

# **INTERNSHIP ON THE RESPONSIBILITIES OF PATENT RESEARCH ANALYST**

*Thesis submitted in fulfilment of the requirements for the*

*Degree of*

**BACHELOR OF TECHNOLOGY**

**IN**

**BIOTECHNOLOGY**

**By**

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Also, I am extremely grateful to my parents for their constant encouragement and for providing us with all the necessary resources required for the successful continual of the internship.

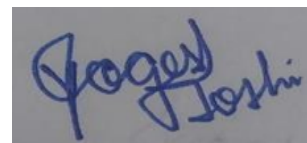
Date: 14th May 2022

## Declaration

I, Yogesh Joshi hereby declare that the project thesis titled “Internship on the Responsibilities of Patent Research Analyst” has solely been submitted by me to “Jaypee University of Information Technology” under the guidance and supervision of Mr. Punit Talwar and the work for the same has been carried out at “Talwar and Talwar Consultants and Services Pvt. Ltd., Mohali”. The project work for 7<sup>th</sup> semester titled “Phytochemical analysis of two valuable traditional underutilized plants of Himachal Pradesh” was carried out under the able guidance of Dr. Hemant Sood at JUIT, Wagnaghat. All the information & statements made by me are correct to the best of my knowledge. My candidature is liable to be cancelled and legal action may be initiated against me in case the information provided is found to be false or incorrect in any way.

Place: Shimla

Date: 14th May 2022



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**TRAINING LETTER**

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Yogesh Joshi (Employee Code: TTC-623) is working with Talwar & Talwar Consultants Pvt. Ltd. since 7 February 2022 as Intern- PRW.

Till now, his performance has been satisfactory.

We wish him all the best for future endeavors.

**For Talwar & Talwar Consultants Pvt. Ltd.,**

*Sna Rikhi*

Authenticated through  
Legality.com (6PL6UA3)  
Sna Rikhi  
Date: Fri May 13 15:04:27 IST  
2022

**Authorized Signatory**

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## Chapter -1: Company Introduction

### 1.1 Introduction:

TT Consultants (Talwar & Talwar Consultants) is a business consulting and services firm headquartered in Sunnyvale, California, USA. The leading Intellectual Property (IP) firm was established in 2006 and offers comprehensive IP and Innovation support services. Through locations in India, the United States, and Taiwan, the organisation has a global footprint. Throughout the innovation lifecycle, from ideation to asset monetization, the company collaborates closely with innovators, corporations, attorneys, and research groups to create tailored solutions. The company provides high-end technical solutions, and its multilingual searches in Taiwanese, Chinese, Japanese, and Korean help clients stay ahead of the competition. The organisation has used valuable and less intrusive methods and believes in gaining rather than purchasing clients. Its clientele includes the likes of Fraunhofer, Greenberg Traurig, Morgan Lewis, Samsung, Gibson Dunn to name a few. Many of the world's largest enterprises, law firms, institutions, and other IP fraternity are served by it. The company assists its customers in making money, defending IP litigation, lead innovation in their sector and make the best use of their IP budgets.

Mission: To facilitate strategic decisions and Impact by providing data driven solutions by best-in-class workforce and other advanced technologies.

Vision: To become a leader in the innovation ecosystem by reaching every company around the globe through our services and products.

Values: Innovative, competence, honesty, excellence, humility, transparency, leadership and helpful.

### 1.2 Company's Management & Executives:

Position/Role	Person
Mentor & Non-Executive Founder	Jitin Talwar
Chairperson	Komal Talwar
Chief Executive Officer	Dr. Nirmal S. Basi



Chief Executive Officer APAC	Jun Chen
Director – Business Development	Dr. Stephen Gucker
Head of Human Resources	Anshuman Singal
Vice President – Business Development	Sameer Goel
Vice President – Business Development	Ranjit Singh
Customer Relations (Japan)	Yoshikazu Tanaka
Vice President – Operations	Vineet Sharma
Vice President – Operations	Ashish Sharma
Vice President – Market Research	Kanika Rajdev

Table 1: List of company's key members/employees with their position.

### 1.3 Services & Solutions Provided by TT Consultants:

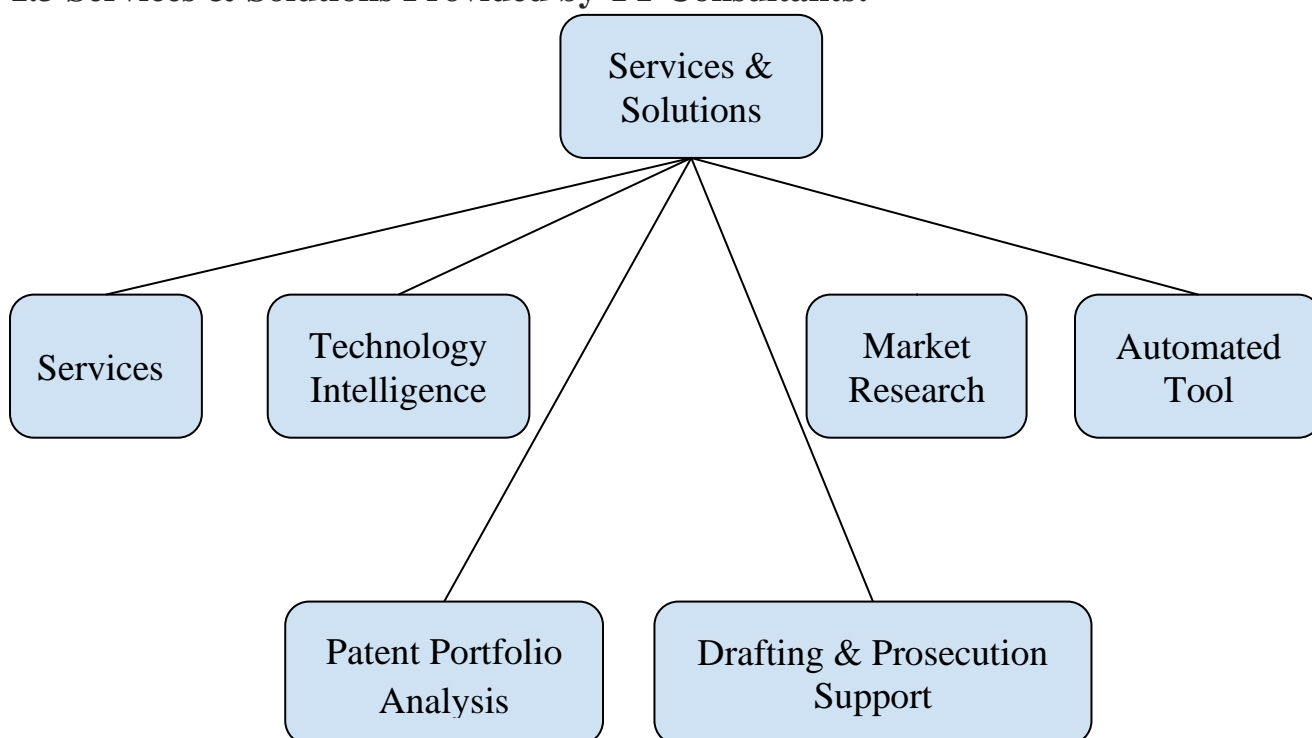


Fig 1: Services & Solutions provided by TT Consultants

**Services:**

- 1)- State-of-the-Art (SOA) Patent Search
- 2)- Patentability Search
- 3)- Invalidation/Validation search
- 4)- Design Search
- 5)- Freedom-To-Operate (FTO) Search
- 6)- Infringement Search

