Ingenious Brain

Future-Proofing Businesses

AI's Revolution in Redefining Healthcare Patent Landscape

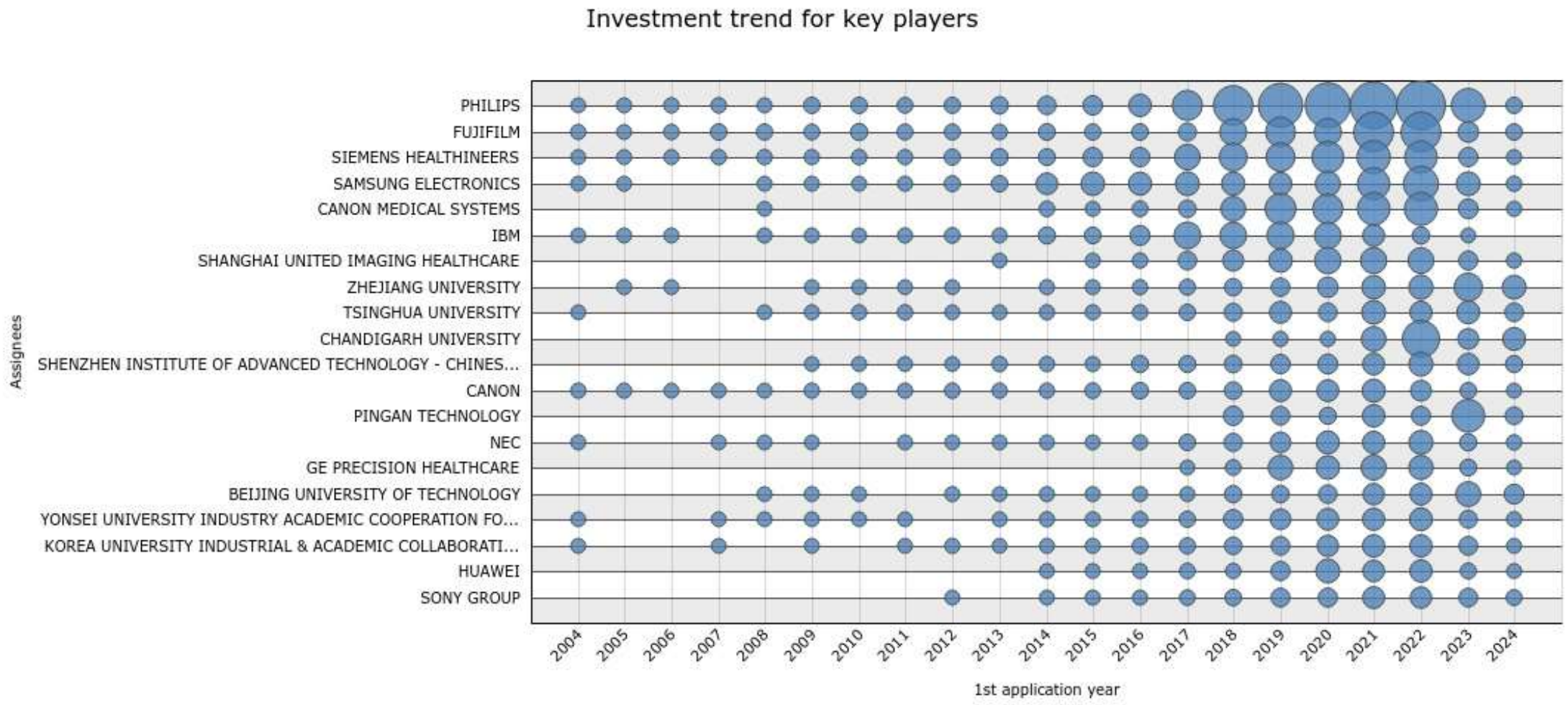
Key Takeaways

- **The adoption of AI in healthcare has grown exponentially since 2016, with COVID-19 driving a rapid focus on solving diverse challenges from an AI perspective.**
- **China leads the AI healthcare intellectual property landscape, and this gap is expected to grow in the future.**
- **Assignees should focus on increasing patent family sizes from two to at least six to strengthen their freedom-to-operate positions.**
- **While the focus has been on quantity over quality, with only 30% of patents granted, there is a vast opportunity to create high-quality, application-driven patents under emerging AI laws.**
- **With most AI healthcare patent portfolios being less than 4-5 years old, there is immense potential to build sustainable long-term licensing strategies.**
