

Hierarchical relations enable a patent researcher to evaluate his or her position effectively. When searching, one begins with a few keywords from his knowledge domain, his field of training, or a recent case he has handled. On his search adventure, the retrieved search results provide him with hints. If he identifies a good number of relevant patents, he wishes to navigate more closely; he learns new keywords and may choose to narrow the next set of search results by adding the new keywords to tighten up the search criteria. In contrast, if he discovers patents that are largely unrelated, he will want to navigate away, de-focusing by reducing his keywords or re-focusing by altering his keywords. Consequently, he updates his search terms and phrases based on the returning results and iterative trial-and-error.

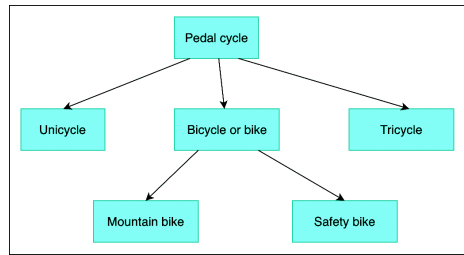


Figure 1: Hierarchy and relative positioning around "bike" words.

Examiner's Automated Search Tool (EAST) of the United States Patent and Trademark Office (USPTO) is intended to ease such iterative process, which examiners use to dynamically update information and efficiently refine the keywords [1].

When refining, identifying the relative positions of the various keyword options is

a critical step. A mountain bike, for instance, is a sort of bicycle. If the word mountain bike is included in an invention disclosure, the claim scope will be limited to bicycles designed for mountainous terrains. While the original intention was to highlight a bike optimized for challenging road conditions, such word usage may inadvertently limit the scope of the invention, therefore raising questions if the IP right was asserted over general purpose bikes.

As such, a mountain bike is a hyponym of a bike, as it refers to a specific sort of bike. In contrast, a bike is an umbrella term that encompasses the mountain bike, i.e. a hypernym of the mountain bike, as depicted in Figure 1.

Consider another example: a structure is an abstract form of an artifact, however an artifact can also refer to other physical forms, such as measurement devices or commodities made for commercial exchanges.

Hypernyms are linguistic terms that refer to expansive categories or ideas. If a search yields insufficient results, a hypernym will relax the criteria to include additional results. A hyponym, on the other hand, describes things in greater detail, narrowing the search by producing fewer but more precise results. As summarized in Table 1, the selection of keywords has direct implications when used as feature terms in the claim scope of a patent or as search terms to locate documents.

Similarly, when analyzing a concept, it is beneficial to observe the hierarchy, so that one understands the relativity of keywords. Figure 2 shows a radial of beamforming, a critical 5G technology.

At the upper right of the radial, for example, "UE Rx beam direction" is shown to comprise sub-concepts in its child nodes, such as beam change (upon angle adjustment), angle (for selection), beam coverage (for detection), detection (for a valid beam range), and failure recovery (upon out of range). As such, if an invention relates to the spatial reception (Rx) characteristics of an user equipment (UE), e.g., a smartphone or a laptop when the beam peak direction is initiated, the reception considerations are characterized by these mechanisms as calculated based on a changing environment as the UE moves. Therefore, a procedural patent that governs the Reception in general has a broader scope than a functional patent that optimizes beam angle selection specifically.

Hierarchical position	Hypernym	Hyponym	
higher level	descriptive	lower level	
Range of meaning in a patent claim	wider scope coverage	specific	narrower scope coverage
If used as a keyword in a search engine	generates more results	generates less results	
	expects lower direct relevancy	expects higher direct relevancy	
	noisier results	more targeted results	
	potentially more false positives, as descriptive terms generate more matched but irrelevant results	potentially more false negatives, as descriptive terms preclude mismatched but relevant results	
Example 1	pedal cycle	unicycle bicycle tricycle mountain bike safety bike	Syntactic Relativity A unicycle, a bicycle, and a tricycle are types of pedal cycles, based on the number of wheels. A mountain bike is a type of bicycle suited for mountainous terrain. A safety bike is a type of bicycle designed to meet certain safety standards, such as those for transporting young children.
Example 2	artifact	structure instrumentation commodity instrumentation	Structure is an abstract form of a human artifact. Instrumentation is a physical form of a human artifact. A commodity is a material form of a human artifact intended for commercial transactions. For detecting fires by measuring the number of small particles in the air. For measuring temperature.

Table 1: Hypernym-hyponym relationships and examples.