**Patent Portfolio Analysis:**

- 1)- Patent Portfolio Optimization
- 2)- M&A- Due Diligence
- 3)- Patent Ranking
- 4)- Patent Monitoring
- 5)- Patent Portfolio Commercialization

**Technology Intelligence:**

- 1)- Landscape Analysis
- 2)- Technology Scouting
- 3)- Technology Tracking
- 4)- Whitespace Analysis
- 5)- Competitor Benchmarking

**Drafting & Prosecution Support:**

- 1)- Patent Drafting & Illustrations
- 2)- Office Action Response

**Market Research:**

- 1)- Bespoke Market Research
- 2)- 360° Solutions

**Automated Tool:**

- 1)- Xlscout

## Chapter 2: Introduction to Intellectual Property

### 2.1 Introduction

Intellectual property (IP) refers to intangible creations such as ideas, designs, creative work, invention or a manuscript of the human mind (intellect) considered to be the property of its creator/inventor.

Intellectual property right (IPR) refers to the right of an inventor to protect and derive economic benefits from his/her intellectual property like an invention etc.

#### Features of IP

- It is the creation of the human mind (intellect).
- It is an intangible property.
- It is time bound and territorial.
- It is attended with limitations and exceptions.

#### Benefits of IPR:

- It encourages innovation.
- Allows exchange of knowledge.
- Protects the creator and their invention.
- Allows commercial return to inventors.
- Allows work to be used in the public domain.

### 2.2 Types of IPR

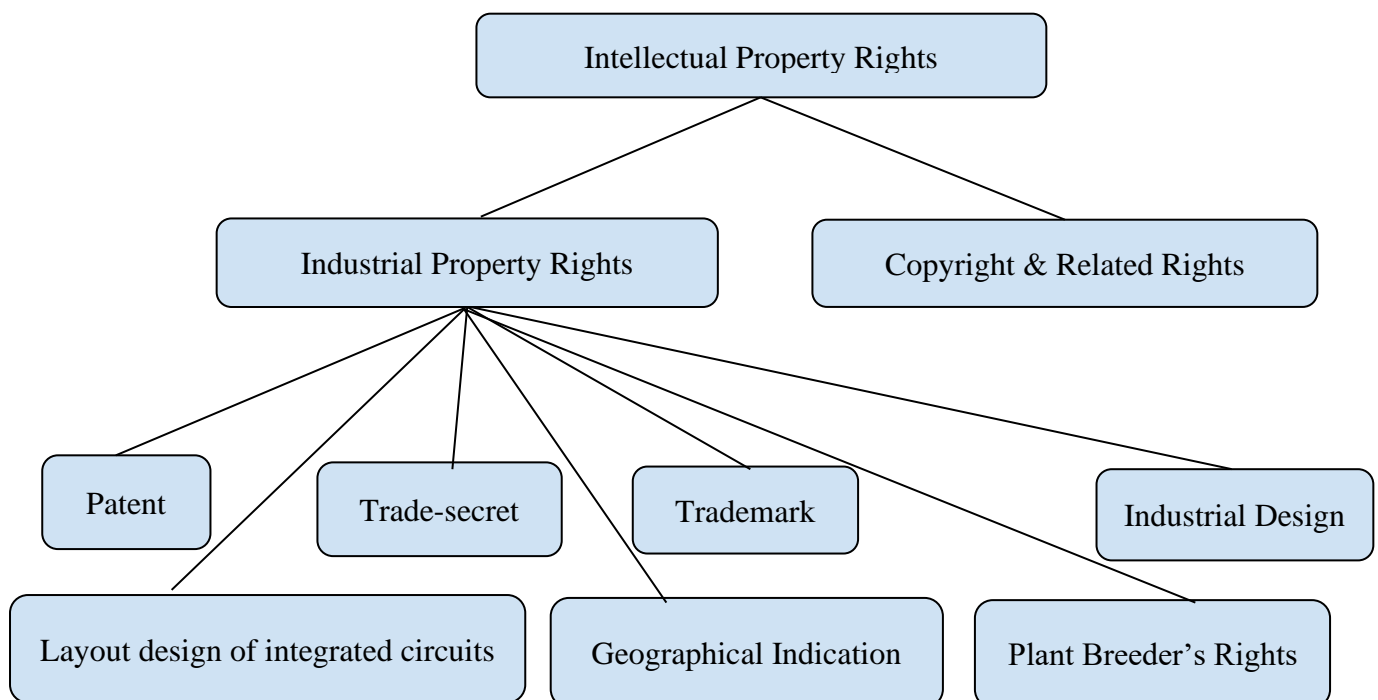


Fig 2: Types of Intellectual Property Rights

**Patent:**

It is defined as an exclusive right conferred by the national government for a new or improved product or process capable of industrial application developed by the inventor or patent holder.

Validity: 20 years from the filing date of regular application.

**Trade secret:**

It refers to a formula, practice, process, patterns, methods, techniques, marketing strategies, manufacturing process or compilation of information, which is unknown to the public or reasonably ascertainable, which is vital to the operation of business organization and allows the enterprise to obtain an economic advantage over its competitors.

Validity: Unlimited period of time

**Trademark:**

A trademark (trade-mark or trade mark) is a distinguishing symbol or signal used by a person, business, or legal body for identification of a product's origin, its quality and its manufacturer. A name, word, phrase, logo, symbol, design, image, or a combination of these components is usually used.

Different designations of Trademark-

- ™: Unregistered Trademark
- SM: Unregistered service mark
- ®: Registered Trademark

Validity: 10 years from filing date. (renewable)

**Industrial Design:**

It covers the whole or part of a product's ornamental or aesthetic aspects. It covers both 2D like patterns, lines or colour and 3D features like shape/surface.

Validity: 15 years

**Integrated Circuit Layout Design:**

It covers the layout of circuit design on semiconductor, which is an integral part of a chip. It was introduced to tackle the possibility of copying by photographing each layer of an IC and thereafter make its clones. It is also essential to protect layout designs (topographies) of IC to regard huge investments in terms of both time and monetary resources.

Validity: 10 years from filing date.

**Geographical Indication:**

It is a name or sign used on goods manufactured or produced in a particular geographical area given that the goods in question have qualities, a reputation, or features that are primarily attributed to their place of origin, such as climatic circumstances. Some examples include Mysore sandalwood oil (Karnataka), Kangra tea (Himachal Pradesh), Chanderi saree (Guna, Madhya Pradesh).

Validity: 10 years (renewable)

**Plant Breeder's Rights:**

Plant breeder's rights (PBR) refer to the exclusive rights conferred to the holder allowing him/her commercial monopoly for a period for the registered plant variety. These protect a plant variety's propagation material, such as seeds, cuttings, graftings, and so on. It is essential for the new plant variety to be distinguishable from others, as well as uniform and stable.

Validity: 25 years: trees and vines

20 years: other species.

**Copyright & Related Rights:**

The legal protection afforded to the owner of the rights to an original work made by him is known as copyright. It is divided into two categories: economic rights and moral rights.

Reproduction, broadcasting, public performance, adaptation, translation, public recitation, public display, and distribution are examples of economic rights.

