Indian Institute of Technology Dharwad

Intellectual Property Management

HS 304

Patent Search and Analysis Report

Name: Kunal Vaidya

Roll Number: 170020003

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Patent Search & Analysis

Aim

The aim is to take a product and analyze it's patents to find technological trend, year-wise trend,assignee trend and gain valuable insights.

About the Product

The product I am going to analyze is Wireless Mouse.Wireless mouse or Optical mouse was first demonstrated by two independent inventors in 1980's by **John Markoff & Sol Sherr**, it uses a infrared led and a four-quadrant infrared instrument to detect grid lines in pattern with infrared engrossing ink on a special metallic surface. Optical mouse or wireless mouse uses a light source to detect movements relative to surface, it is different from mechanical mouse, in optical mouse moving parts are not present.

Figure 1: Depicting Wireless Mouse

Wireless mouse consist of transmitter, reciever, battery, and reciver can be placed behind the battery inside the mouse. The reciever is connected to the computer and transmitter is inbuilt in side of the mouse, reciever and transmitter uses radio frequency to communicate each other to transfer signals from both sides and it is a continous process, if battery power drainsout we need to replace or if the battery is rechargable we need to charge before using.

Strategy

Make use of the open source database Patentscope to conduct preliminary search for wireless mouse patents and refine our search after every result to improve precision and recall.So this means we will start with a simple query and improve the query by adding other filters in our query.After getting the best result, patents will be classified into different groups based on invention focus.

Searching in Patentscope

Steps Involved in Refining Search

1.First, started with a basic search query **FP:(“wireless mouse”~1) AND (ad:[2017 TO 2020])**