- **Litigation is expected to double, driven by opposition rates currently four times higher than litigation.**
- **The cross-domain nature of AI in healthcare demands skilled technical experts who can navigate both healthcare challenges and AI algorithms to deliver robust claim analyses.**

Evolution of Healthcare AI Patent Portfolio [2004-2024]

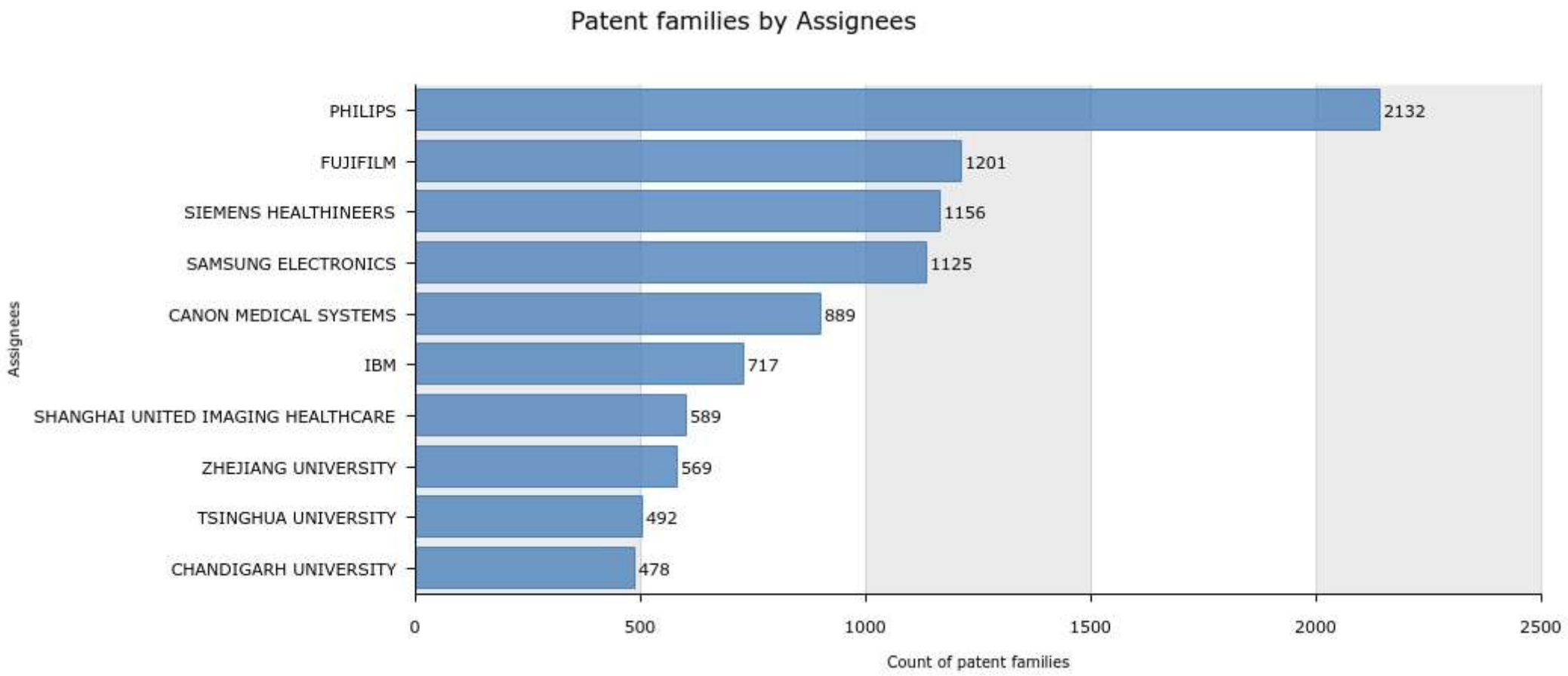
Around 45% of AI-related patents in the healthcare domain are pending, 30% are granted, and 25% are defunct, showcasing a dynamic and evolving intellectual property landscape. The ***exponential rise in filings since 2016*** *highlights a significant shift from the previously stagnant trend. Notably,* ***opposition rates are four times higher than litigations,*** *highlighting the domain's high level of competitiveness.*