The author's moral rights include the right to object to any distortion, mutilation, or other change of his work that could harm his honour or reputation.

Related rights refer to the rights that performers, phonogram manufacturers, and broadcasting organisations have in relation to their performances, phonograms, and broadcasts.

Related rights differ from copyright in that they pertain to people who act as middlemen in the creation, recording, or distribution of works.

Validity: 70 years plus the author's life (or for some works 95 years from first publication)

## Chapter 3: Patent

### 3.1 Introduction

Patent refers to a legal document which gives an inventor exclusive right to make, sell, use and gain monetary benefits from an invention and prevent others from doing so.

#### Conditions for Patentability:

- Novelty factor in invention.
- Existence of an inventive step.
- The invention should be able to be used in industry
- Invention must be non-obvious.

#### Non-Patentable Items:

- Laws of Nature
- Mental Processes
- Computer Software
- Abstract Ideas
- Methods of conducting Business
- Printed Matter

#### Advantages of Patents:

- Helps gain monopoly over market
- Competition is killed/restricted.
- Allows generation of revenue through licensing or sale.
- Grants a product credibility.
- Market yourself

#### Disadvantages of Patents:

- High cost of filing fee for a patent application
- Liability
- Limitation of time
- Limitation of space

### 3.2 Classification of Patent

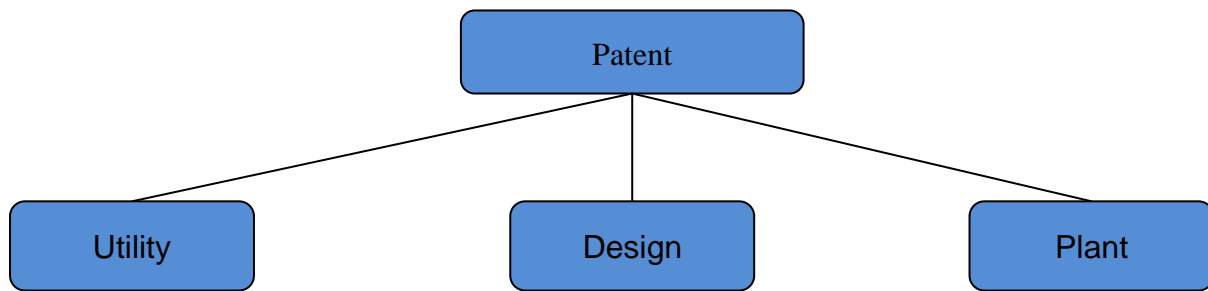


Fig 3: Classification of Patents

#### **Utility Patent:**

A utility patent is granted for inventions or embodiments of ideas, which are new, useful and non-obvious. It comprises five categories namely process, product (manufacture), machine, composition of matter and improvement of an existing idea.

Types of Utility:

- 1)- General Utility: Functional requirements
- 2)- Specific Utility: The necessity that the invention accomplish the function.
- 3)- Moral/Beneficial Utility: A condition that does not poison, promote debauchery, or facilitate private assassination.

#### **Design Patent:**

A design patent covers a new and original design feature which is ornamental (non-functional) in nature of a manufactured device. It is only valid for 14 years after it is issued.

#### **Plant Patent:**

A plant patent is granted for invention or discovery or asexually reproducing a novel plant variety. It is not applicable to a plant existing in uncultivated state or a tuber propagated plant and it's necessary that the plant is stable. Any asexual reproduction mode which produces true genetic copy of the plant is valid. Examples of such modes include bulbs, rhizomes, runners, tissue culture, grafting, budding, layering among others.

### 3.3 Glossary Related to Patents

#### **Applicant:**

Any person or an organization which files a patent application is referred to as an applicant. An application can have more than one applicant.

**Application Number:**

A patent application is assigned a number at the time of filing. This number is called the application number. An application number comprises a country code, filing year and a serial number.

**Inventor:**

An inventor refers to a person responsible for creation or development of invention. An application can have more than one inventor and an applicant can also be the inventor.

**Description:**

It is a section of the patent application that describes the invention, the technical sector, and also specifies prior art known to the applicant.

**INPADOC:**

INPADOC stands for International Patent Documentation. It basically is a patent family. It may be defined as a collection of patent documents sharing the same technical field. At least one priority is shared among any two members.

**Priority Number:**

It is the same as the application number of the claimed priority document and relates to the number of the application for which priority is claimed.

**Publication Number:**

It refers to the number assigned to a patent application when it's first published. It comprises a country code and a serial number.

**Patent Family:**

A group of interconnected patent applications filed in one or more countries to protect the same or a comparable invention by the same inventor and linked by a common priority date (or priorities).

**Legal Events:**

It refers to legal procedural steps encountered during grant or post-grant stage.

**Citations:**

Citations refers to quoting/mentioning of one document by another due to two having similar content or like belonging to the same field of invention etc.

Example: Patent X (2015) is cited by Patent Y (2021).

Here, Patent X is a backward citation of Patent Y and Patent Y is a forward citation of Patent X.

- The newer document is called a citing document.
- The earlier document is called a cited document.



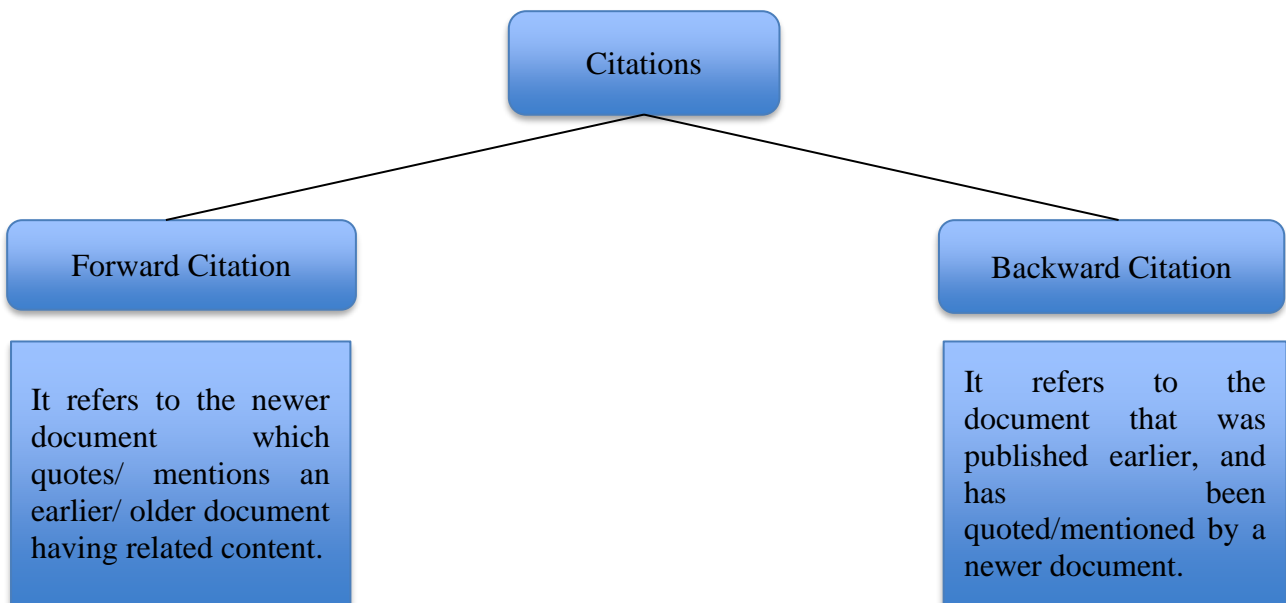


Fig 4: Types of Citations

**Claims:**

Claims refer to the part of the patent application which describes the technical features of invention.

