Increase awareness of the product
- Prepare for legal consultation
- Reduce patent attorney and patent agent fees



Are university researchers at risk for patent infringement?

- “Academic researchers have regularly ignored patents on key technologies as a strategy to maneuver around patent thickets and freedom-to-operate issues, but they may be more at risk than they realize.”
- “An earlier report to the National Academy of Sciences suggests ...regular infringement of patents by university researchers, which is neither a sustainable nor a desirable solution.”

— Amy Yancey & C Neal Stewart Jr. **Are university researchers at risk for patent infringement?** Nature Biotechnology 25, 1225 - 1228 (2007)

Improving Patent Quality: The Challenges Inventors Face

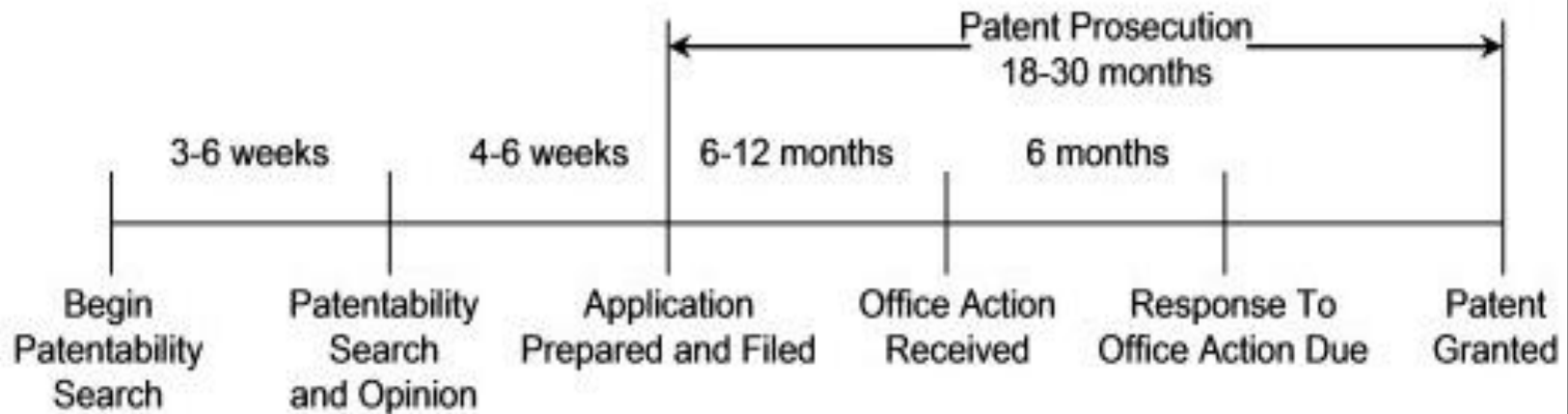
- Current backlog of over 600,000 patent applications at the US Patent and Trademark Office
- Of these applications, over 40% are repeat filings
- After two years of validity reviews, 77% of patents granted are determined invalid



From Idea to US Patent

Model Patent Timeline

Application Preparation & Prosecution Timeline



Prior Art Searching with *IEEE Xplore*

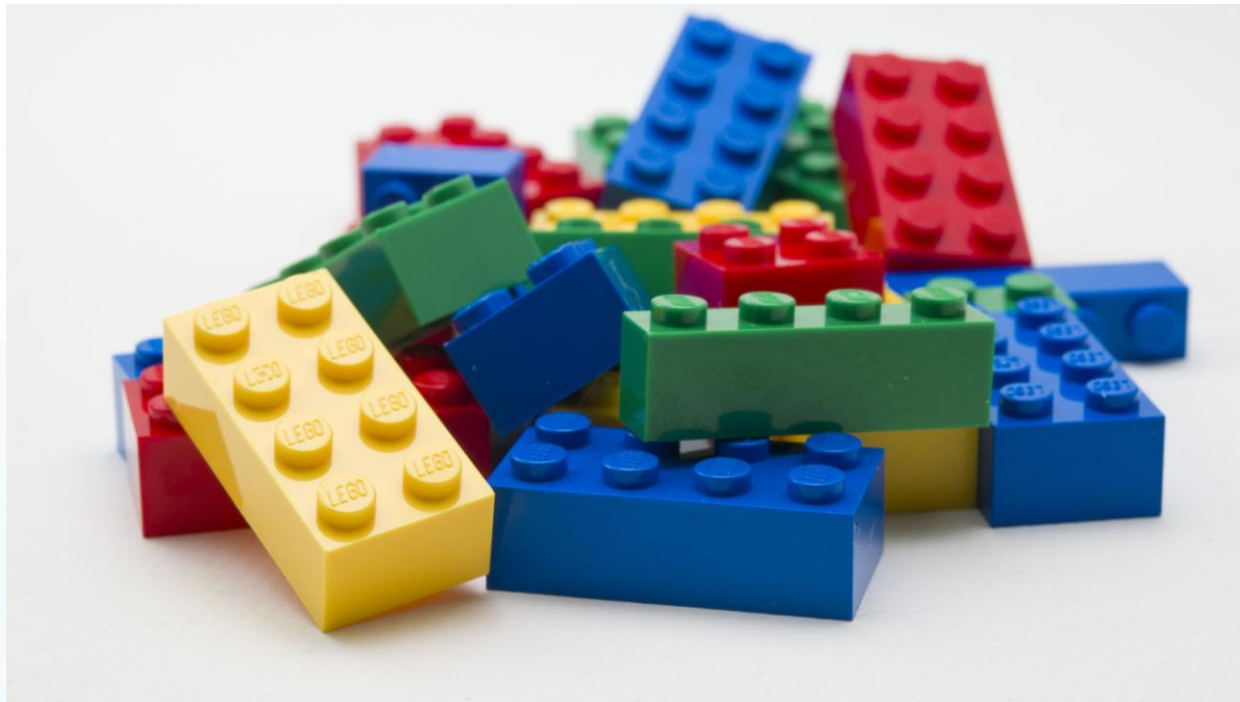
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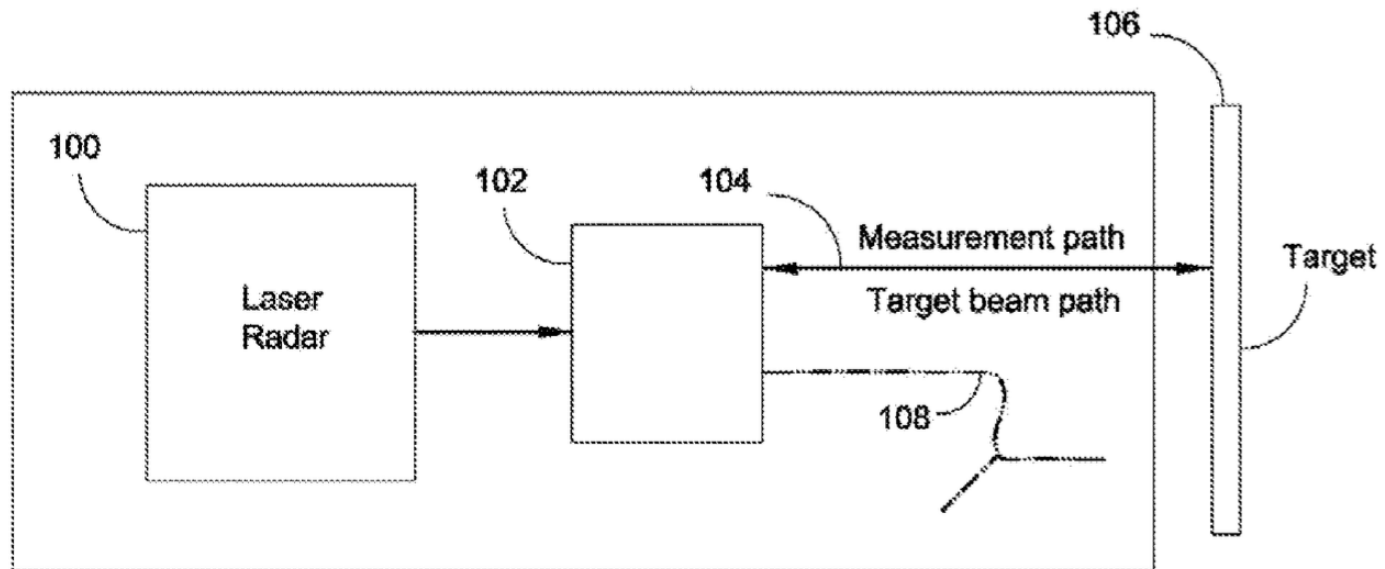
- Start broad, then narrow down with refining terms
- Seek key terms in abstract, claims and specifications
- Gather synonyms for these key terms



Example:

“Optical assembly for laser radar”

(US Application 20130194563)



Where to find key concepts in a patent application

- Abstract
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings
- Detailed description of the invention
- Claims

(57)

ABSTRACT

A compact optical assembly for a **laser radar system** is provided, that is configured to move as a unit with a laser radar system as the laser radar system is pointed at a target and eliminates the need for a large scanning (pointing) mirror that is moveable relative to other parts of the laser radar. The **optical assembly** comprises a light source, a lens, a scanning reflector and a fixed reflector that are oriented relative to each other such that: (i) a beam from the light source is reflected by the **scanning reflector** to the **fixed reflector**; (ii) reflected light from the fixed reflector is reflected again by the scanning reflector and directed along A line of sight through the lens; and (iii) the scanning reflector is moveable relative to the source, the lens and the fixed reflector, to adjust the focus of the beam along the line of sight.

Create a list of synonyms

“Optical assembly for laser radar”

Optical
Optics
Ocular
Lens

Laser
Laser beam
Ray

Scanning
Check
Inspect
Examine
Screen

Reflector
Mirror
Glass

Search strategy

- **EXAMPLE:** Optical assembly for laser radar
- **MAIN CONCEPT:** Radar
- **SECONDARY CONCEPT:** optical assembly, scanner, laser

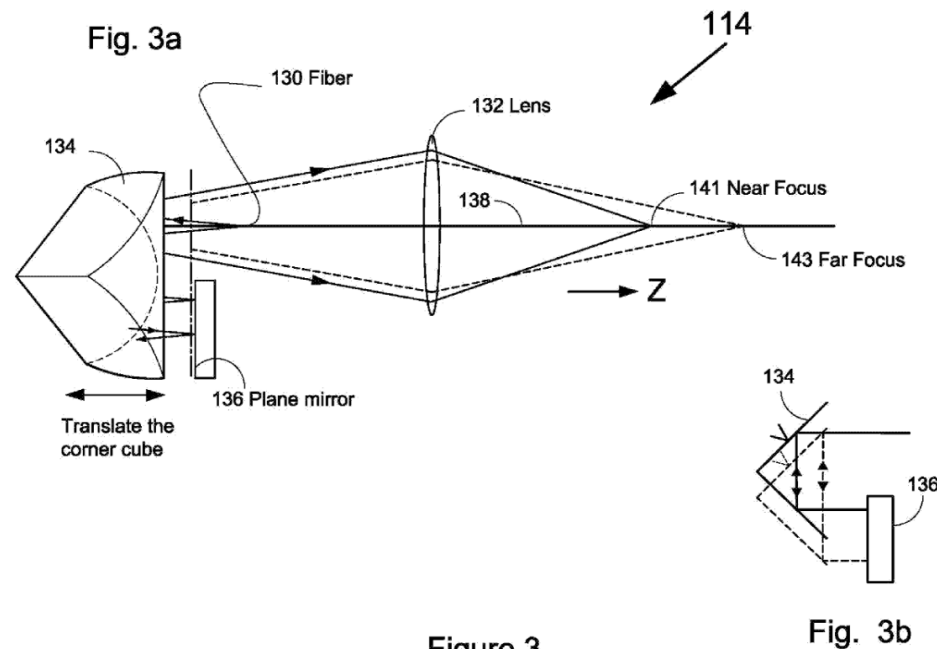


Figure 3

Fig. 3b

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in

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AND ▼

in

Full Text & Metadata ▼

↑

×

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Michael Schluse; Juergen Rossmann
2016 IEEE International Symposium on Systems Engineering (ISSE)
Year: 2016
Pages: 1 - 6, DOI: 10.1109/SysEng.2016.7753162
IEEE Conference Publications
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☐ **Automatic detection of vehicles at road intersections using a compact 3D Velodyne sensor mounted on traffic signals** 🔒
Ahmad K. Aijazi; Paul Checchin; Laurent Malaterre; Laurent Trassoudaine
2016 IEEE Intelligent Vehicles Symposium (IV)
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Pages: 662 - 667, DOI: 10.1109/IVS.2016.7535458
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Abstract:

The construction and operation of two laser-based glasses-free 3D (autostereoscopic) displays that have been carried out within the European Union-funded projects MUTED and HELIUM3D is described in this paper. Both use a multi-user head tracker to direct regions viewer's referred to as exit pupils to viewer's eyes. MUTED employs a direct-view LCD whose backlight comprises novel steering optics and in HELIUM3D image information is supplied by a horizontally-scanned fast light valve whose output is controlled by a spatial light modulator (SLM). The principle of operation, construction and results obtained are described.