Year-wise Breakdown of Top Patent Assignees in Healthcare



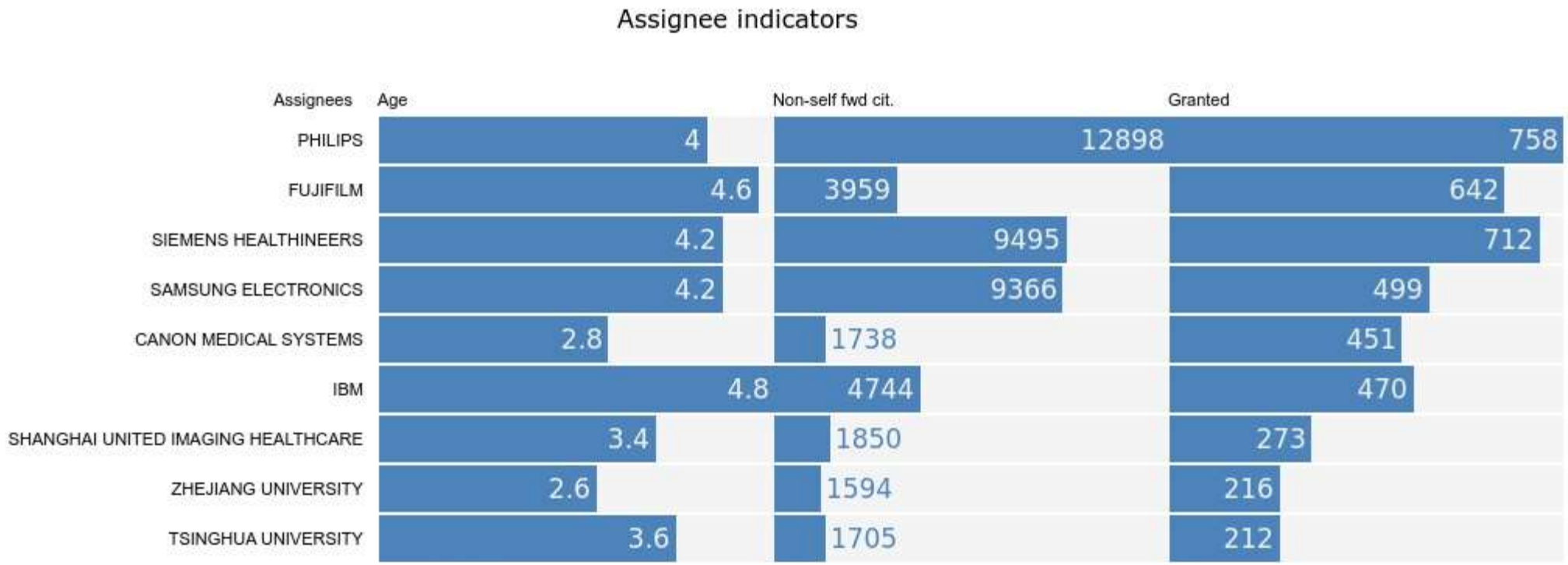
***Top 5 players have been aggressively filing since 2016*