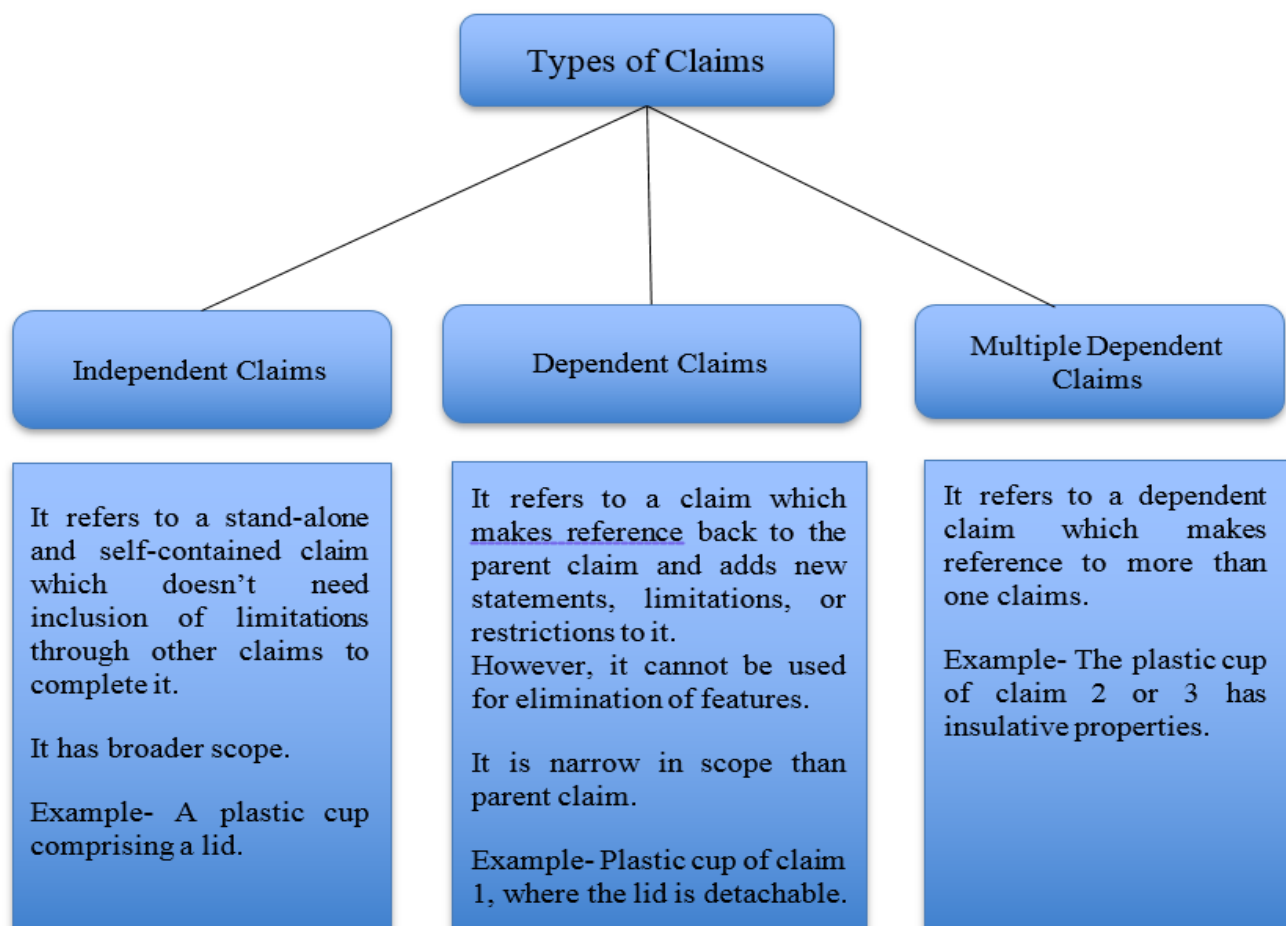


Fig 5: Types of claims

## Chapter 4: Patent Application

### 4.1 Introduction

It refers to the legal and administrative steps involved in obtaining a patent for an innovation. It can also be defined as a physical document comprising a written description of the invention that permits a person competent in the relevant technical field to create and use the invention.

### 4.2 Types of Patent Applications

#### **1)- Provisional Application:**

It refers to a temporary application filed when the invention is still under research and development, but the inventor wishes to get a priority date. It is required to include specification i.e. description and drawing(s) but doesn't require formal claims. It offers various advantages to inventor mentioned as follows:

- Preserve a priority date
- Extra one year to fully develop the invention
- An additional year of protection
- Constructively reduce an invention to practice
- Preserve a non-US Priority date
- Permits the applicant to use the phrase "patent pending" on products

Besides several advantages as mentioned above, several limitations are also associated with provisional applications given as follows:

- Increase in overall cost of patent filing
- Requirement of sufficiently detailed and well-stated disclosure of invention
- One-year filing deadline
- Potential loss of trade secrets
- False sense of security

#### **2)- Non-Provisional Application/ Ordinary Application:**

It refers to an application filed in the Patent Office where the applicant doesn't have any priority to claim or when the application lacks a reference to any preceding convention application. It includes a written document consisting of both detailed description and claims, an oath/declaration, drawings if necessary and filing fee.

**3)- Convention Application:**

It's an application claiming priority date based on similar or nearly identical applications submitted in "convention nations," or countries that have signed the Paris Convention for the Protection of Intellectual Property. It must be filed within 12 months of the date on which a similar application was originally filed in the convention country.

**4)- PCT International Application:**

It is an international application which streamlines the patent application process in several countries at the same time. It is governed by and filed under Patent Cooperation Treaty. It is validatable in around 142 countries. There are several pros of filing a PCT application mentioned as follows:

- Helps seek protection in up to 142 countries by filing just one international application.
- Allows an applicant time to assess an invention's value, viability and potential markets as it gives 31 months from the date of international filing or priority date to enter the national phase.
- Allows the applicant to assess the novelty and inventiveness of his/her invention by analysing the International Search Report, which cites prior art.
- Allows the applicant to get an idea on feasibility of patentability by requesting an International Preliminary Examination Report.
- Priority date acquired from a PCT application is recognized internationally.

**5)- PCT National Phase Application:**

It's a Patent Office application that claims precedence over an international filing date. It's an application that results from a PCT filing. In India, a National Phase application must be filed within 31 months after the PCT application's filing or priority date, whichever comes first.

**6)- Patent of Addition Application:**

It is an application filed when there is a slight modification or improvement in the invention and doesn't involve any substantial inventive step for which a patent is already granted. Only after the parent patent has been issued is a patent of addition granted. As a result, there is no need to pay a separate renewal cost. In case the parent patent is revoked, the applicant can request for conversion of patent of addition into an independent patent.

**7)- Divisional Application:**

It is an application divided out of the parent application due to the application claiming two or more inventions. It is filed by the applicant on his own will or if an objection is raised by the Patent Office.