Published in: [Journal of Display Technology](#) (Volume: 6, Issue: 10, Oct. 2010)

Page(s): 531 - 543

INSPEC Accession Number: 11523349

Date of Publication: 10 May 2010 

DOI: [10.1109/JDT.2010.2044367](#)

Image searching

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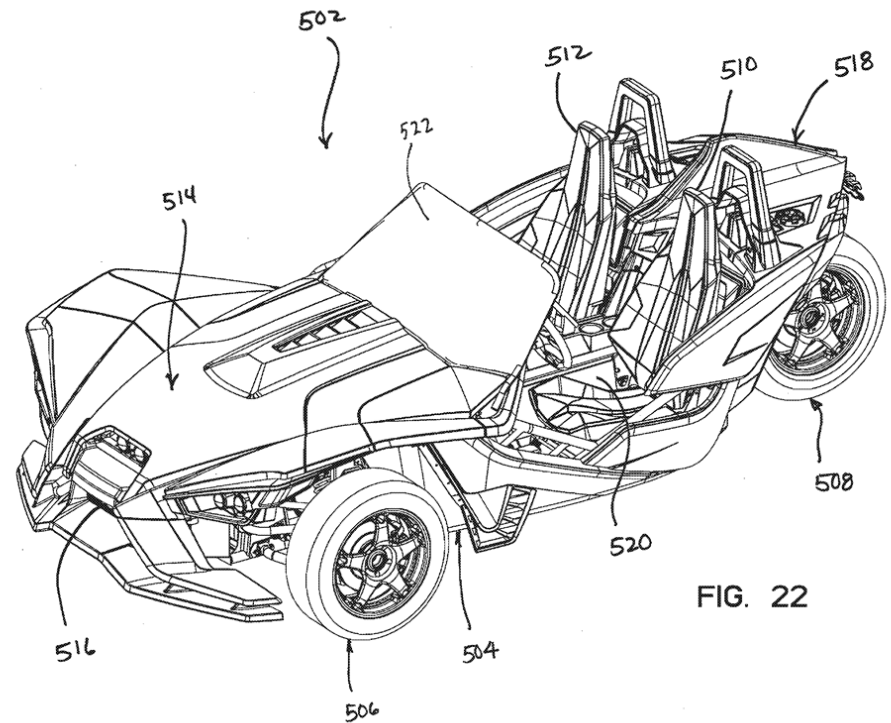


FIG. 22

Images Tab

Quickly determine similarities between prior art and patent application at hand

Abstract



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Fig. 1.



3D display types. This figure shows all generic 3D types that do not require the wearing of special equipment on the

Fig. 2.



Fig. 3.

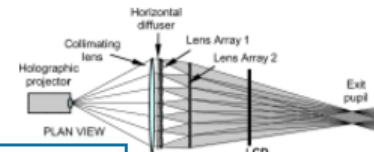
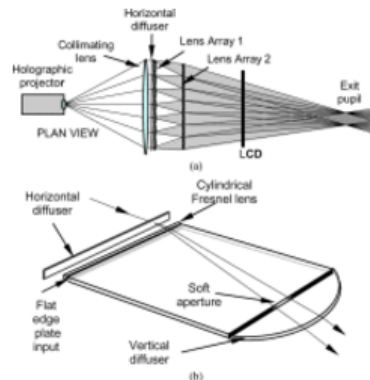


Fig. 3.



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equivalent and element construction. (a) Equivalent element.

Keywords

Discover synonyms to broaden your search strategy



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IEEE Keywords

Three dimensional displays,
Holography,
Liquid crystal displays,
Head,
Holographic optical components,
Eyes,
Optical modulation,
Three dimensional TV,
Optical control,
Lighting control

INSPEC: Controlled Indexing

three-dimensional displays,
laser beam applications,
liquid crystal displays,
spatial light modulators,
stereo image processing,
target tracking

INSPEC: Non-Controlled Indexing

LCD,
laser-based head tracking,
3D display research,
laser-based glasses-free 3D displays,
autostereoscopic displays,
European Union-funded projects,
MUTED,
multiuser head tracker,
HELIUM3D image information,
horizontally-scanned fast light valve ...

Author Keywords

three-dimensional (3D) display,
Autostereoscopic,
head-tracking,
liquid crystal on silicon (LCOS),
RGB laser

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Standards Dictionary

Uncover even more synonyms for your search strategy

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- ☐ Standards (44)
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Year

☐ **Frequency diverse array and MIMO hybrid radar transmitter design via Cramér–Rao lower bound minimisation**

Kuandong Gao; Wen-Qin Wang; Jingye Cai
IET Radar, Sonar & Navigation
Year: 2016, Volume: 10, Issue: 9
Pages: 1660 - 1670, DOI: 10.1049/iet-rsn.2015.0644
IET Journals & Magazines

[Abstract](#) (9914 Kb)

☐ **Experimental analysis of multistatic multiband radar signatures of wind turbines**

Francesco Fioranelli; Matthew Ritchie; Alessio Balleri; Hugh Griffiths
IET Radar, Sonar & Navigation
Year: 2016, Volume: 10, Issue: 8
Pages: 1400 - 1410, DOI: 10.1049/iet-rsn.2015.0474
IET Journals & Magazines

[Abstract](#) (11428 Kb)

☐ **Radar classification of indoor targets using support vector machines**

Travis D. Bufler; Ram M. Narayanan
IET Radar, Sonar & Navigation
Year: 2016, Volume: 10, Issue: 8
Pages: 1411 - 1420, DOI: 10.1049/iet-rsn.2015.0475
IET Journals & Magazines

Standards Dictionary Terms

- far-field region
- antenna
- antenna pattern
- electromagnetic radiation
- ground plane
- radiation intensity
- near-field region
- dielectric constant
- power gain
- antenna array
- dipole
- electric dipole
- magnetic dipole

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Fahri Yaras; Hoonjong Kang; Levent Onural

Subjective evaluation of stereoscopic images: effects of camera parameters and display duration
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High-Density Directional Display for Generating Natural Three-Dimensional Images
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References



Citat

Viewing: **Laser-Based Head-Track 3D Display Research**

1. P. Benzie, J. Watson, R. Rakkolainen, K. Hori, S. Sainov, C. von Kopy, "3D TV displays: Technologies", *IEEE Syst Video Technol.* pp. 1647-1658, Nov

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References in this Article

- 1 A survey of 3D TV displays: Techniques and technologies
- 2 Interactive three-dimensional displays; Seeing the future in depth
- 3 Volumetric Three-Dimensional Display Systems
- 4 Volumetric three-dimensional display system with rasterization hardware
- 5 Hologram-like video images by 45-view stereoscopic display

Citations to this Article

- 1 Multi-User Autostereoscopic 2D/3D Switchable Flat-Panel Display
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- 3 Low Crosstalk Multi-View Tracking 3-D Display of Synchro-Signal LED Scanning Backlight System
- 4 Multi-user eye tracking suitable for 3D display applications
- 1 Natural three-dimensional display with smooth motion parallax using active partially pixelated masks

This Article



J. Schwarz,
3D-Display
Wiley, 2000.

Patent Citations

Patent citations from USPTO, EPO & WIPO

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1. Bohn, David D.; Fleck, Rod G.

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Robbins, Steven John

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Author/inventor search

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Pages: 1314 - 1321, DOI: 10.1109/TCE.2007.4429218
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Bioucas Dias, J.M.; Leitao, J.M.N.; Fonseca, E.S.R.
Geoscience and Remote Sensing, IEEE Transactions on
Year: 2004, Volume: 42, Issue: 2
Pages: 443 - 456, DOI: 10.1109/TGRS.2003.817216
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Etem, Y.; Lewis, M.F.
Microwave Photonics, 1996. MWP '96. Technical Digest., 1996 International Topical Meeting on

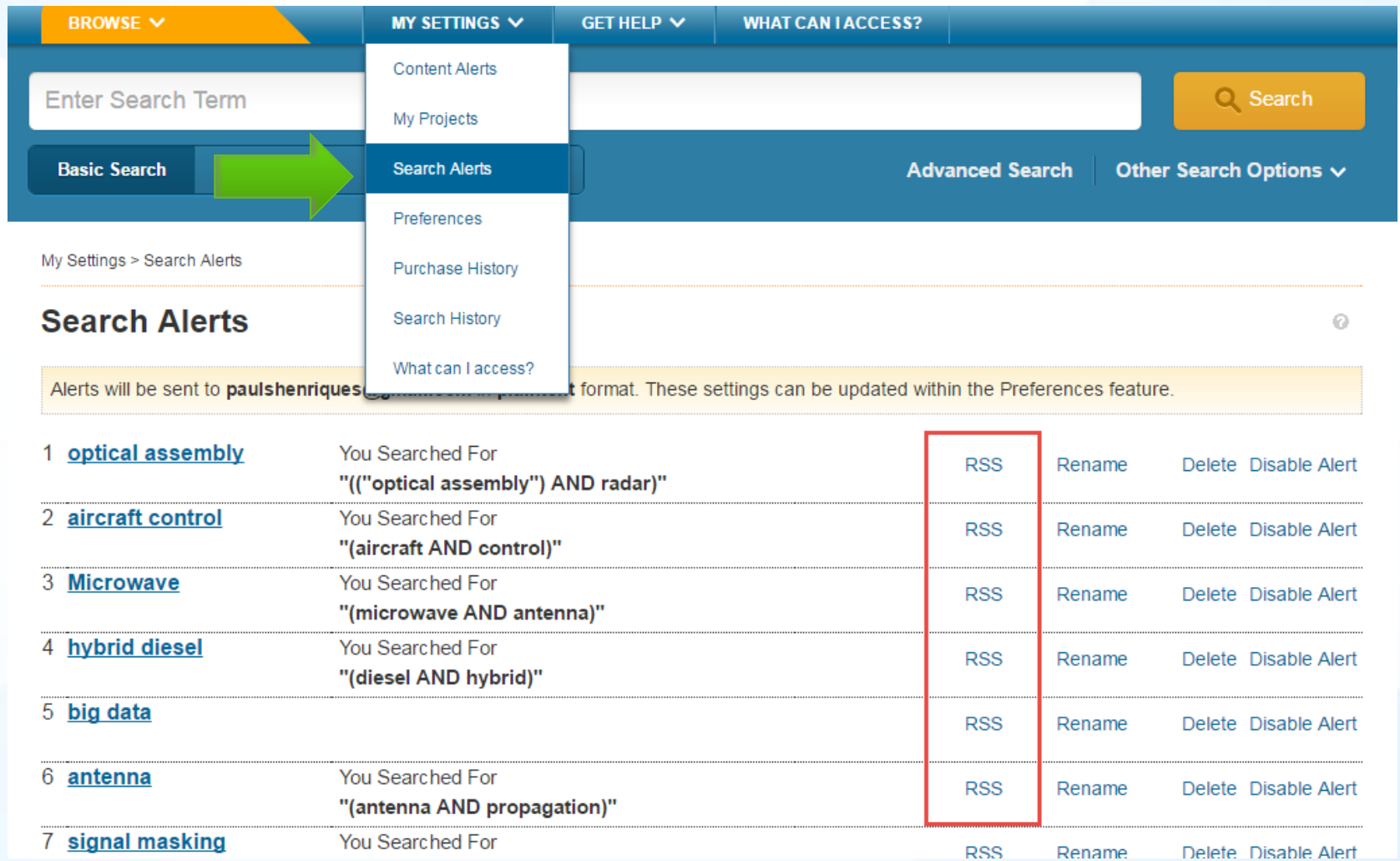
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4	hybrid diesel	You Searched For "(diesel AND hybrid)"	RSS	Rename	Delete	Disable Alert
5	big data		RSS	Rename	Delete	Disable Alert
6	antenna	You Searched For "(antenna AND propagation)"	RSS	Rename	Delete	Disable Alert
7	signal masking	You Searched For	RSS	Rename	Delete	Disable Alert