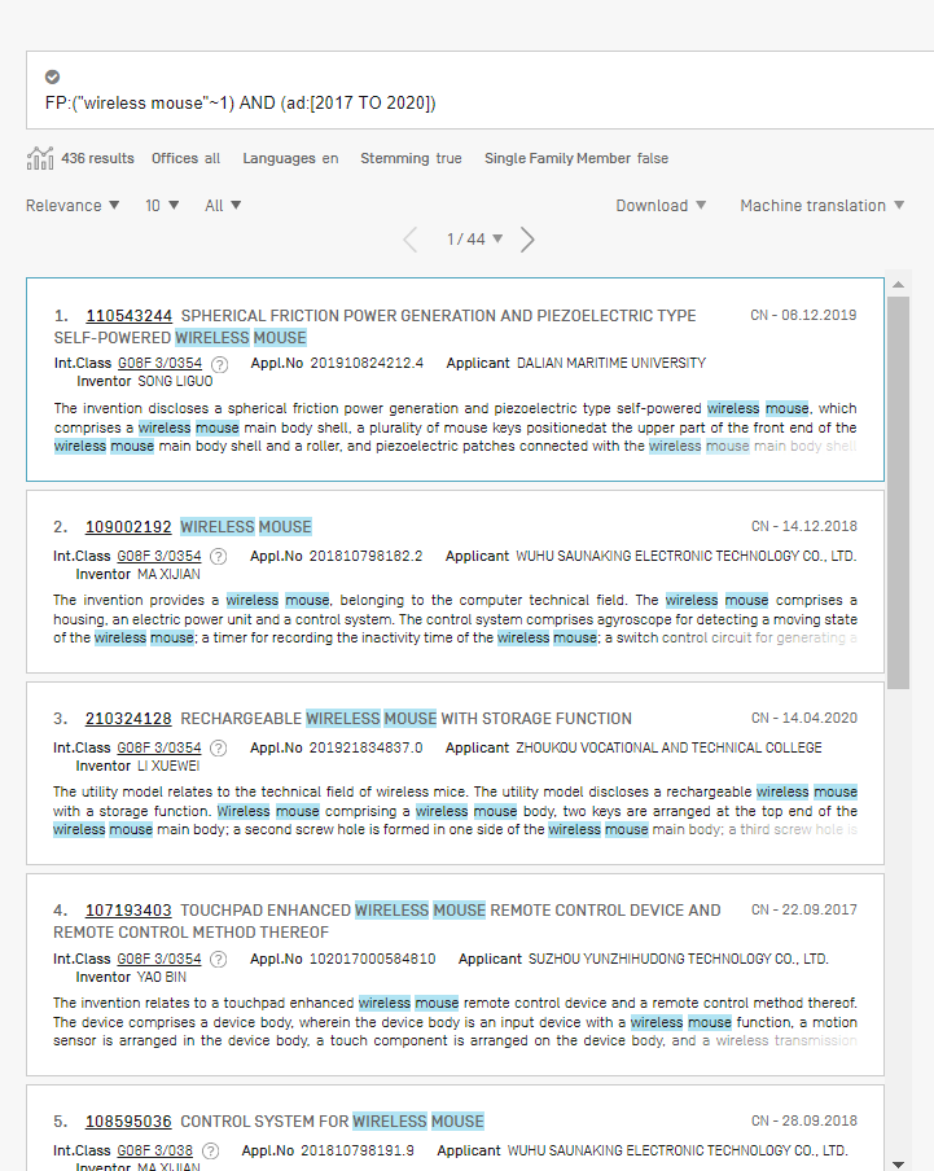


Figure 2: Search Results for Query 1

So, there are some unwanted results in our search results like control system,touchpad and also apparatus for charging mouse which we do not want so we will filter out that.

2.So,now we wil filter apparatus,control system patents using search query **FP:("wireless mouse"~1) AND (ad:[2017 TO 2020]) ANDNOT (control OR apparatus)**