### 4.3 Structure of Patent Application:

- Title
- Abstract
- Field of invention
- Background
- Summary
- Brief description drawing
- Detailed description drawing
- Detailed description
- Claims
- Drawings

### 4.4 Patent Administration in India:

These are 4 patent offices in India-

- Kolkata (Head Office)
- Mumbai
- Delhi
- Chennai

### 4.5 Principal Dates Related to Patent Application:

**Invention Date:** It refers to the date of completion of invention.

**Filing Date:** It refers to the date when application was validly filed or was deemed to fulfil all filing requirements and necessary parts like specification, claims and drawings are filed with a patent office.

**Priority Date:** It refers to the initial date on which a patent application was filed somewhere on the planet. It is also referred to as an “effective filing date”.

**Issue Date:** It refers to the date when the patent is issued by the patent office. It is also known as “grant date”.

**Publication Date:** It refers to the date of publish of a patent document which renders it as a part of the SOA. It usually organization after 18 months after priority date.

**Expiry Date:** It refers to the date when patent term ends, and patent is free for use in public domain with no protection to inventor.

## Chapter 5: Patent Classification System

### 5.1 Introduction

- It refers to the way of arranging documents like patent applications by patent examiners or patent offices for quick discovery/detection of documents disclosing similar inventions or making similar claims to the patent in question.
- Its primary purpose is facilitating searching and retrieval of patent documents.
- Searching based on classification has both pros and cons mentioned as follows:

#### Pros:

- Provides more exhaustive results than text-based searching
- It is independent of text language and change in terminology.
- Allows for concept search
- Handy in case of old patents which lack full text of claims/description.

#### Cons:

- Classifications have a complex structure.
- One requires knowledge of classification rules to utilize it.

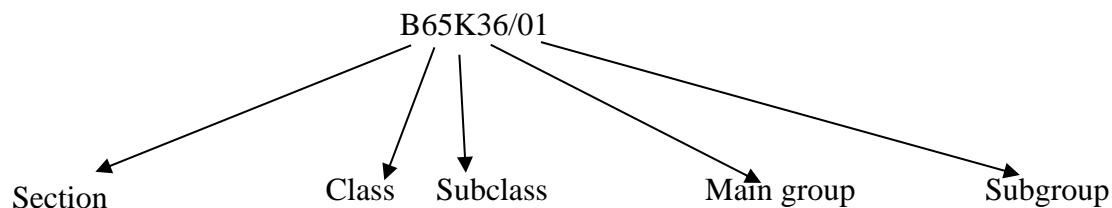
### 5.2 Types of Classification Systems:

#### 1)- International Patent Classification (IPC)

- It is a hierarchy-based patent classification system which uses language-independent symbols to classify patents.
- It categorises on the grounds of technical field of patents.
- It was introduced in 1968.
- It uses two types of classification designations namely core classification designation and advanced classification designation. The former is revised every 3 years whereas the latter is revised every 3 months.
- IPC classification system consists of 5 main hierarchical levels given as follows:
  - ❖ Level 1 – Sections (A-H)
  - ❖ Level 2 – Classes
  - ❖ Level 3 – Subclasses

- ❖ Level 4 – Main groups
- ❖ Level 5 – Subgroups

Example: B65K36/01



## **2)- European Patent Classification (ECLA):**

- ECLA is maintained and designed by the European Patent Office (EPO).
- It acts as an extension of the IPC classification system.
- As with IPC, ECLA also has sections divided from A-H and has the same further hierarchy levels namely classes, subclasses, groups and sub-groups.
- Example: D05H7/00
- ECLA may use addition of another subgroup to the IPC subgroup for further division in scope as represented in the example ahead.
- Example: D05H7/00H3
- Some major advantages offered by ECLA include maintenance and creation by highly skilled professionals, narrow class definitions, accelerated revision schedules and non-patent literature indexing.

## **3)- US Patent Classification (USPC):**

- This classification system only applies to US patent documents.
- Despite it being limited to only US patents it is still widely used as US patents are an essential part of prior art search.
- It was introduced in 1968, the same year as the introduction of IPC.
- It classifies using a class and subclass with the former being a 3 digit whereas the latter being a 6-digit number, in which the last 3 digits are decimal places.
- A slash separates these classes and subclasses.
- Example: 705/312.558

**4)- Cooperative Patent Classification (CPC):**

- It is the result of joint development by EPO and USPTO. The two offices harmonized their existing classifications systems namely ECLA and USPC respectively.
- It replaced the ECLA system on 1<sup>st</sup> Jan 2013 and the USPC system in 2015.
- Now, both offices use the CPC system.
- CPC was launched with 2 major objectives, First, improving patent searching and second, sharing resources.

**5)- Locarno Classification (LOC):**

- This international classification system is used for the purpose of classifying industrial designs.
- It was established in 1968 at a conference held in Locarno hence the name.
- The LOC system consists of a class, a subclass, an alphabetical list of goods and explanatory notes.

Other classification systems include Japanese FI and F-term Classification, Canadian Patent Classification (CaPC).

## Chapter 6: Patent Cooperation Treaty

- PCT refers to the international patent law, multilateral treaty, which provides an unified approach for international patent protection.
- A single patent application filed under the PCT with Receiving Office (RO) protects invention in all of its contracting members/states.
- The International Searching Authority (ISA) provides a search report and comments on the patentability of the invention.
- It doesn't grant patents because "universal patent" doesn't exist. To receive a grant, one must first enter the national/regional phase and apply for a patent.
- It is the most cost-effective and strategically advantageous method of all approaches for protecting patents internationally.
- The state parties/ contracting states of PCT together establish the International Patent Cooperation Union.

### Function of WIPO in PCT:

- WIPO is the administrative organization which supervises the international applications being filed under the PCT.
- Additionally, WIPO is responsible for examining applications to check them for adherence to formalities of filing.
- Furthermore, WIPO is accountable for publishing PCT applications and their related information on its website.
- WIPO is also liable for PCT application and other related documents' translation into English or French.

### Alternatives for Filing Applications Under the PCT:

Alternative 1: Submit an international PCT application that meets PCT formality requirements and pays a single set of fees.

Alternative 2: Within 12 months, file a national application followed by a PCT application.