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signal masking

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Signal masking

Quinn, J.A.; Williams, C.K.I.

Acoustics, Speech and Signal Processing, 2008. ICASSP 2008. IEEE International Conference on

Year: 2008

Pages: 2989 - 2992, DOI: 10.1109/ICASSP.2008.4518278

IEEE Conference Publications

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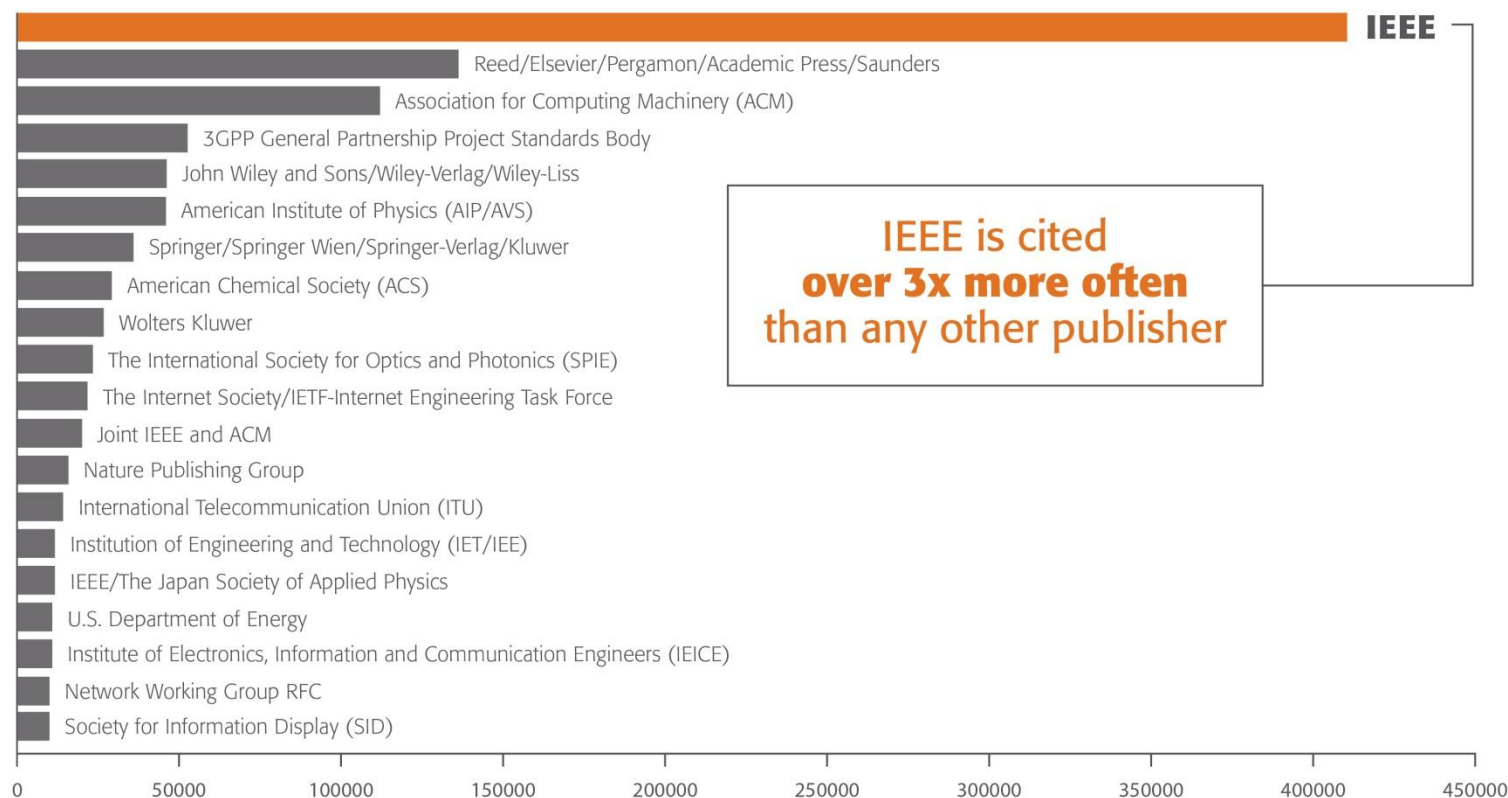
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- Over 4.1 million documents from IEEE journals, conferences & standards
- IP.com's proprietary Prior Art Database
- Other non-patent literature including PubMed Central & IBM Redbooks
- Invention disclosures of licensable technology from universities

Innovative Features

■ Patented Semantic search platform

- Patented IQ+ search engine allows users to find valuable content that is buried in complex patent and technical documents, allowing IP professionals to more effectively analyze prior art and increase productivity.

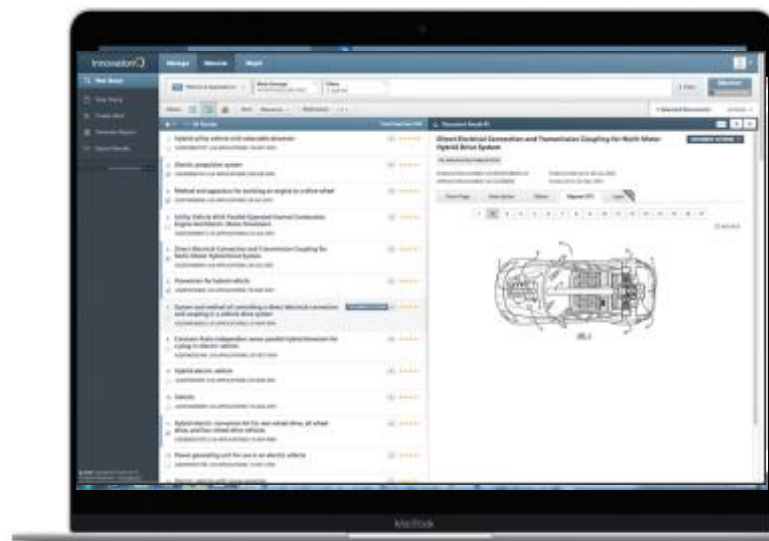
■ Visualizations for Competitive Intelligence and Landscaping

■ Visualize concepts with the Map tool

- A visual representation of critical documents based on concepts and meaning extracted from content. Easily identify whitespace and quickly highlight documents by specified organizations.

■ More features to streamline your workflow

- Filters, collaboration tools, save results, export



Prior Art Searching: The Old Way

- Understand the patent application
- Identify key concepts of the invention
- Identify databases to search
- Create sets of synonyms
- Develop a search strategy
- Perform an author/inventor
- Save your search history



What if You Could Turn This...

Query:

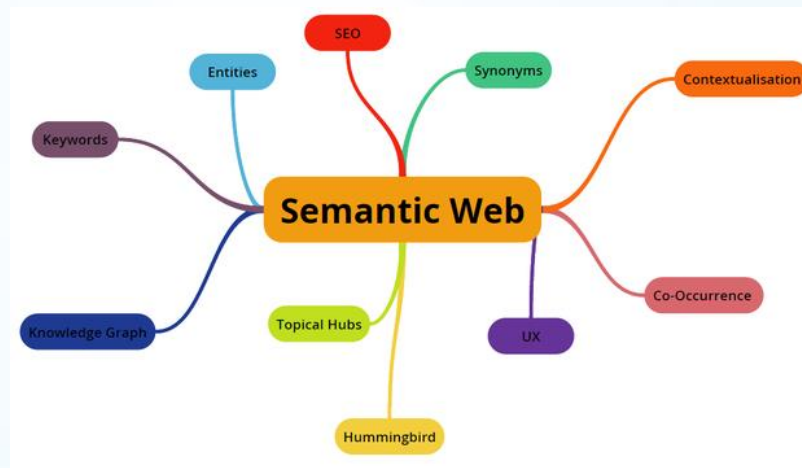
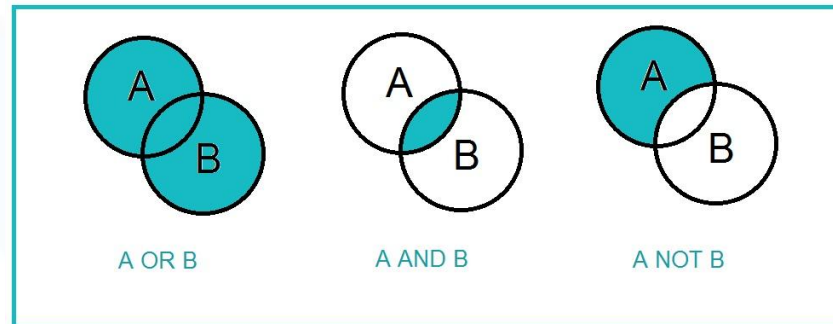
ALL=(surgical OR curve OR segment) AND
suture AND
(((intervertebral OR cutting OR member OR
arcuate OR guide)
NEAR5 (bone OR seal)) SAME (tissure OR
jaw*)) AND (Instrument OR
cannula*1) AND DP>=(19930101) AND
IC=(H01L 39/02 OR H01L
39/12 OR H01F 38/14)

Into This?