Top 10 Players Based on Patent Families Assigned



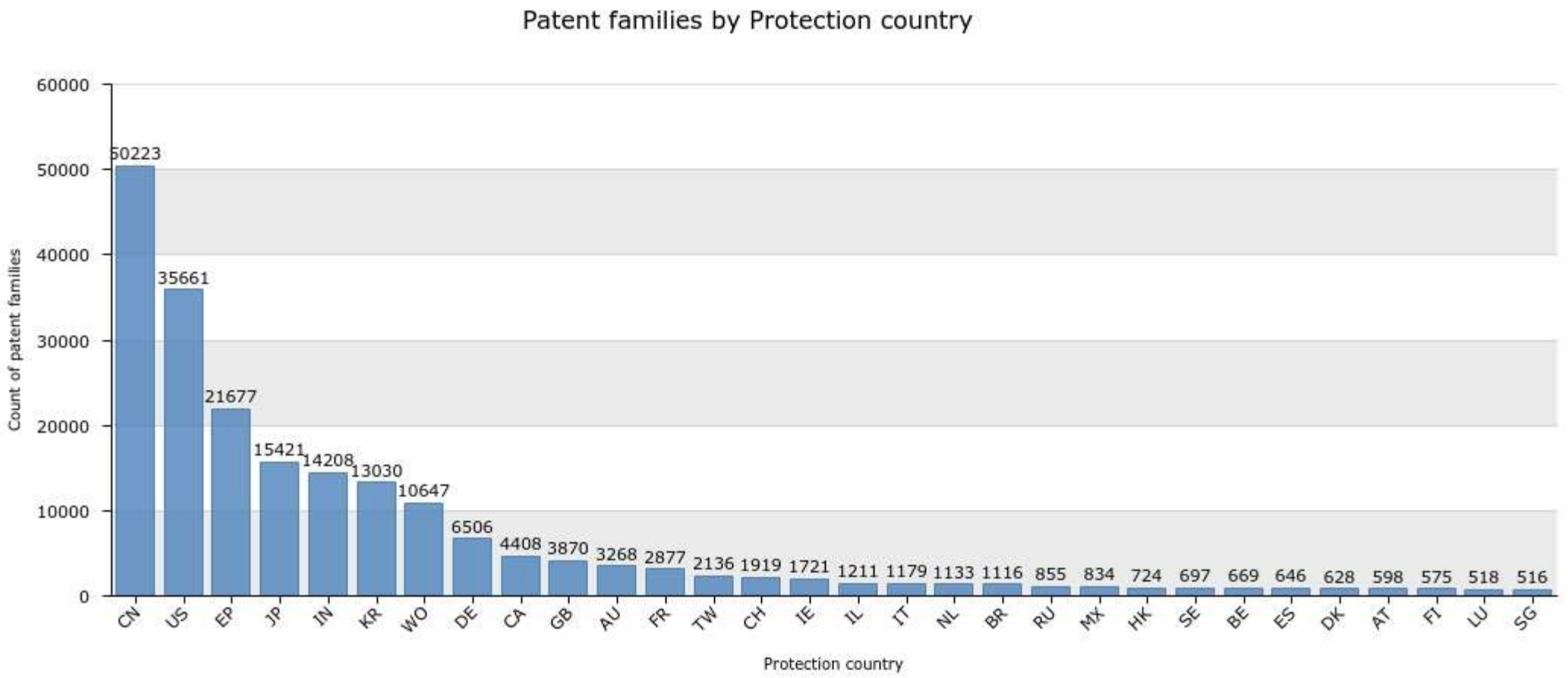
***Ten leading players account for nearly 10% of the global patent portfolio*