**Application Procedure/ Timeline of PCT:**

## Chapter 7: Patent Searching

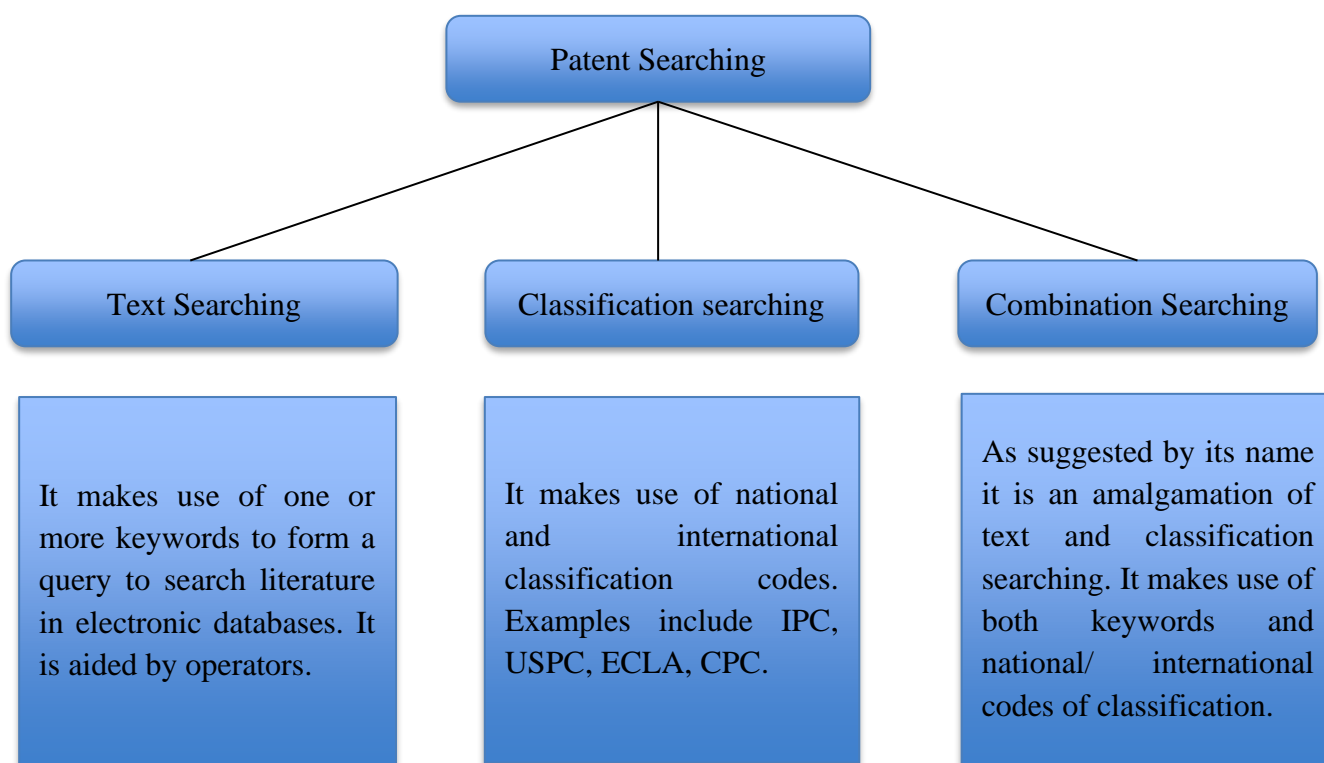


Fig 6: Classification of Patent Searching based on approach/method

### Classification of Patent Searching based on Purpose:

#### **1)- Novelty Search:**

It is the most commonly performed patent search and is also known as the Patentability search. Novelty Search comes into practice when an inventor intends to find a product/process similar or identical to the invention he/she has developed so as to check the feasibility of patenting his/her invention.

#### **2)- Validity Search:**

Validity Search, also called Invalidation Search, aims to look out for patents which have been granted erroneously as a result of missing some relevant prior art. It often is used by companies which have been sued for infringing upon another company's patent. As a result, these sued companies wish to invalidate the patent in question so that the patent owner (company) loses legal rights of protection on the patent and eventually win infringement cases.

#### **3)- Infringement Search:**

Infringement search comes into play when a company wishes to identify any potentially infringing products, standards or services based on the subject patent's technology. It helps recognize another

company which may be making, selling or using the patented product without licensing or consent of the company.

#### **4)- Freedom-To-Operate (FTO) Search:**

FTO Search is performed for determining whether a product or process infringes upon a valid patent or pending patent applications at a given point in time in a specific jurisdiction or market. It is generally performed before launching a product into a market. It is also known by the names of Clearance Search, Right-to-Use Search or Right-To-Market.

#### **5)- State-Of-The-Art (SOA) Search:**

SOA search is an exhaustive search that helps identify the existing prior art and encapsulates the present situation of development technology or sub-technology of interest. It helps a person, or a company assess and analyse their R&D activities and commercial viability. It is helpful both when one is plunging into a new field of technology or when one wishes to fine-tune or change their strategies for R&D and commercialization.

#### **Date Criteria for Different Patent Searches:**

S.No.	Patent Search	Date Criteria
1	Patentability Search	No limit/ restriction
2	Invalidation Search	$\leq$ Earliest Priority Date
3	Infringement Search	$\geq$ Earliest Priority Date
4	FTO Search	Within 20 years
5	SOA Search	No limit/ restriction

Table 2: Different patent searches with respective date criteria.

## Chapter 8: Tasks Performed/ Projects Undertaken

**\*\*Note:** Due to the company's non-Disclosure policy and Confidentiality agreement I am bound to not disclose the particular and comprehensive projects or their details like report, charts, graphs, queries etc. I have worked on. Hence, I present here the general nature of tasks I performed during the internship period so far.