Query:

A surgical cannula with curved segments used to guide a medical instrument through a curved or bowed path

From Boolean to Semantic



Discover Unreturned Results Through InnovationQ Plus

Boolean:

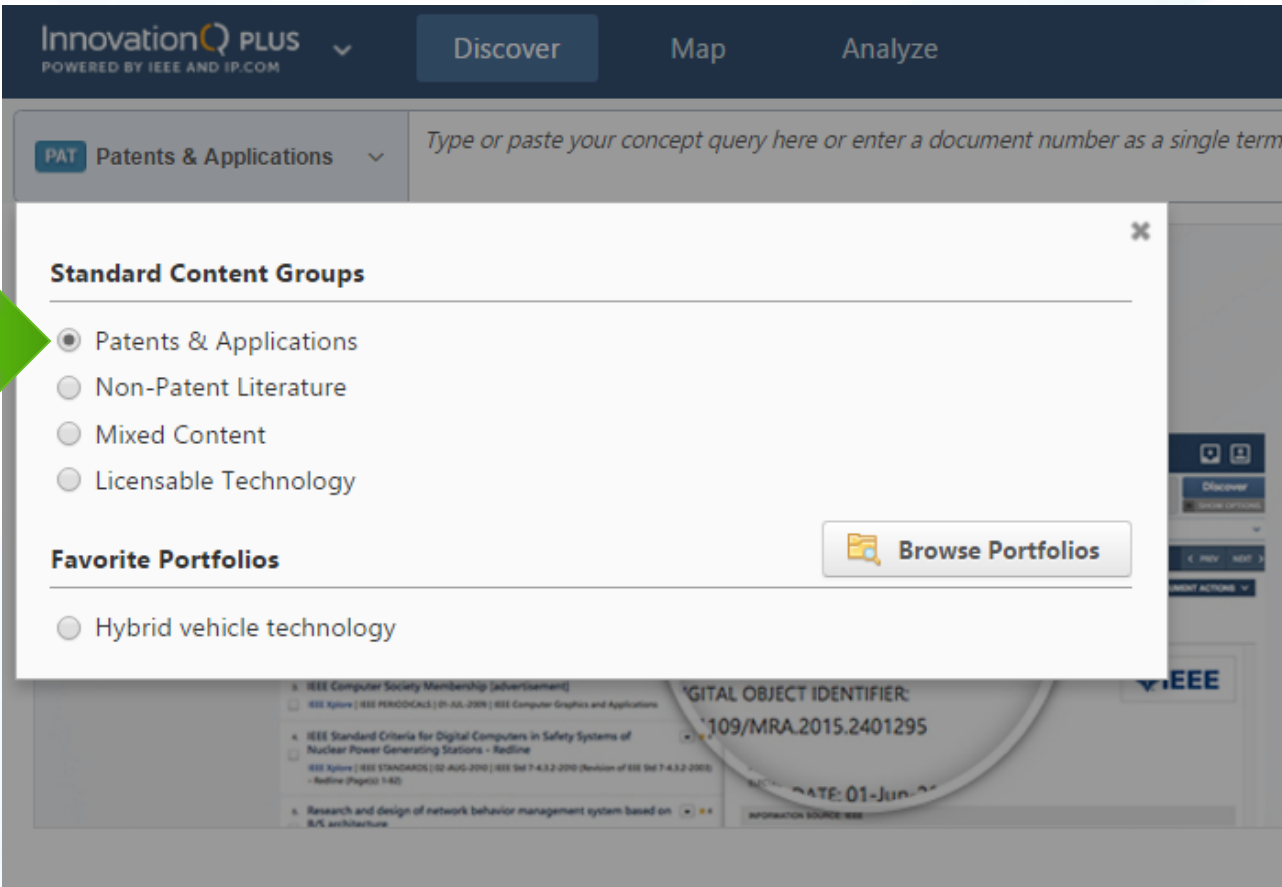
Autonomous vehicle

Concept Search:

Autonomous vehicle	Navigation	Accelerator
Car	Network	Van
Automobile	Locomotive	Pilot
Driver	Fuel	Self driving
Truck	Transport	Wheels
Robot	Route	Tram
GPS	Passenger	Train
Transport	Brake	Bus
Satellite	Engine	Taxi

Discover: Content Groups

Search Patents & Applications, Non-Patent Literature, Mixed Content or Licensable Technology



The screenshot shows the 'Discover' tab of the Innovation Plus interface. A dropdown menu is open, displaying 'Standard Content Groups' with four radio button options: 'Patents & Applications' (selected), 'Non-Patent Literature', 'Mixed Content', and 'Licensable Technology'. A green arrow points to the 'Patents & Applications' option. Below this, the 'Favorite Portfolios' section shows 'Hybrid vehicle technology'. A 'Browse Portfolios' button is also visible. The background shows a search bar with the placeholder text 'Type or paste your concept query here or enter a document number as a single term' and a list of search results.

Innovation PLUS
POWERED BY IEEE AND IP.COM

Discover Map Analyze

PAT Patents & Applications

Type or paste your concept query here or enter a document number as a single term

Standard Content Groups

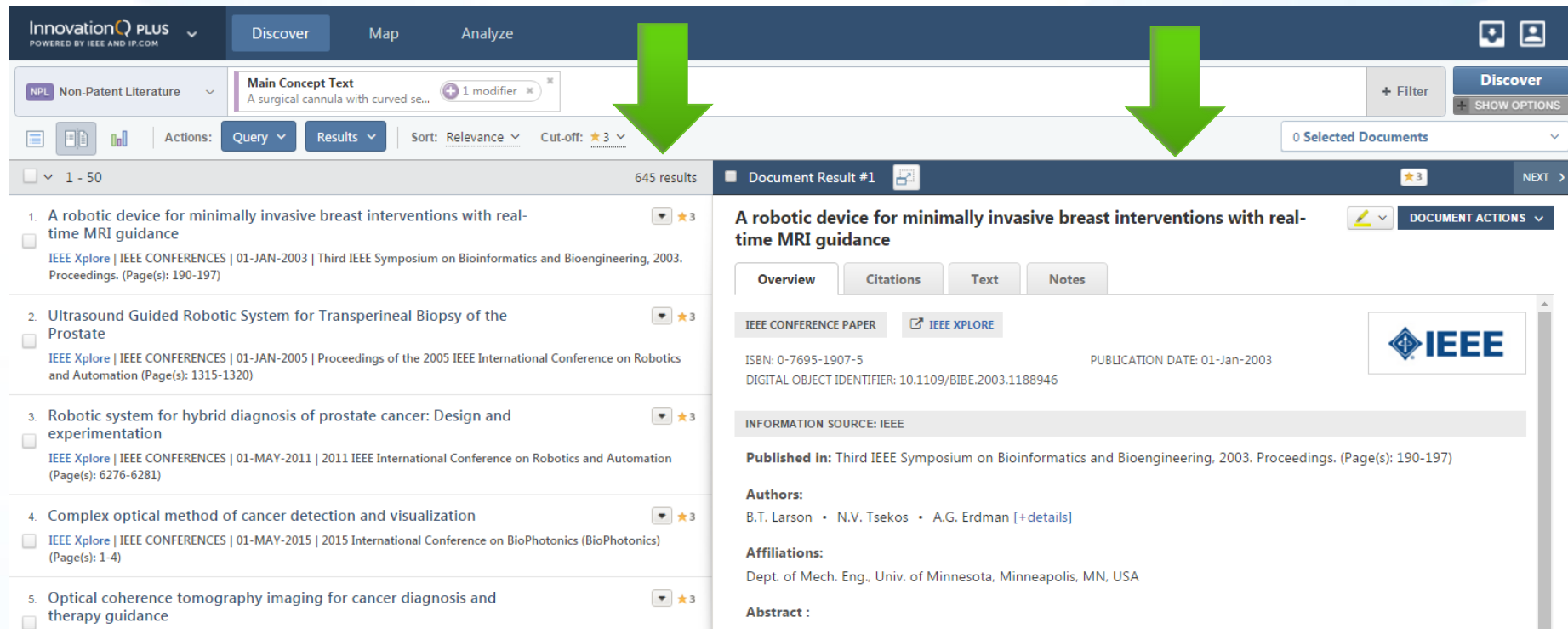
- ☒ Patents & Applications
- ☐ Non-Patent Literature
- ☐ Mixed Content
- ☐ Licensable Technology

Favorite Portfolios

- ☐ Hybrid vehicle technology

Browse Portfolios

Discover: Results Split View



InnovationQ PLUS
POWERED BY IEEE AND IP.COM

Discover Map Analyze

NPL Non-Patent Literature

Main Concept Text
A surgical cannula with curved se... 1 modifier

+ Filter Discover
SHOW OPTIONS

Actions: Query Results Sort: Relevance Cut-off: ★ 3 0 Selected Documents

1 - 50 645 results

Document Result #1

1. A robotic device for minimally invasive breast interventions with real-time MRI guidance
IEEE Xplore | IEEE CONFERENCES | 01-JAN-2003 | Third IEEE Symposium on Bioinformatics and Bioengineering, 2003. Proceedings. (Page(s): 190-197)

2. Ultrasound Guided Robotic System for Transperineal Biopsy of the Prostate
IEEE Xplore | IEEE CONFERENCES | 01-JAN-2005 | Proceedings of the 2005 IEEE International Conference on Robotics and Automation (Page(s): 1315-1320)

3. Robotic system for hybrid diagnosis of prostate cancer: Design and experimentation
IEEE Xplore | IEEE CONFERENCES | 01-MAY-2011 | 2011 IEEE International Conference on Robotics and Automation (Page(s): 6276-6281)

4. Complex optical method of cancer detection and visualization
IEEE Xplore | IEEE CONFERENCES | 01-MAY-2015 | 2015 International Conference on BioPhotonics (BioPhotonics) (Page(s): 1-4)

5. Optical coherence tomography imaging for cancer diagnosis and therapy guidance

A robotic device for minimally invasive breast interventions with real-time MRI guidance

Overview Citations Text Notes

IEEE CONFERENCE PAPER IEEE XPLORE

ISBN: 0-7695-1907-5 PUBLICATION DATE: 01-Jan-2003
DIGITAL OBJECT IDENTIFIER: 10.1109/BIBE.2003.1188946

INFORMATION SOURCE: IEEE

Published in: Third IEEE Symposium on Bioinformatics and Bioengineering, 2003. Proceedings. (Page(s): 190-197)

Authors:
B.T. Larson • N.V. Tsekos • A.G. Erdman [+details]

Affiliations:
Dept. of Mech. Eng., Univ. of Minnesota, Minneapolis, MN, USA

Abstract :

IEEE

Add Concept Modifiers

Add terms and phrases to your concept and refine result set with “More Like This” and “Less Like This”

The screenshot displays the Innovation PLUS interface, which is powered by IEEE and IP.COM. The top navigation bar includes 'Discover', 'Map', and 'Analyze' buttons. Below the navigation bar, a search results list is shown with a dropdown menu open for the third result.

1. Apparatus and method for iris image analysis
☐ An apparatus including circuitry configured to receive a plurality of images and extract at least one iris image from each of the plurality of images... receive a claimed identity iris image corresponding to an identity to be authenticated, normalize the iris images and...
CURRENT ASSIGNEES: KING FAHD UNIV PETROL & MINERALS
US9189686 | US PATENTS | 17-NOV-2015

2. System and method for sensor adaptation in iris biometrics
☐ The sensor adaptation technique applicable to non-contact biometric authentication, specifically in iris recognition, is designed to handle the sensor adaptation that occurs when enrollment iris samples and test iris samples are acquired with different sensors. The present system and method...
CURRENT ASSIGNEES: UNIV MARYLAND BALTIMORE
US9530052 | US PATENTS | 27-DEC-2016

3. Adaptive multi-modal integrated biometric identification detection and surveillance systems
☐ A surveillance system is provided that includes at least one sensor disposed in a security area of a surveillance region to sense an occurrence of a potential security breach event; a plurality of cameras is disposed in the surveillance region; at least one camera of the plurality has a view of the...
CURRENT ASSIGNEES: PROXIMA CORP
US7956890 | US PATENTS | 07-JUN-2011

5. Guidable cutting instrument
US6471700 | US PATENTS | 29-OCT-2002

The dropdown menu for the third result is open, showing the following options:

- Modify Query
- Replace Main Concept
- More Like This
- Less Like This
- Document
 - Preview
 - Add to Portfolio
 - Select

At the bottom right, a text box states: "This disclosure is directed to minimally-invasive access devices through small access portals to minimize tissue damage. The access device includes a guide frame".