Leading Players: Average Age, Forward Citation, and Grant



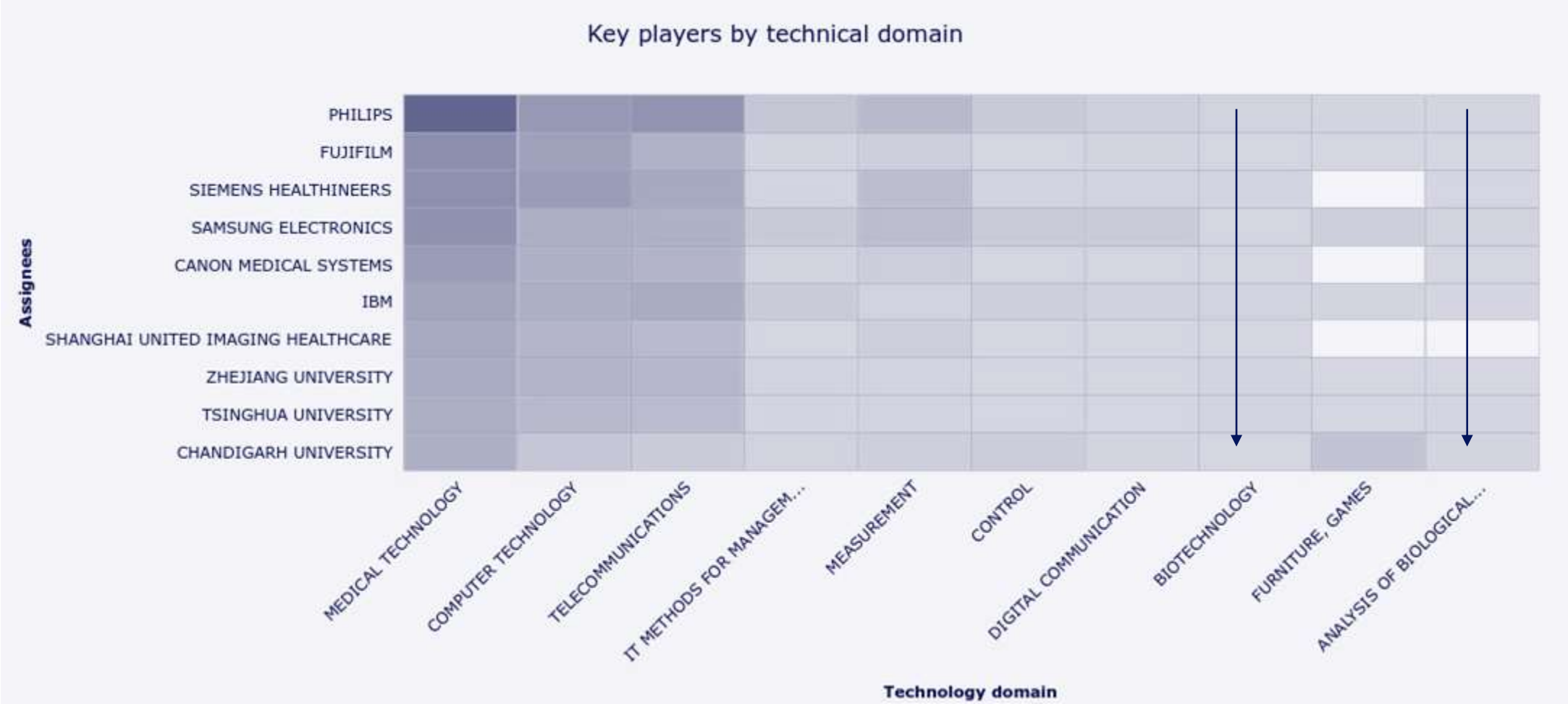
Due to the recent jump in filing trends, the average portfolio age for the top 10 players is very young, ranging from 2.6 to 4.6. The forward's citation of the top 10 players is significantly high.