### 1)- Learnt Search Procedure:

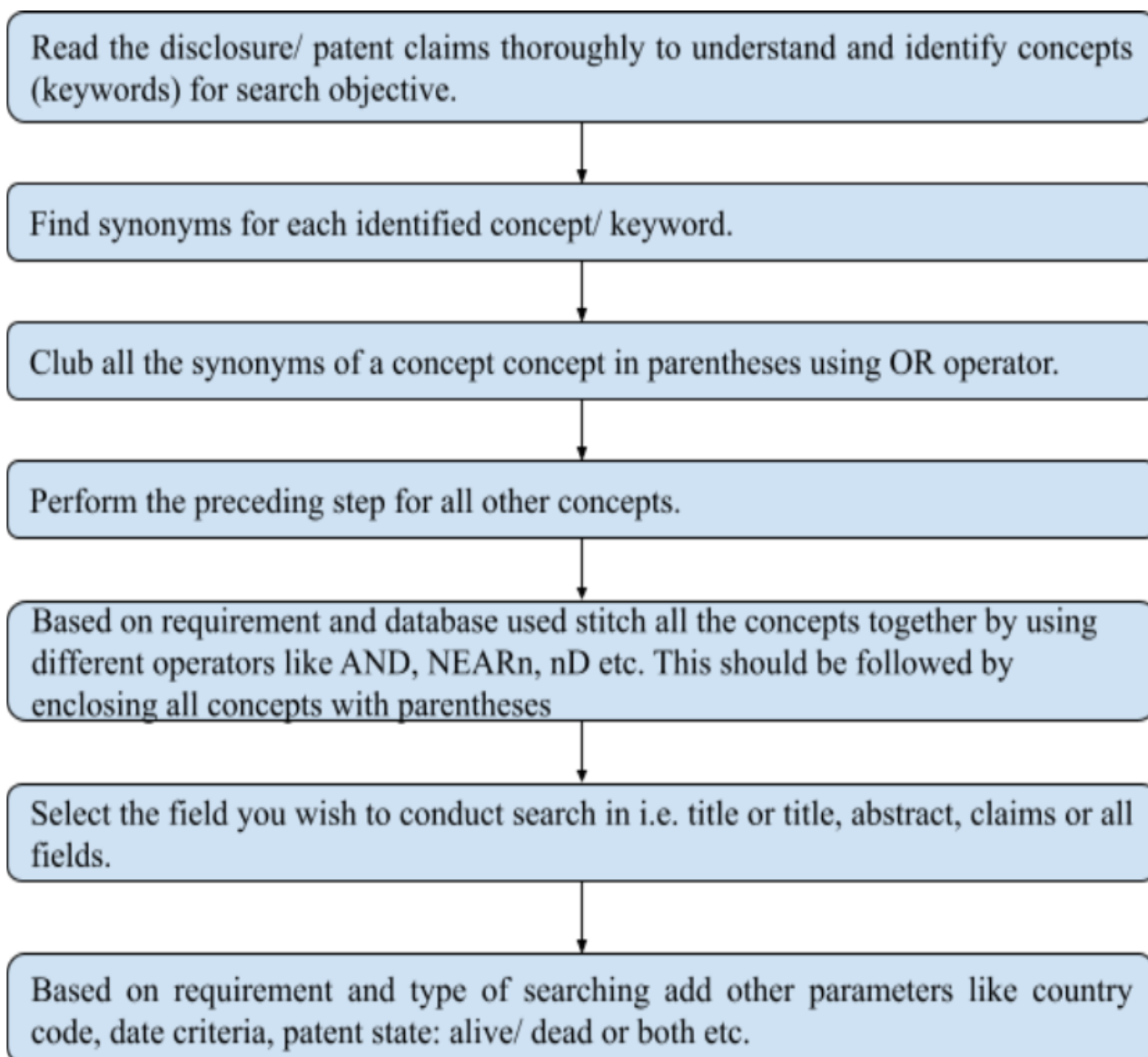


Fig 7: Procedure of Patent Searching

## 2)- NPL Searching:

### NPL sources:



Fig 8: Components of NPL

### Databases Utilized:

- Google Search
- Google Scholar
- ScienceDirect
- Frontiers
- JSTOR
- NCBI
- IEEE

Google Search

Operator	Purpose	Example
OR	Separating synonyms of keywords	(Extendable OR expandable OR stretchable)
AND	Separating two concepts	(Motor AND cycle)
NOT	Excluding keywords appearing after NOT	(Annular NOT proximal)
*	Acts as a wild-card and captures any word.	Circular -replication
-	It excludes the word it is used before from search results	Molecular -diagnostics
~	Searches for the word and its synonyms it is used before	~Thanks results in Gratitude, grateful, etc.
“”	Searches for exact phrase	“antibiotic susceptibility test”
AROUND()	It helps specifies no. of words that can separate two names	“Andy Rubin” AROUND(2) “Steve Jobs”

Table 3: List of Operators for Google Search (database)

Query Examples:

1)- (Light emitting OR Glowing OR Luminescent OR Illuminating) AND (Chemical Indicator OR Chemical Sensor OR Detection system) AND (Air pollutants OR Chemical Impurities OR Dust OR Chemical compounds) AND (Photo detector OR Photo sensor) AND Airstream AND "Fuel cells"

Hits: 78

2)- ((TI=((heart) OR (cardiovascular) OR (cardiac) Or (vascular))) (AB=((valve) (commissure) (leaflet)))

Hits: 325

## 2)- PL Searching

### Google Patents

Operator	Purpose	Example
OR	Separating synonyms of keywords	(Connection OR link OR joint OR juncture)
AND	Separating two concepts	(Air AND pollutant)
NOT	Excluding keywords appearing after NOT	(Toy NOT train)
*	Searches for variable forms of the root word	Rub* captures rubber, ruble, rubbed, etc.
+	Searches for stopwords	Captur
-	Removes the word it is used before and searches only the word before.	((hybrid)-vehicle)
NEAR/x	Searches words at a maximum distance of x between them in any order.	Mobile NEAR/3 charger
ADJ/x	Searches words at a maximum distance of x between them in order they appear	USB ADJ/5 port
WITH	Searches for the word within the next 20 terms, in any order.	Literature WITH textbook
SAME	Searches within the next 200 words, in any order.	Fungicide SAME spores

Table 4: List of Operators for Patent Searching on Google Patents

#### Query Examples:

1)- (TI=((solar cell) OR (solar panel) OR (photovoltaic cell))) ((crush) OR (mill) OR (pulverize)) (tetrahydrofuran) (recycle) Hits: 409

2)- ((TI=((Solar panel) OR (solar module) OR (solar cell) OR (photovoltaic cell) OR (photovoltaic module))) (AB=((crush) OR (mill) OR (grind) OR (pulverized)))) ((Tetrahydrofuran) OR (Toluene)) Hits: 296

Derwent Innovation

Operator	Purpose	Example
OR	Separating synonyms of keywords	(Cup OR mug OR glass)
AND	Separating two concepts	(Electric AND vehicle)
NOT	Excluding keywords appearing after NOT	(Noise NOT pollution)
*	Searches 1-99 characters before or after a term	<ul style="list-style-type: none"> <li>● Cam*: Camp, Camel, Camera, Camphor, etc.</li> <li>● *ture: nature, culture, picture, expenditure, etc.</li> <li>● *hydrogen*: dehydrogenation, etc.</li> </ul>
NEARn	Searches keywords/concepts in bi-directional proximity	(Pencil NEAR3 box) means pencil and box can be separated by a maximum of 3 words in any order.
ADJn	Searches keywords/concepts in uni-directional proximity	(Water ADJ2 colours) means water and colours can be separated by a maximum of 2 words and water will always appear before colours
SAME	Identifies 2 keywords within the same paragraph	(Disinfectant SAME microbes) captures patents having disinfectant and microbes occurring within the same paragraph.

Table 5: List of Operators for Patent Searching on Derwent

Query Examples:

1)- CTB=(device\* or apparatus\* or system or instrument\* or machine\* or appliance\*) AND CTB=(Hydroxyl OR "OH-" or ((hydroxyl) near2 (ion\* or radical\*))) AND ALL=(atomi\* or vapor\* or humidif\* or nubuli\* or spray\* or mist\* or aerosol\* or vapor\*) AND ALL=(portab\* or mobile\* or handheld or (hand ADJ2 held) or "hand-held") AND ALL=((lower near5 diameter));

Hits: 378



2)- CTB=(device\* or apparatus\* or system or instrument\* or machine\* or appliance\*) AND CTB=((Hydroxyl OR "OH-") near2 ion\*) or ((hydroxyl) near2 (ion\* or radical\*)) AND ALL=(atomi\* or vapori\* or humidif\* or nubuli\* or spray\* or mist\*) AND ALL=(recharg\* or batter\*) AND ALL=(portab\* or mobile\* or handheld or (hand ADJ2 held) or "hand-held");

Hits: 179

3)- CTB=(hydroxyl or "OH radical" or oxidanyl\* OR hydridooxygen\* or (plasma near2 generat\*)) and CTB=(atomi\* or vapori\* or spray\* or mist\* or sprink\* or humidi\* or nebuli\*) and ALL=(apparatus\* or machine\* or device\* or system\* or instrument\*) and pa=((agis near3 holdings) or (anhui near3 cas near3 zhonghuan near3 defense near3 equipment) or (aseca) or (bernstein near3 eric) or (biomed near3 protect) or (bioquell) or (chen near3 tianlai) or (chen near3 yonghong) or (codesteri) or (covidien) or (creo near3 medical) or (curry near3 randy near3 dale) or (eniware) or (ford near3 global) or (gcmg near3 companies) or (gojo) or (golden near3 jeffry) or (guangzhou near3 depon near3 electric) or (gulko near3 nadezhda) or (haan) or (haan near3 gyung near3 hee) or (chonbuk near3 national near3 university) or (jung near3 hoi near3 suk) or (korea near3 mach near3 materials) or (lee near3 hye near3 in) or (lepore near3 lorenzo) or (livonyx) or (makarov near3 andrey) or (micro near3 pure) or (n2 near3 applied) or (novagreen) or (noxilizer) or (omni near3 solutions) or (oreal) or (procter near3 gamble) or (purplesun) or (reinhausen near3 plasma) or (sensor near3 electronic) or (seoul near3 viosys) or (soovon) or (steffen near3 hanspeter) or (sterifre near3 medical) or (sterio3) or (steris) or (stewart near3 michael) or (suzhou near3 haan near3 technology) or (taewang near3 science) or (tda near3 research) or (tenant) or (tomi near3 environmental near3 solutions) or (univ near3 dong near3 eui near3 ind near3 acad) or (vigitechnics) or (yongfengyu near3 paper near3 mill) or (zeteo near3 tech) or (zhejiang near3 rivamed near3 tech)) and PRD>=(20170101);