See location and frequency of concept terms in document full view



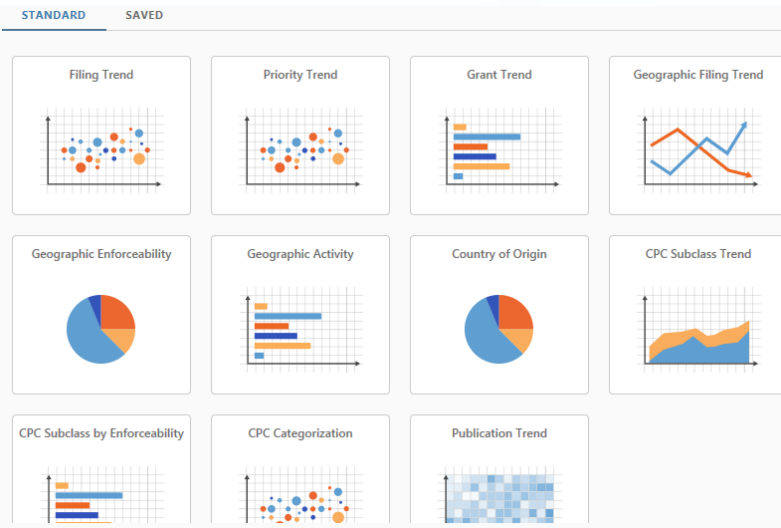
Build a Patent Portfolio

Technical Intelligence:

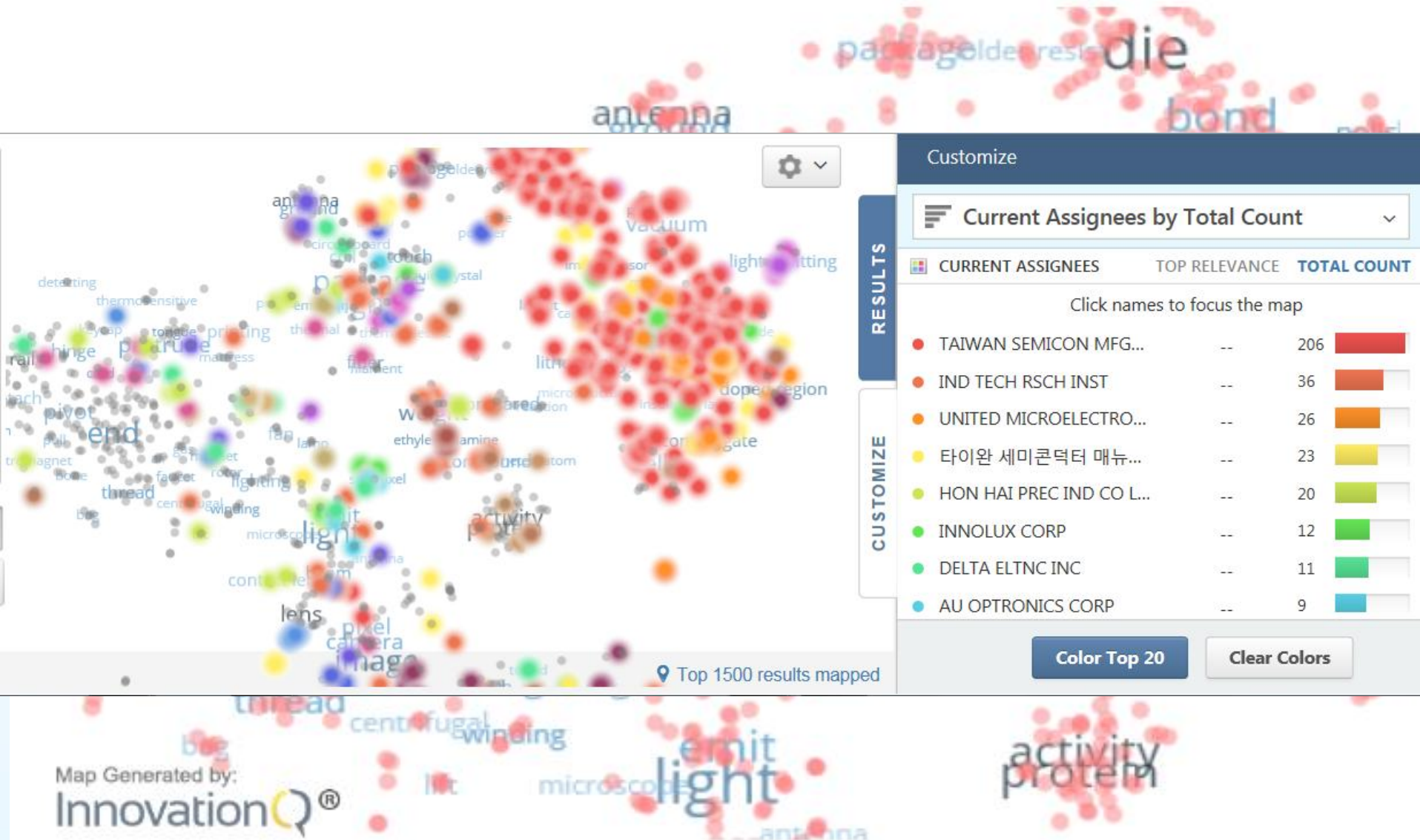
1. Knowledge of the “art” (subject matter)
2. Prior Art searching
3. Technology trends
4. Technology applications (old, current and future)

Competitive Intelligence:

1. Who (organizations) are in this tech space? (assignee/applicant)
2. Who (people) are the professionals? (author/inventor)
3. Who are they collaborating with?
4. What are they doing?
5. How are they doing it? (patent claims)
6. How can I track these alliances or competitors? (search alerts)
7. Where are they interested in doing business?



Technical & Competitive Intelligence by Region



Analyze Patent Portfolio by Organization

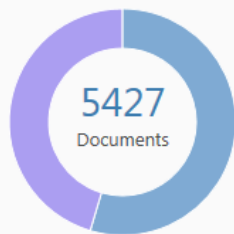
Overview

5427
Documents

0
Filters

0 Selected Documents

Collection Breakdown



■ US Patents
■ US Applications

2963
2464

Top Current Assignees

TAIWAN SEMICON MFG CO TSMC LTD	5427
GLOBAL UNICHIP CORP	46
NATL TAIWAN UNIV	38
NATL CHIAO TUNG UNIV	15
UWIZ TECH CO LTD	5
TAIWAN SEMICON MFG CO LTD	3
IMEC VZW	2
APPLE INC	1
ARIOA DIAGNOSTICS INC	1
ASIX ELTNC CORP	1

Enforceability

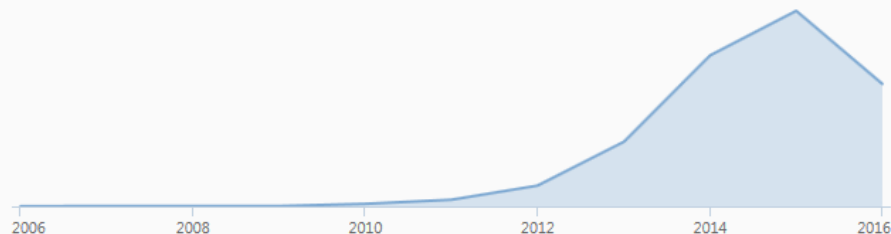
Likely	2963
Unlikely	0
Issued	895
Undetermined	1569