Geography-wise Patent Filings



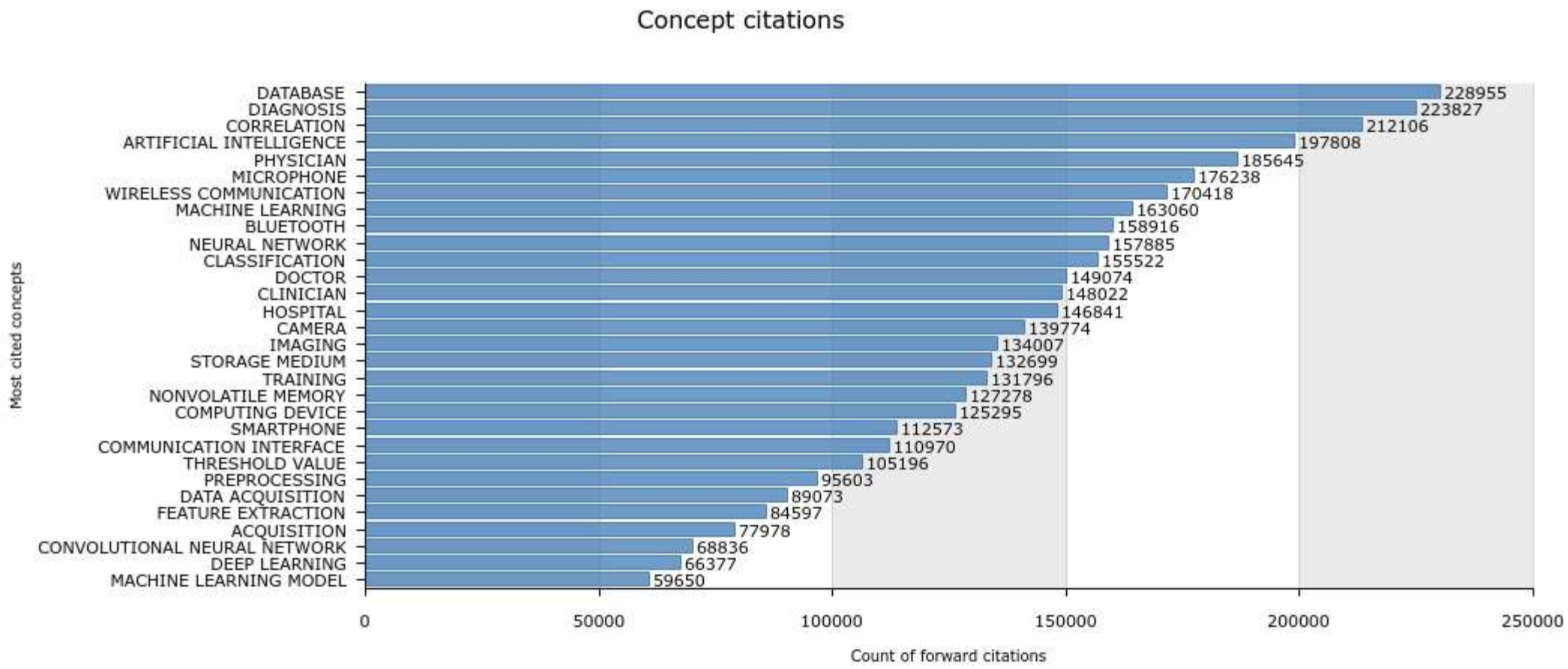
More than 40% of healthcare protections in AI belong to China, followed by the US, EP, JP & IN

Whitespace Analysis



Based on the top assignees' contributions, AI in the biotechnology and analysis of biological material area has more white space than in any other healthcare segment.

Forward Citations Based on Concept



The training dataset and diagnosis emerge as dominant trending concepts. Other identified concepts show significant overlap with database and diagnosis. These insights are derived from an analysis of IPC classifications.

Leveraging AI in biotech is unlocking new potential for defining expansive genus claims, advancing therapeutic innovation

Claims:
1.A method of treating a mutant isocitrate dehydrogenase 1 (IDH1) enzyme-associated central nervous system cancer in a subject comprising: detecting the presence of an isocitrate dehydrogenase 1 (IDH1) mutation in a nucleic acid present in a sample obtained from the subject, wherein the IDH1 mutation is present in a mutant codon that corresponds to a wild type codon that encodes amino acid 132 in the wild type IDH1 polypeptide of SEQ ID NO: 130; and administering to the subject a chemotherapeutic agent to treat the cancer.