Hits: 79

Orbit

<b>Operator</b>	<b>Purpose</b>	<b>Example</b>
OR	Separating synonyms of keywords	(Car OR vehicle OR Automobile)
AND	Separating two concepts	(Antibody AND Vaccine)
NOT	Excluding keywords appearing after NOT	(Lifestyle NOT diseases)
+	Collects all the combinations of words it is used after.	Fix+ will capture fixes, fixture, fixed, etc.
?	Collects no. of characters equal to the number of times it is used.	Contain?? will capture the words container and contained only. (9 lettered words only) Light????? will capture lightening, lighthouse, lightproof etc. (10 lettered words only)
nD (n=1-99)	Searches terms in proximity to each other in any order	(Gaming 5d laptop) means gaming and laptop can appear in any order but will be separated by a maximum of 5 words. This would capture laptop for gaming, laptop for extensive gaming, gaming experience with powerful laptop.
nW (n=1-99)	Searches terms in proximity to each other in specified order	(Identity 4w card) means identity will precede card and they can be separated by a maximum of 4 words. This would result in identity checked through card etc.

S	Searches terms in the same sentence	Carbon s capture
P	Searches terms in the same paragraph	Bacterial and diseases

Table 6: List of Operators for Patent Searching on Orbit database.

## Query Examples:

1)- (((lighting 2d fix) or (light 2d fit+) or luminaire or (lamp 2d assembl+) or (lamp 2d fix+) or (light 2d assembl+)) 5d (sustainabl+ or cellulose+ or bamboo or wood or "PET" or "PP" or hemp or (polyethylene 2d terephthalate) or polypropylene or (recycl+ 2d PET) or (PET 2d water 2d bottle?)))/ti/ab/clms and (metal+ or aluminium or aluminum or copper or brass or steel or "al")/ti/ab/clms/tx

Hits: 265

2)- ((light+ or lumin+ or lamp?) 2d (assembl+ or fix+ or fit+))/ti/ab/clms and (((metal+ or aluminium or aluminum or brass or copper or nickel or titanium or tungsten) 5d (enclos+ or hous??? Or cover+ or hood or body or encas+ or inner or inside or interior) 10d (power or (LED 2d driver) or LED)))/ti/ab/clms/tx and ((outer or exterior or cover+ or body) 10d (sustainab+ or cellulose+ or "PET" or (polyethylene 2d terephthalate) or "PP" or polypropylene or hemp or bamboo or (paper 2d pulp) or "PMMA" or (recycl+ 2d plastic?) or ("PET" 2d water 2d bottle?)))/ti/ab/clms/tx

Hits: 150

3)- (((disinfect+ or steriliz+ or sanitiz+ or clean+ or purif+ or decontaminat+ or de\_contaminat+ or fumigat+ or pasteuriz+ or depollut+ or de\_pollut+ or de\_purat+ or depurat+) 5d (method+ or procedur+ or techniqu??? Or practice??? Or proces?? Or device??? Or apparatu?? Or equipment?? Or appliance?? Or instrument+ or tool??? Or utensil?? Or machine+ or mechanism?? Or plant+ or structure?? Or system+ or framework?? Or set\_up??? Or generator???) /ti/ab/clms and ((hydrox???? Or oxidanyl?? Or hydridooxygen??? Or "oh") 5d (ion??? Or radical???) /ti/ab/clms and ((titanium??? 3d +oxide+) or titania?? Or "tio2") /ti/ab/clms/tx and ((orifice+ or ???Hole??? Or open??? Or perforat+ or space+ or pore+) 5d (mult+ or numerous?? Or many?? Or various?? Or different+ or diverse+ or several???) /ti/ab/clms/tx and ((ultra??? 5d violet???) Or "uv" or ultraviolet???) /ti/ab/clms/tx )

Hits: 115

### **3)- Technology Analysis using XLSCOUT**

With 130+ million patents and 200+ million research publications, XLSCOUT is the world's largest AI-enabled technology database and IP analytics platform. We take the best data patents, NLP, and other data sources available on the market and apply a combination of machine learning algorithms and manual validation to refine, standardise, and enrich the data. It is one among the few platforms that offers IP professionals both an advanced search option and an NLP-based interface that is intuitive and simple to use regardless of IP ability level.

It is made with the objective of helping organisations identify strategic answers to the difficulties that R&D, IP, and Innovation departments confront during the innovation process with quick, thorough, and accurate findings by combining knowledge in both IP and data science.

I was responsible for making PPTs on a number of current technologies for analyzing the current scope of these in a particular country using the in-house tool XLSCOUT.

The tool helps analyze a technology by providing information under the following heads:

- Portfolio Summary
- Patent Trend - Application Year, Application Country, Assignees
- Top IPC Classes
- Technology Breakdown
- Top Problems
- Technology Timeline Trend etc.

### **5)- Market Research**

- I was responsible for checking the quality of data collection and correctness of the responses received by listening to recorded telephonic interviews for a particular market research survey.
- Additionally, I was responsible was preparing PPTs on current technologies for market research using internet resources and tools. The topics covered included market size and growth, market segmentation, market dynamics, market trends, recent developments, partnerships, collaborations, acquisitions and mergers and portfolio of key players and start-ups of the industry.

## Conclusion

The protection of intellectual property is essential for encouraging innovation. Businesses and individuals would not realise the full benefits of their discoveries if ideas were not protected, and they would spend less time on research and development. Our national and state economies rely heavily on intellectual property (IP). Economic growth and competitiveness are fueled by intellectual property. IP rights enforcement ensures that items are genuine and of the high quality that consumers expect. Consumers and markets want and rely on the trust and peace of mind that IP rights provide. By sharing the protected know-how vital to the original, patented invention, IP rights facilitate the free flow of information. As a result of this process, new ideas and enhancements to current ones emerge. In the face of hardship, intellectual property rights encourage entrepreneurs to keep pushing for new breakthroughs. A patent search helps save both time and money by determining whether or not your innovation already exists. One will be capable to tell if an invention will infringe on other patents' rights or invalidate a rival patent after doing a thorough patent search. A patent search might also help you improve your idea by allowing you to see what else is available. When you research other accessible patents, you may assess the uniqueness and utility of your innovation and make necessary adjustments.

So far during the period of internship I have got acquainted with skill of patent searching using both paid and unpaid patent databases namely Goggle Patents, Orbit, Derwent Innovation, Espacenet among others. Additionally, I also acquired the skills to perform NPL search on various internet sources and databases like Google Scholar, JSTOR, Frontiers, ScienceDirect etc. Being involved in working with different teams like Market Research and XLSCOUT, I could polish the values of adaptability, communication and team coordination. Being given the opportunity to tackle different tasks individually and without constant supervision enhanced my confidence and instilled a sense of accountability in me.

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