Top 3 CPC Subclasses

H01L	3975
G06F	217
G11C	206

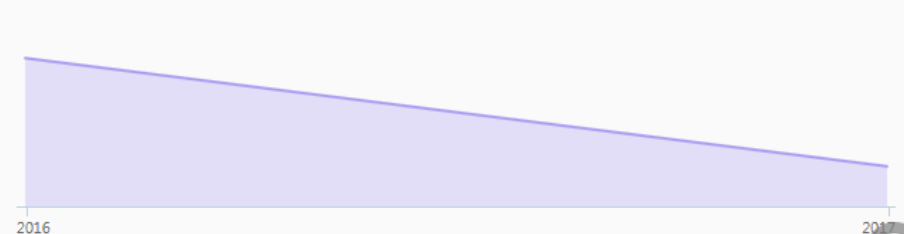
Application Date Trend

2006 - 2016

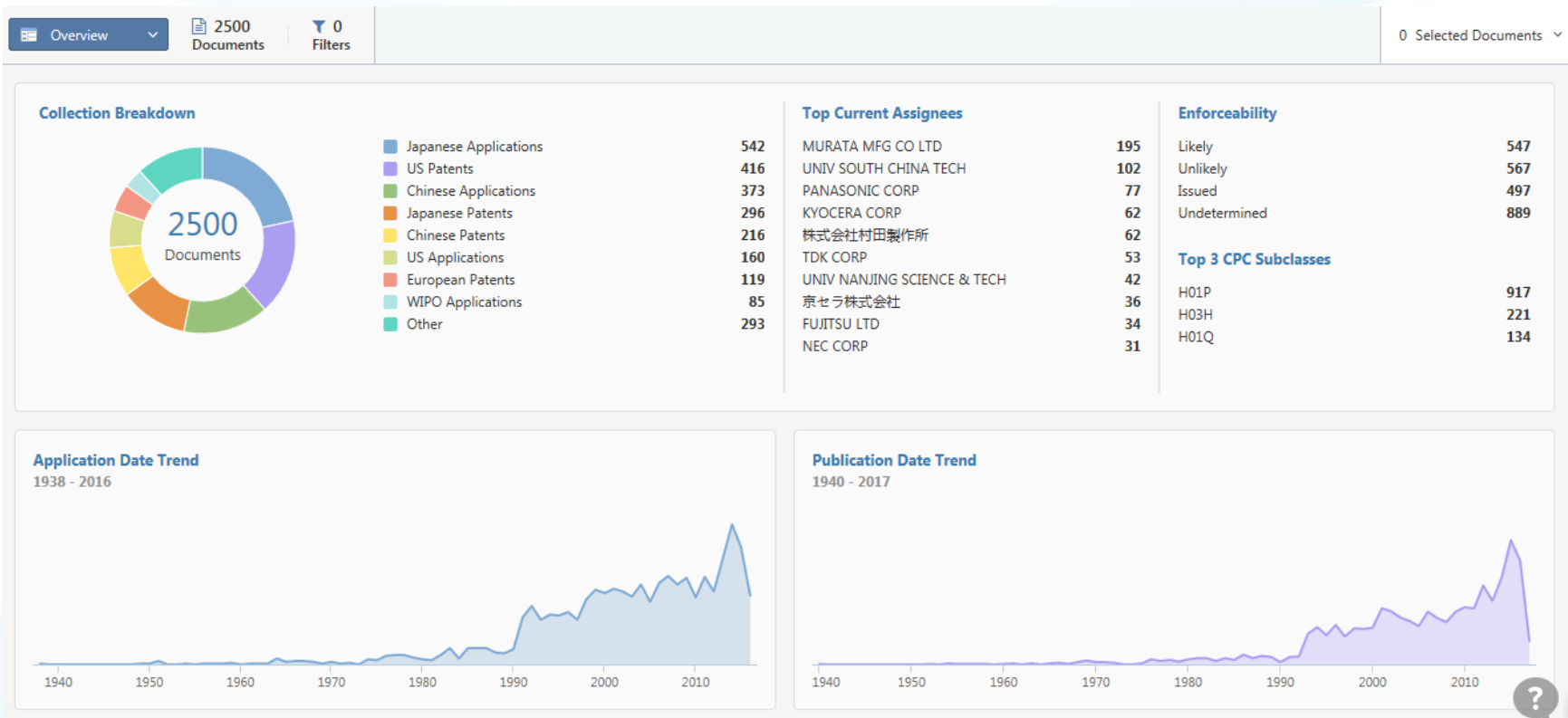


Publication Date Trend

2016 - 2017

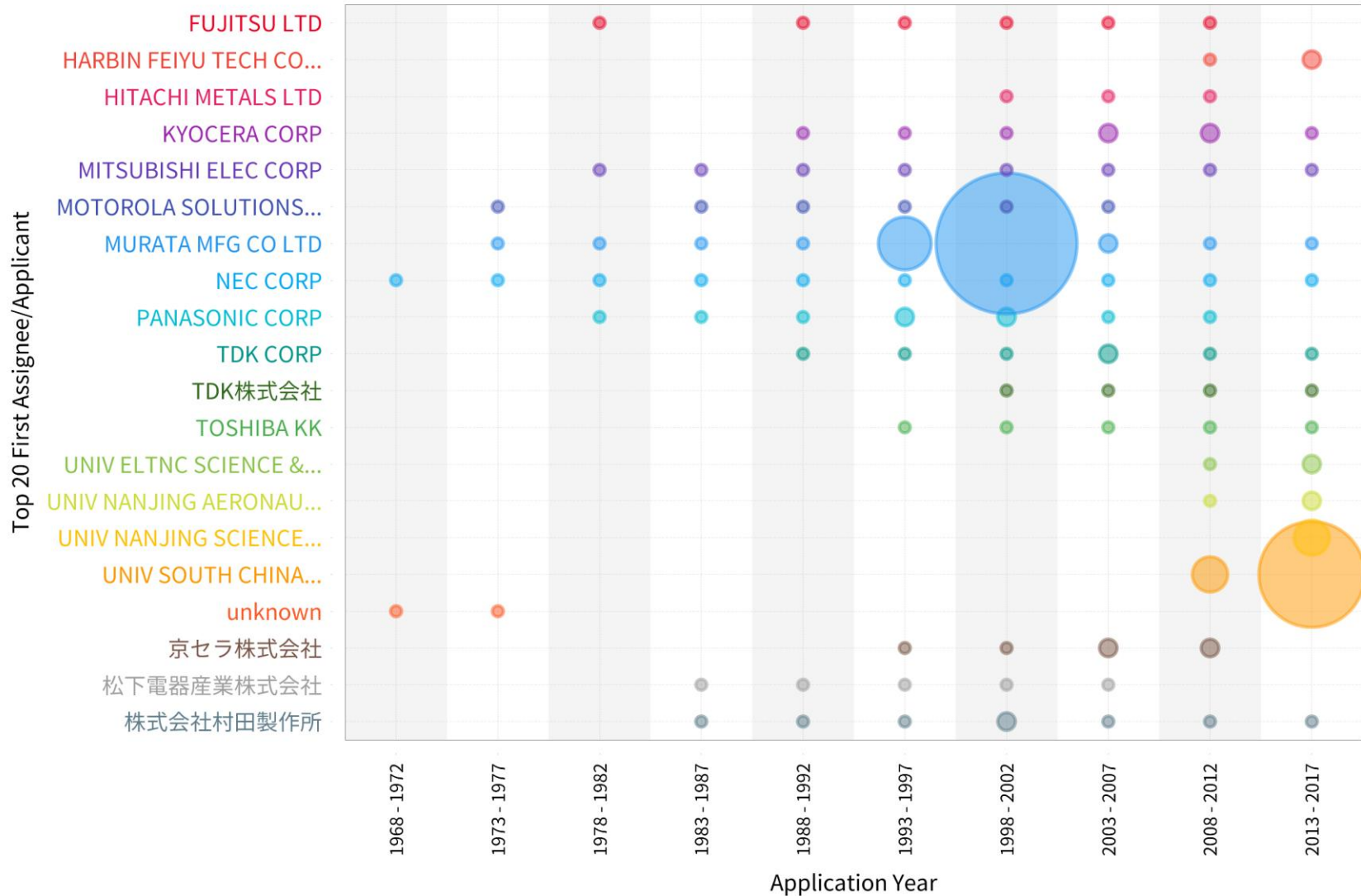


Analyze Patent Portfolio by Subject

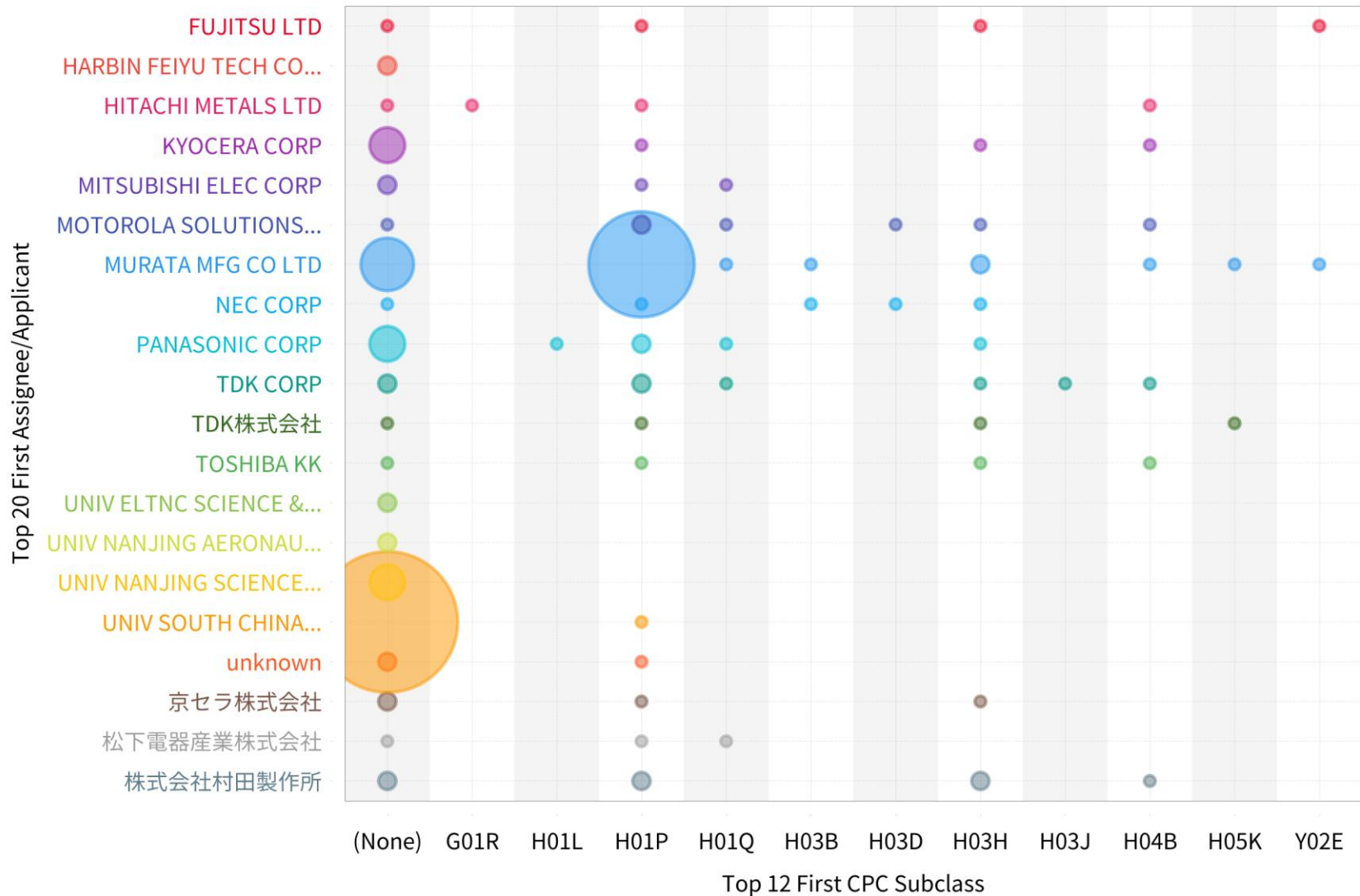


dual band pass filter

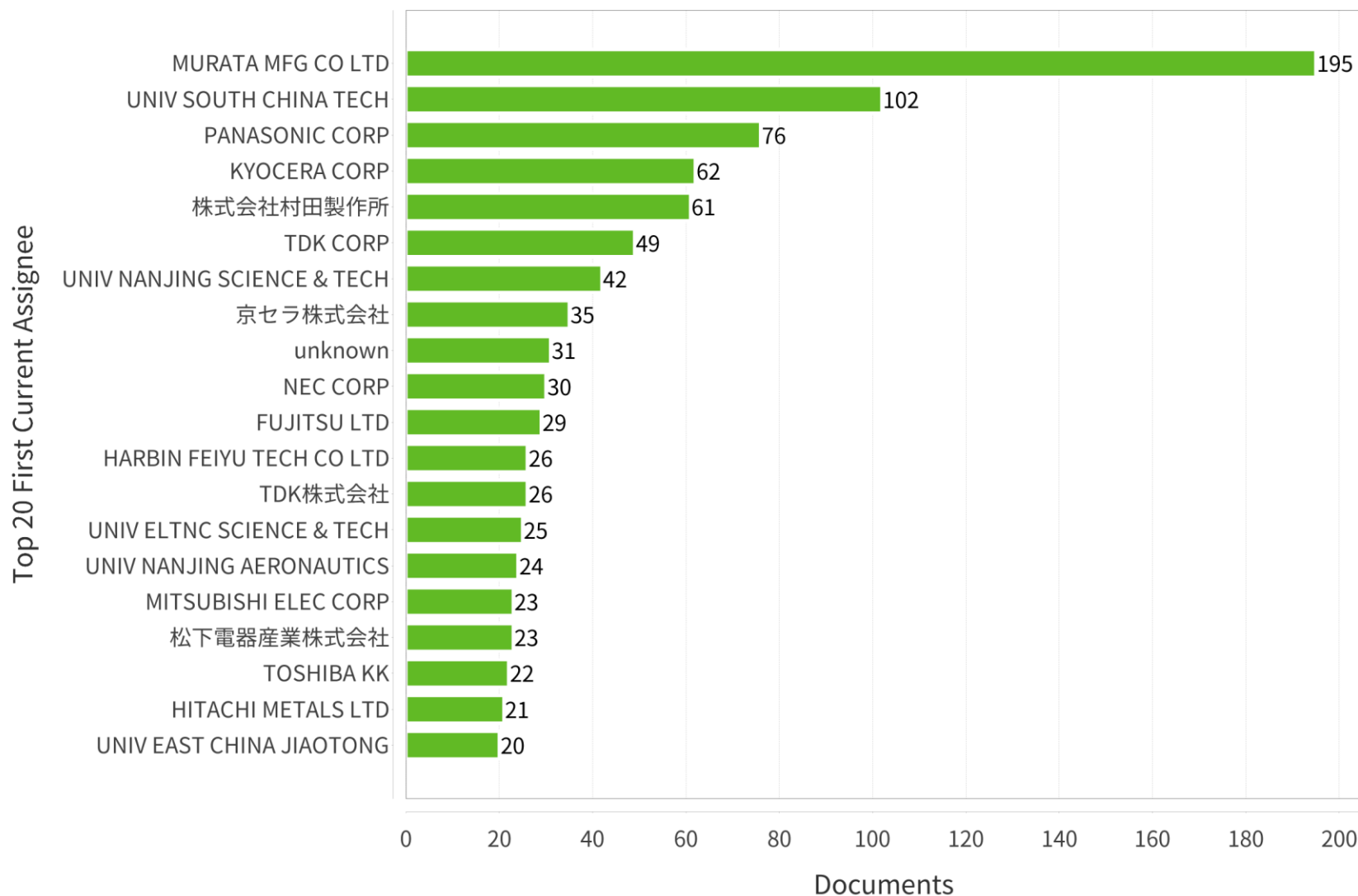
Filing Trend



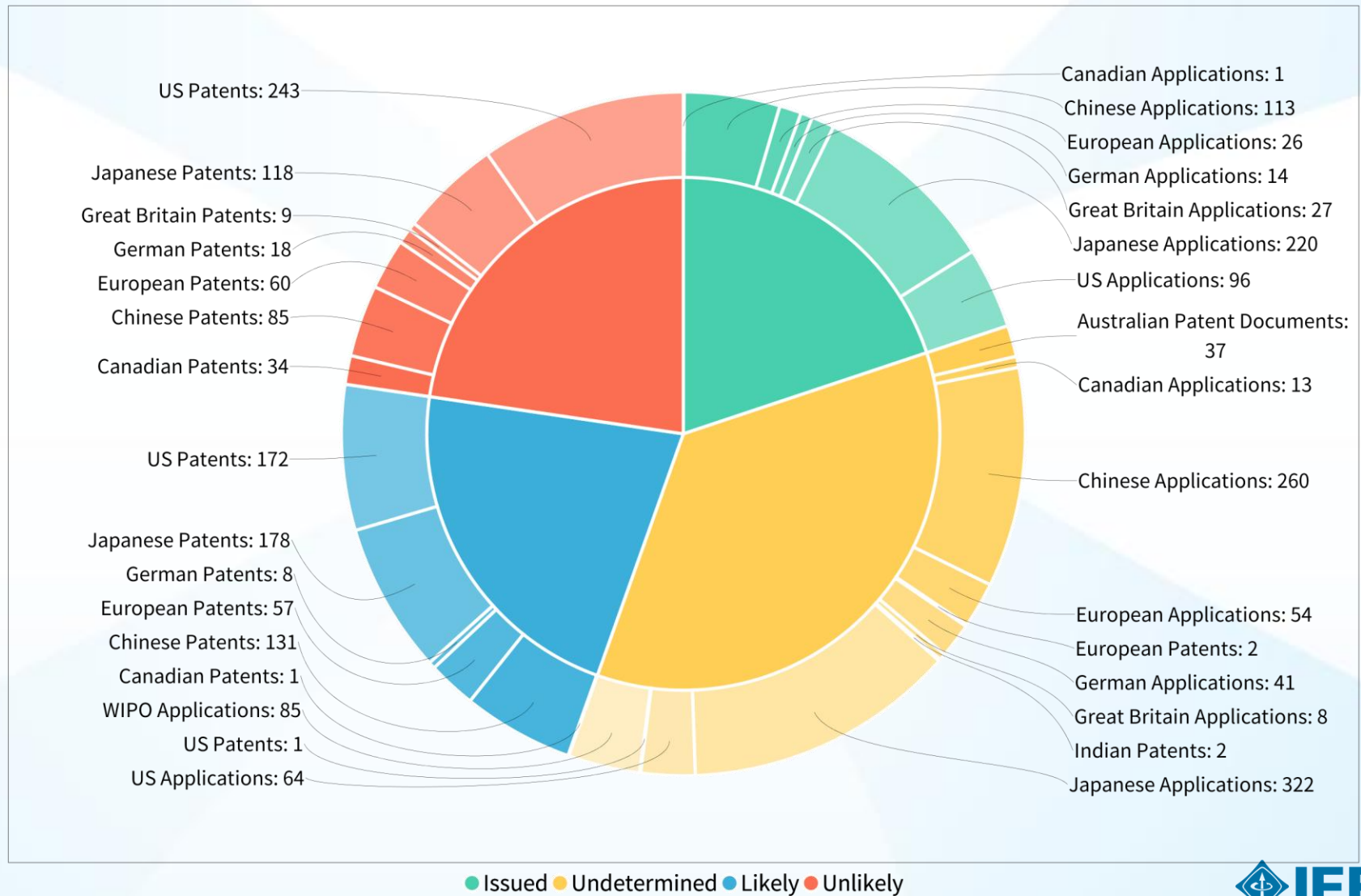
CPC Categorization



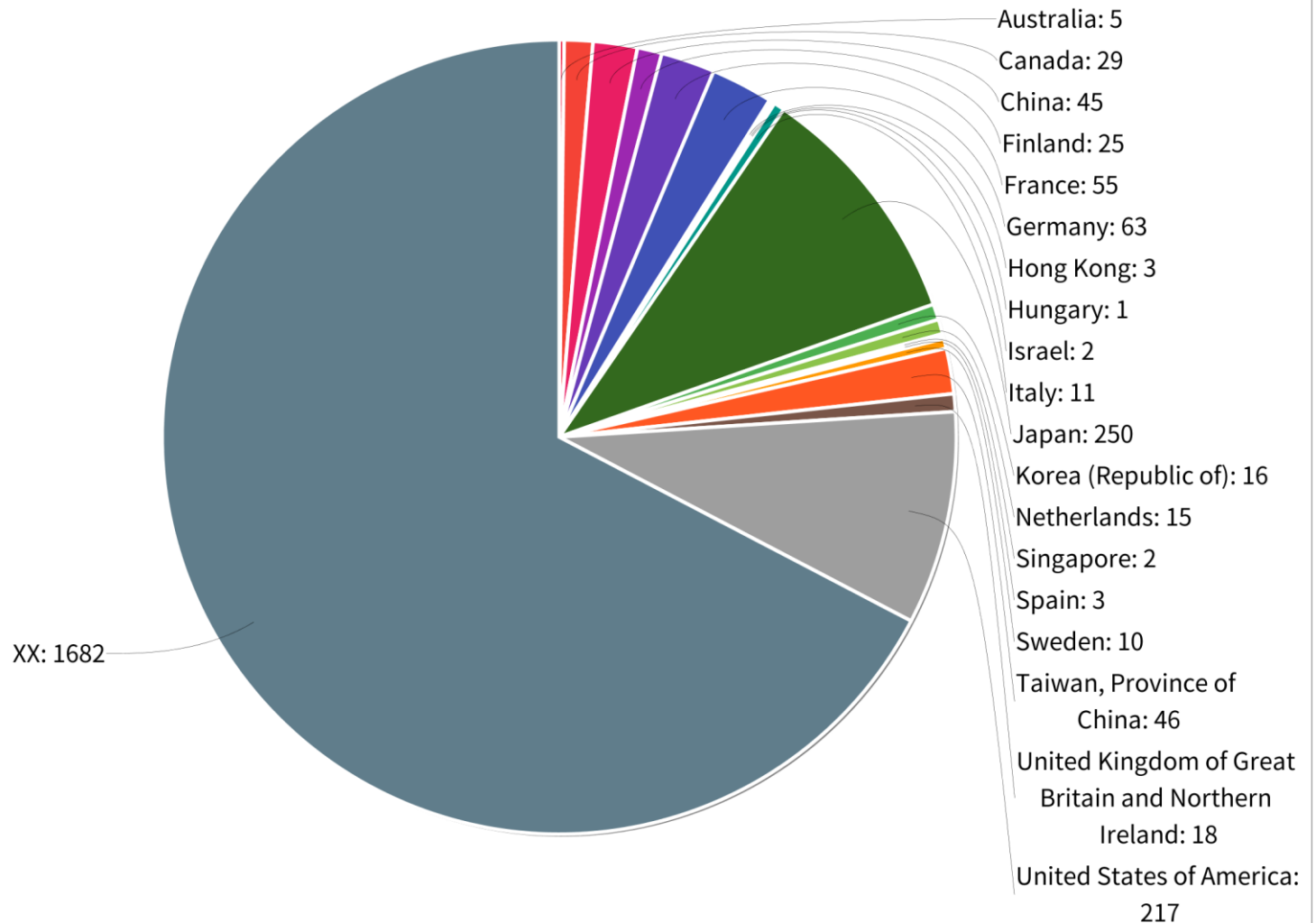
Current Assignee by Count



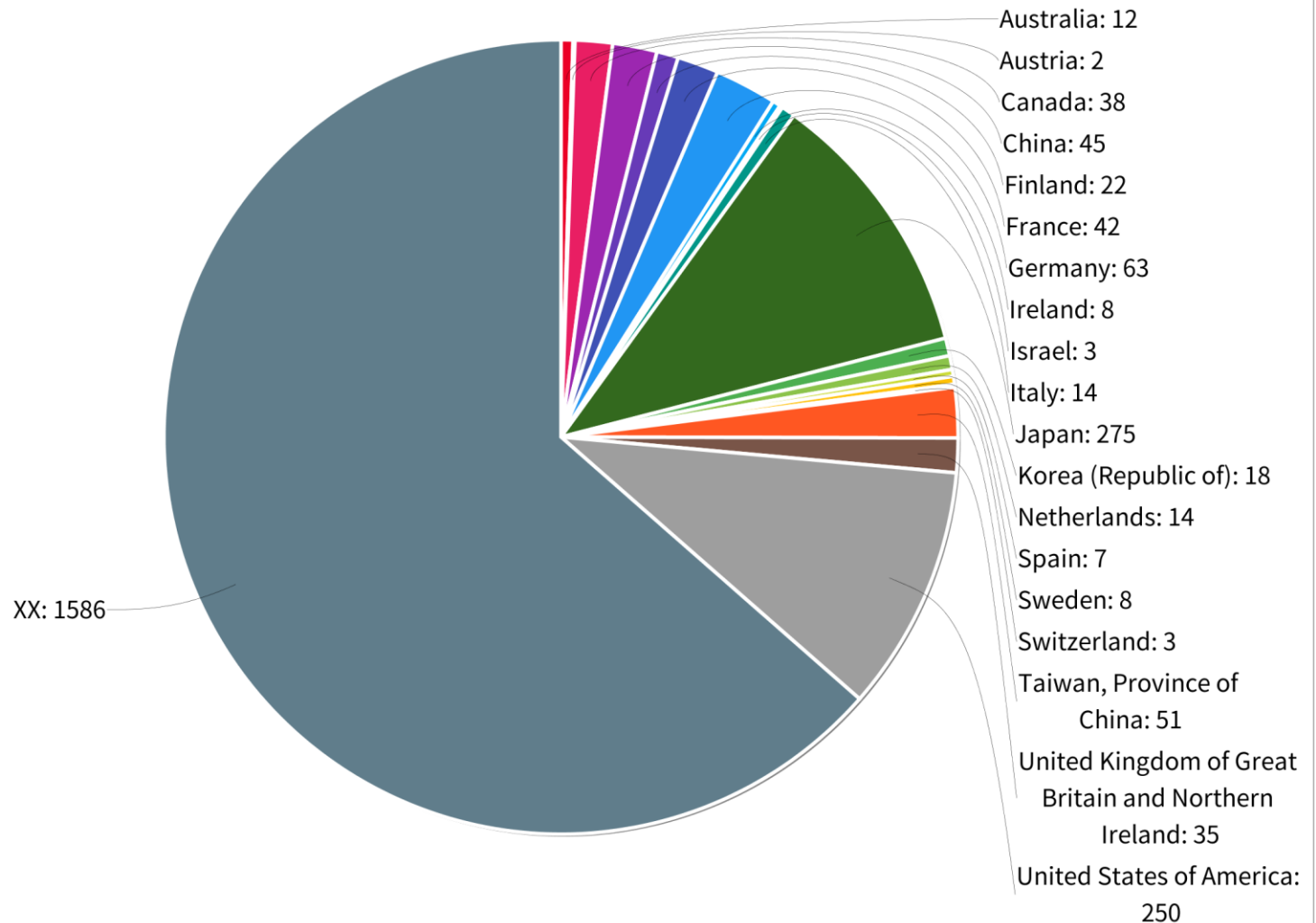