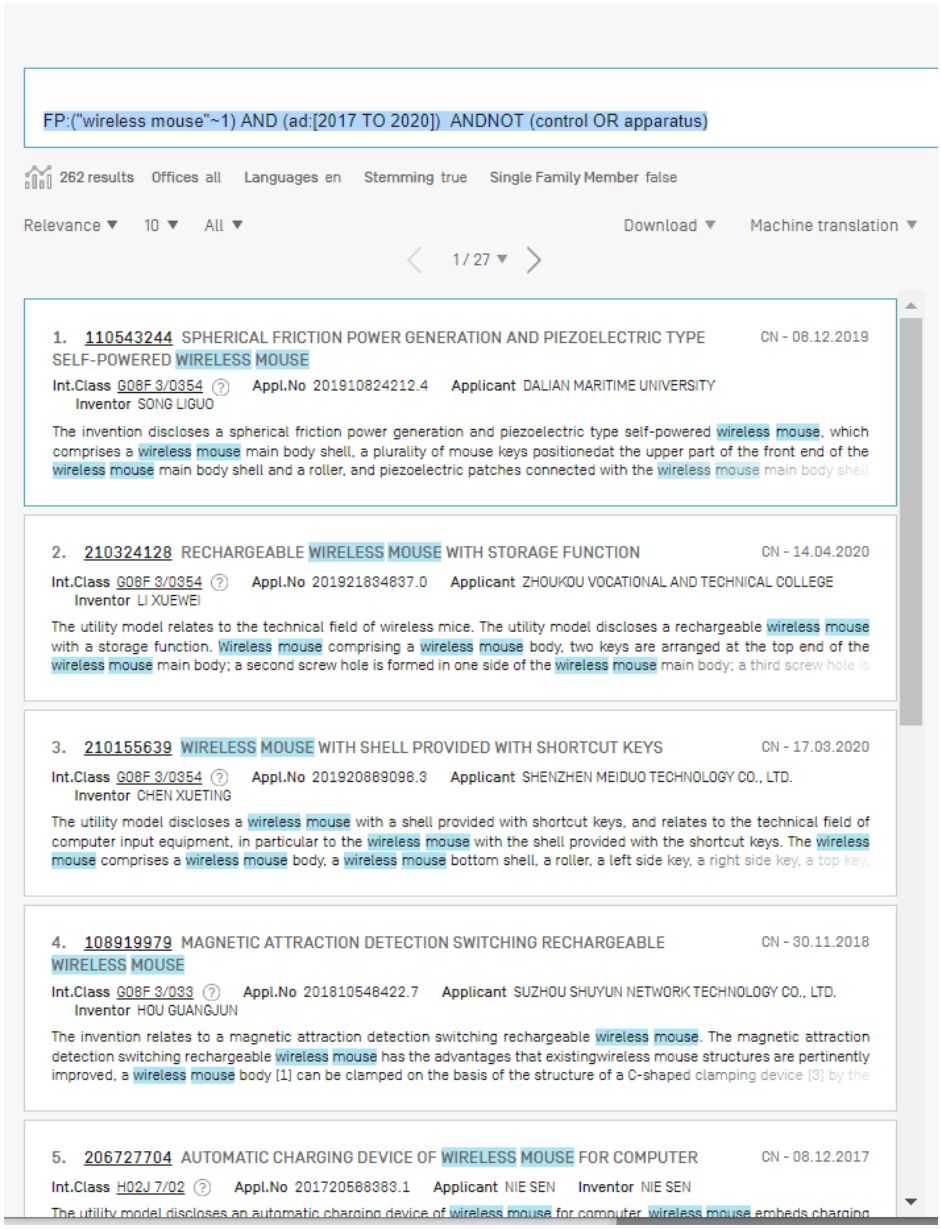


Figure 3: Search Results for Query 2

So, now we do not have patents of charging apparatus or control system.still there are some patents about charging device of wireless mouse which we do not want. IPC codes for relevant patents are similar for many patents so searching via IPC can give us better results.

3.We will try searching with IPC codes G06F3/0354 OR G60F3/033

G	PHYSICS
06	COMPUTING; CALCULATING OR COUNTING
F	ELECTRIC DIGITAL DATA PROCESSING
3	Input arrangements for transferring data to be processed into a form capable of being handled by the computer; Output arrangements for transferring data from processing unit to output unit, e.g. interface arrangements
01	Input arrangements or combined input and output arrangements for interaction between user and computer
03	Arrangements for converting the position or the displacement of a member into a coded form
033	Pointing devices displaced or positioned by the user; Accessories therefor
0354	with detection of 2D relative movements between the device, or an operating part thereof, and a plane or surface, e.g. 2D mice, trackballs, pens or pucks

Figure 4: Breakdown of IPC codes used

Search Query is **FP:("wireless mouse"~1) AND (ad:[2017 TO 2020]) ANDNOT (control OR apparatus) AND (G06F3/0354 OR G60F3/033)**

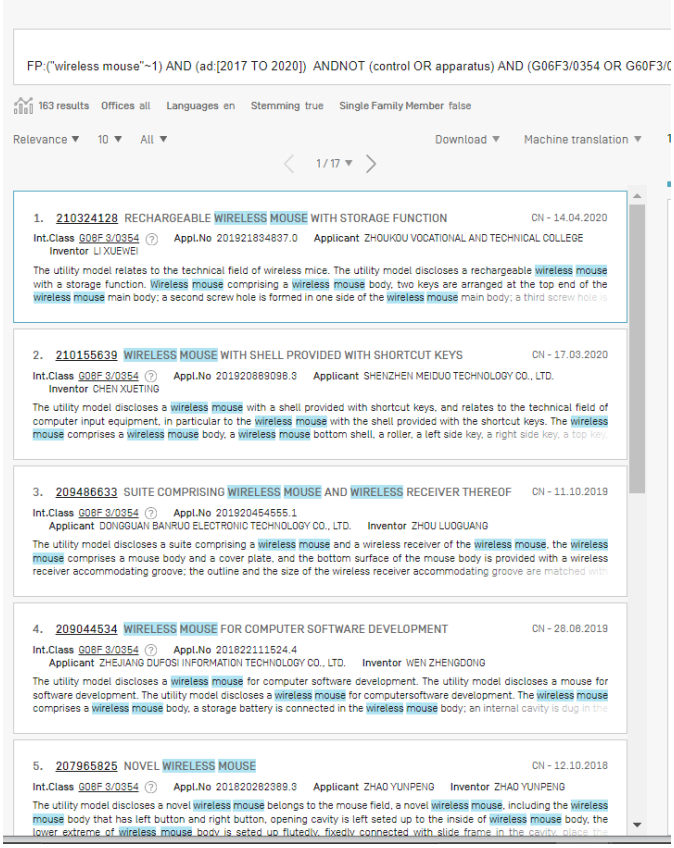


Figure 5: Search Results for Query 3

Now, we have obtained a much more refined search as there are no patents relating to charging devices or apparatus.So through this search query we have obtained maximum relevant patents.