At the lower left of the radial, as another example, "UE Rx beam selection" involves the physical sub-concepts such as width, pair, shape, alignment, steering, and multi-beams. Hence, beam selection is determined by capability parameters during spatial reception: the number of beams used, shape of the beam (for determining width), information on the beam pattern, spherical coverage, pair and alignments.

He who controls the keyword controls the outcome.

The quality of keyword strategies determines the quality of IPR strategies. Utilizing high-quality keywords renders the following direct benefits:

- better results, NOT more results, as options are visualized and well understood;
- transparency, as relativity can be understood from the hierarchically;
- explainability of the search strategy: how high/low level words affect results, or, whether to zoom out with a hypernym or zoom in with a hyponym;
- consistent landscaping, which can be executed methodically, leads to accurate interpretations;
- strategic keyword deployment to minimize ambiguity yet retain broadest scope possible;
- ability to crosscheck search results that are otherwise precluded by the CPC hierarchy;
- ability to crosswalk terminologies and render insight into term mapping and claim charting efforts;
- ability to construct topic taxonomy to support claim drafting and standard essentiality mapping;
- ability to improve patent portfolios by learning the positions, roles and interactions of keywords;
- ability to calibrate understanding of formerly pocket-listed keywords; and,
- ability to learn new words and new opportunities.

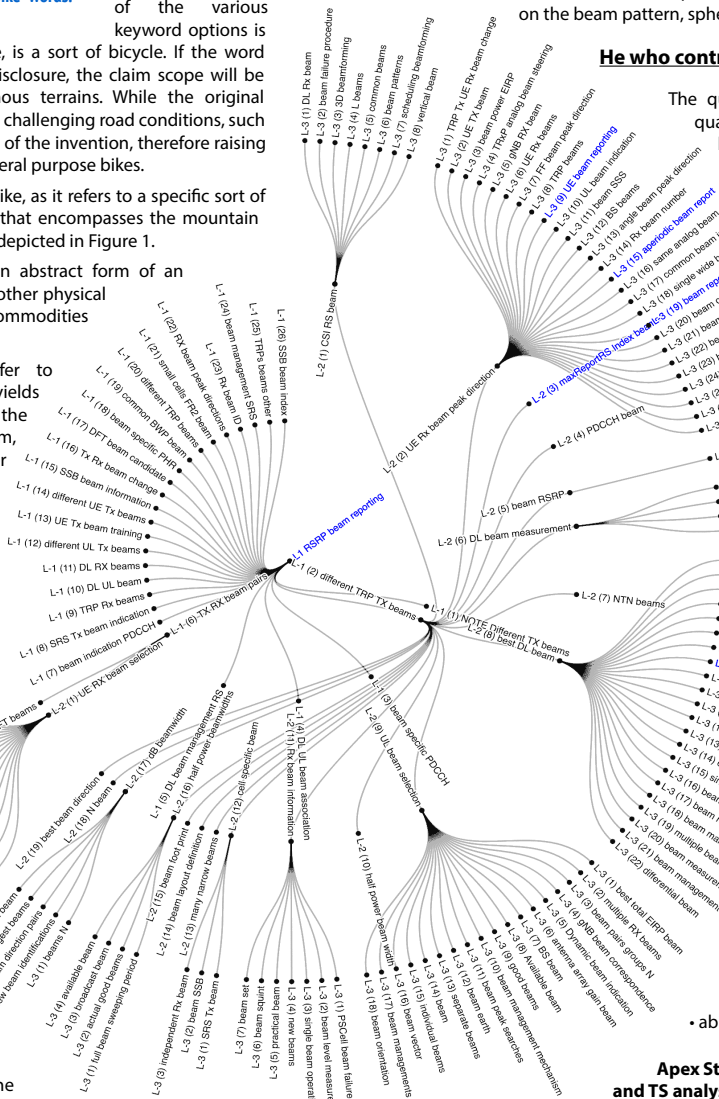


Figure 2: Hierarchy of "beamforming" technologies.

Apex Standards is providing clients in the TDoc, SEP, and TS analysis platforms with new hierarchical keyword analysis plugins. For more, email support@apexstandards.com

References

- [1] USPTO EAST 902.03(e) Search Tool: www.uspto.gov/web/offices/pac/mpep/s902.html
- [2] Apex Standards Claim Construction: www.apexstandards.com/asconst.pdf
- [3] Apex Standards Claim Charting: www.apexstandards.com/apex.pcc.pdf