8. A method of treating a mutant isocitrate dehydrogenase 1 (IDH1) enzyme-associated central nervous system cancer in a subject identified as having an isocitrate dehydrogenase 1 (IDH1) mutation that is present in a nucleic acid wherein the IDH1 mutation is present in a mutant codon that encodes amino acid 132 in the wild type IDH1 polypeptide of SEQ ID NO: 130, the method comprising: administering to the subject a chemotherapeutic agent to treat the cancer.

"AI-driven platforms provide a powerful tool for innovators aiming to expand the diversity of sequences by templating a broad range of variants from a limited starting set." **However, by reading the claim, AI can't be determined.**

[0156] In addition to the frequency of mutations in a gene, the type of mutation can provide information useful for evaluating its potential role in disease (19). Nonsense mutations, out-of-frame insertions or deletions, and splice site changes generally lead to inactivation of the protein products. The likely effect of missense mutations can be assessed through evaluation of the mutated residue by evolutionary or structural means. To evaluate **missense mutations, we developed a new algorithm that employs machine learning of 56 predictive features based on the physical-chemical properties of amino acids involved in the substation and their evolutionary conservation at equivalent positions of conserved proteins (12). Approximately 15% of the missense mutations identified in this study** were predicted to have a statistically significant effect on protein function when assessed by this method

US10704108B2

How Do We Analyze AI Patents?

Genus claims: breadth vs enablement

Many biotech and pharma patents include so-called "genus" claims, which are directed toward a broad class of molecules defined around a limited number of working examples. Typically, the number of molecules or embodiments covered by such genus claims far exceeds the number that were made, tested, or could ever be practically made or tested.

In contrast, a claim limited to only the embodiments actually tested would often fail to provide an effective commercial barrier for the patentee. Competitors could—and likely would—easily design around the few claimed embodiments, exploiting the patentee's disclosed invention while avoiding infringement of the patentee's claims.

The *Amgen v. Sanofi* case at the U.S. Supreme Court (Amgen) suggests that genus claims may face heightened scrutiny during both examination and litigation. This is particularly significant for antibodies targeting new therapeutic applications.

How Do We Analyze AI Patents?

Identity right patents based on basic data analytics & advanced data analytics categorization

One important aspect of patent analysis is determining whether the patent falls under the basic data analytics domain or the advanced data analytics domain.

Below are pointers to making the right judgment.

Basic Data Analytics	Advance Data Analytics
Historical trends and making informed decisions (based on facts)	Historical data and predicts future outcomes & providing actionable insights
Machine Learning algorithms – Neural Network	Deep learning algorithms: Convolutional Neural Network
Database at local system	Database from multiple system or cloud or data lakes
Supervised Learning	Supervised Learning or Unsupervised Learning

How Do We Analyze AI Patents?

AI Software-enabled patents

It has been noticed that Healthcare patents in AI don’t disclose any AI-related keywords or processes; however, the patent discloses the use of an AI software tool that acts as an enablement. For example, US8187885B2 discloses a method for control for autofluorescence in a microbead kit for quantitative calibration. However, the claims don’t teach anything about AI-related inventions.

Detail Description:

A list mode **FCS data file is imported into FlowJo analysis software (TreeStar Inc., Ashland, Oreg.) and gated to allow separate analysis of each microbead population**. The manufacturer determines each microbead population's ERF or MESF value and provides it with the kit.

How Do We Analyze AI Patents?

Imaging & Non-imaging patents

Healthcare patents deal with a lot of image-based analysis. There are two types of patents, of which one deals with image processing and the other with computer vision. Image processing deals with improvement in the input image, whereas computer vision deals with processing an image with AI. Categorizing such patients in the right bucket is important, and below is the table to classify such patients.

Imaging Patents	Non-imaging Patents
Image Processing	Computer Vision = AI + Image Processing
Output is an image	Output is a description which does a prediction or gives a probability
Example: Image enhancement	Example: Identify objects from an image for decision-making
Imaging Patents	Non-imaging Patents

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