Geographic Enforceability



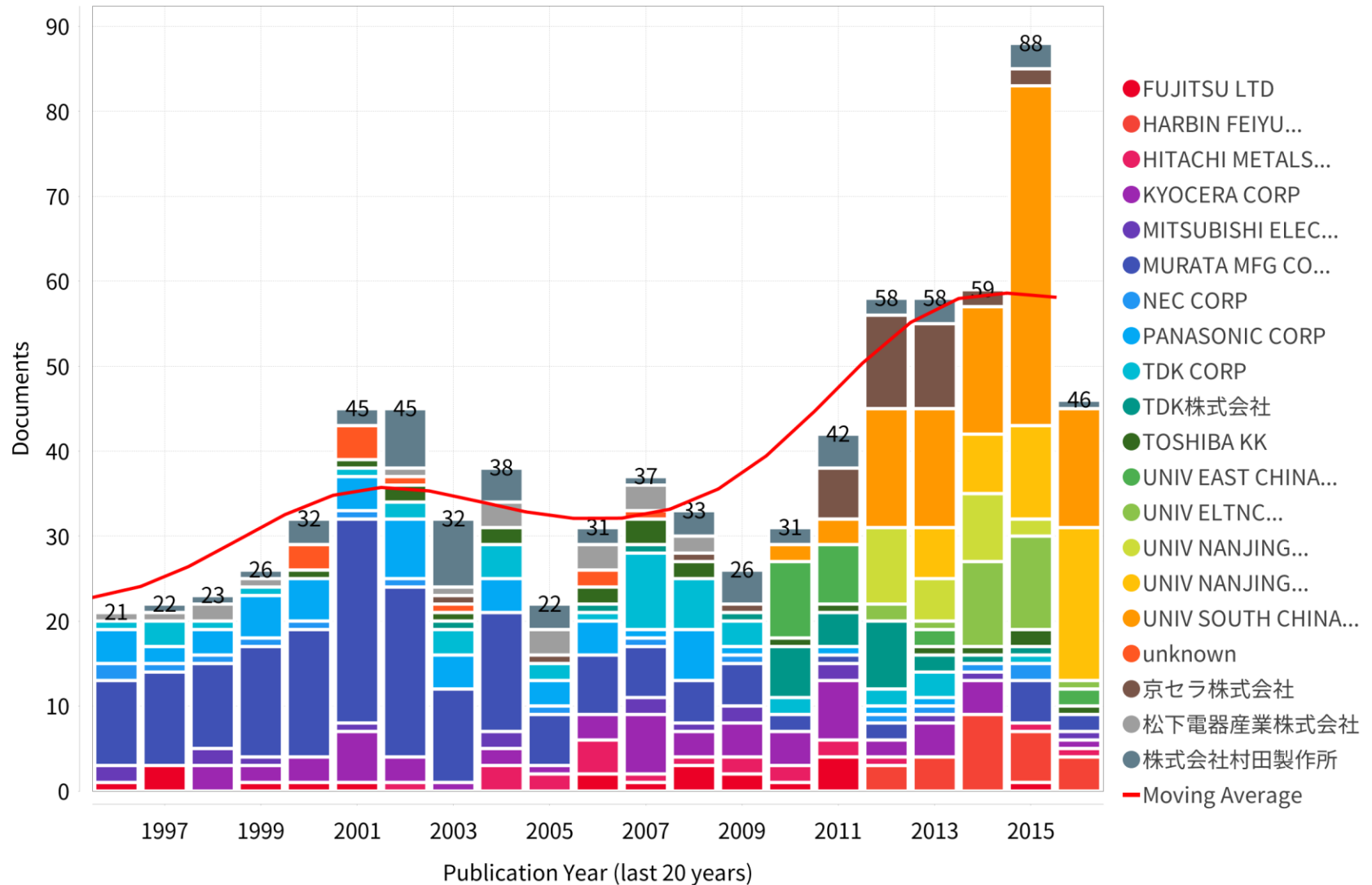
Country of Origin (WO)



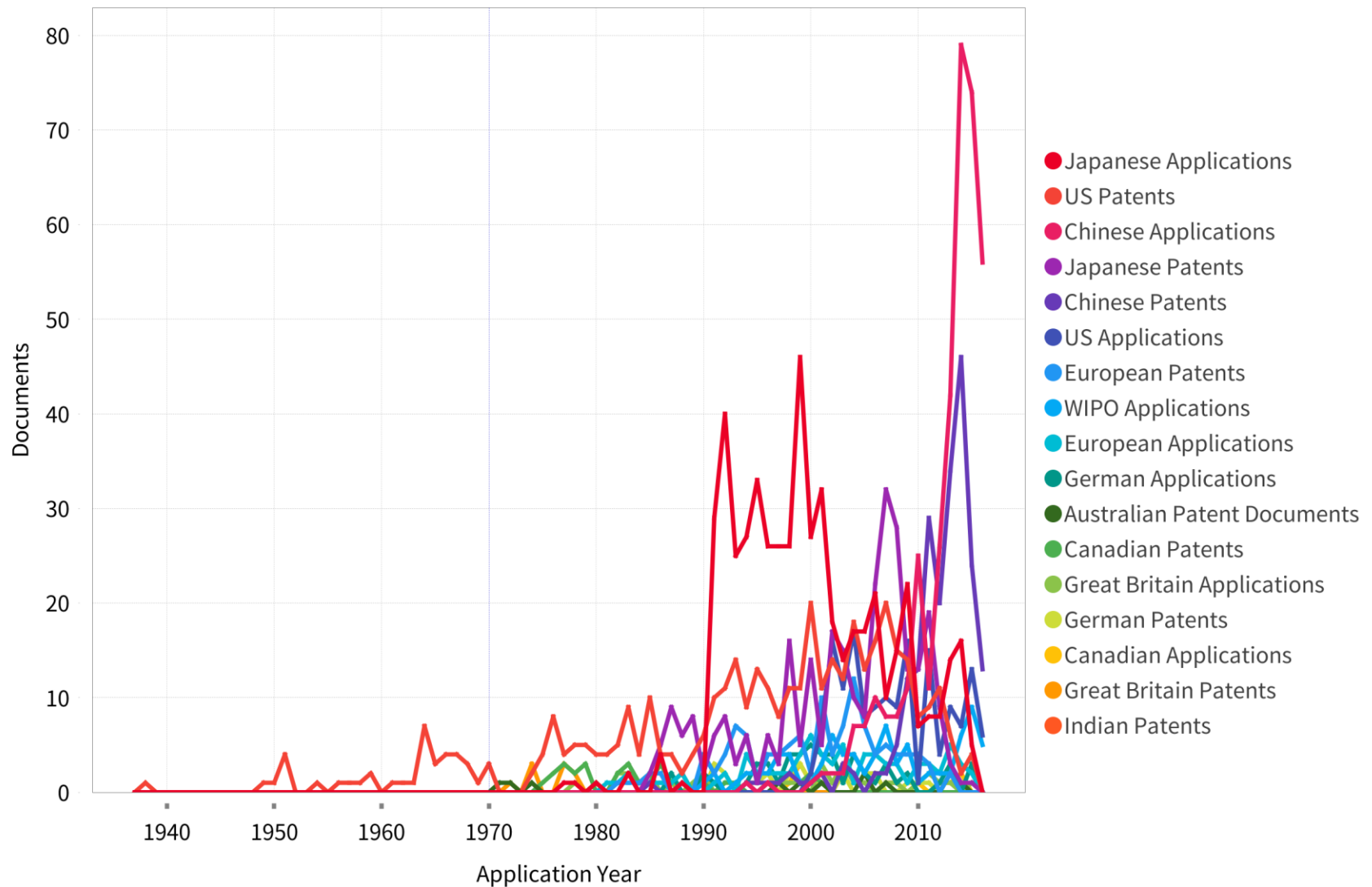
Country of Origin (US)



Current Assignee within Publication Year



Geographic Filing Trend



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**For more information:
innovationqplus.ieee.org**

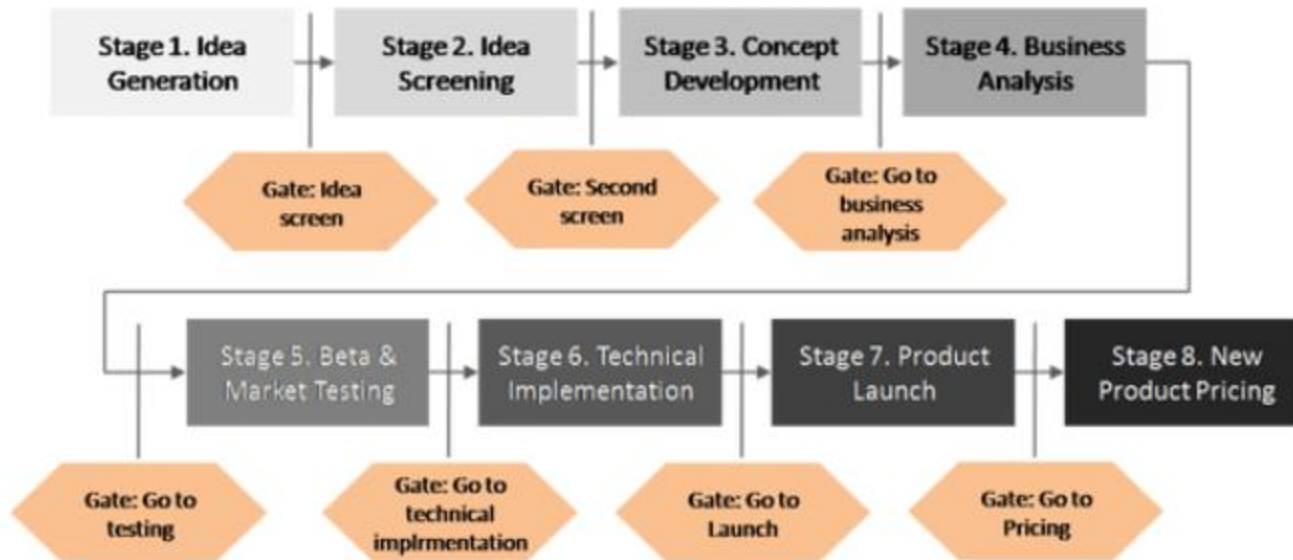
Other sources for patent research

- USPTO Patent Full-Text Database:
<http://www.uspto.gov/patft/index.html>
- Espacenet (European Patents):
<http://www.espacenet.com/access/index.en.htm>
- Japan Platform for Patent Information: <https://www.j-platpat.inpit.go.jp>
- Google Patents: <https://patents.google.com>
- Internet Wayback Machine (useful for dating prior art):
<https://archive.org/web>

When to Start Prior Art Searching?

The earlier, the better!

- It is important to conduct prior art searching in the early stage, instead of the final stage of idea development!



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Source: <https://www.cleverism.com/product-development-overview-idea-product/>

<http://www.ieee.org/go/clientservices>
<http://www.ieee.org/training>

有问题请联系
李箐
li.q@ieee.org