Search Queries for other Database

Google Patents

Final Search Query: **((wireless mouse)) NOT ((control OR apparatus))((G06F3/0354) OR (G60F3/033)) before:publication:20201010 after:publication:20170101**

Espacenet

Final Search Query: **ˆwireless prox/distance<1 mouse AND pd="2017:2020" NOT (control OR apparatus) AND (ipc="G06F3/0354" OR ipc=G06F3/033)**

Classifying Patents based on Invention Focus

I am going to classify the top 50 patents based on their Invention Focus So, I divided the patents into 10 categories of Invention Focus:

Table 1: Categories of Invention Focus in Columns

Invention.Focus	InventionFocus
Design & Storage	Multipurpose Mouse
Mouse Design	Charging of Mouse
Wireless Receiver	Power Generating Mouse
Energy	Mouse Based on Solar Energy
Mouse with Touch	Magnetic Mouse

Table 2: Patents for Design & Storage

Application.Id	Title	Invention.Focus
CN294272868	Rechargeable wireless mouse with storage function	Design & Storage
CN248518451	Wireless mouse for computer software development	Design & Storage

Table 3: Patents for Mouse Design

Application.Id	Title	Invention.Focus
CN291920559	Wireless mouse with shell provided with shortcut keys	Mouse Design
CN232305025	Novel wireless mouse	Mouse Design
CN237086412	Wireless mouse for communication computer	Mouse Design
CN282914559	Anti-falling wireless mouse	Mouse Design
CN250136962	Novel wireless mouse	Mouse Design
CN205769322	Wireless mouse convenient for left hand operation	Mouse Design
CN232598910	Wireless mouse	Mouse Design
CN236622706	Electricity magnetic fixing formula wireless mouse	Mouse Design
CN225107000	Wireless mouse of dismantlement easy to assemble	Mouse Design
CN205446782	Wireless mouse used at home	Mouse Design
CN204877044	Portable teacher uses wireless mouse	Mouse Design
CN214583341	Novel falling-resistant wireless mouse capable of being quickly moved	Mouse Design
CN222382938	Wireless mouse	Mouse Design
CN207833809	Wireless mouse	Mouse Design
CN237706456	Portable wireless mouse who accords with human engineering	Mouse Design

Application.Id	Title	Invention.Focus
KR235174649	TWO-FINGER WIRELESS MOUSE	Mouse Design
CN250937981	Computer wireless mouse	Mouse Design
CN219561230	Wireless mouse convenient to it is clean	Mouse Design
CN293536906	Four-axis roller module of wireless mouse	Mouse Design
CN221304930	Wireless mouse	Mouse Design
CN241978510	Bluetooth wireless mouse convenient to deposit	Mouse Design
CN251361076	Wireless optical mouse with weight adjusting function	Mouse Design
CN215325960	Wireless mouse with function of effectively relieving hand fatigue	Mouse Design

Table 4: Patents for Wireless Reciever

Application.Id	Title	Invention.Focus
CN274849684	Suite comprising wireless mouse and wireless receiver thereof	Wireless Reciever

Table 5: Patents for Energy Efficiency of Mouse

Application.Id	Title	Invention.Focus
CN234310008	Clamping rechargeable type wireless mouse	Energy Efficiency of Mouse
CN223884171	Energy -saving wireless mouse	Energy Efficiency of Mouse
CN235377253	Wireless mouse of spontaneous electricity	Energy Efficiency of Mouse
CN291492935	Wireless mouse	Energy Efficiency of Mouse

Table 6: Patents for Mouse with Touch

Application.Id	Title	Invention.Focus
CN204786775	Vehicle-mounted universal wireless mouse and communication method thereof	Mouse with Touch
CN212977312	On -vehicle general type wireless mouse	Mouse with Touch
KR246921788	WIRELESS MOUSE WITH DRAWING TABLET	Mouse with Touch
CN250136975	Wireless touch mouse	Mouse with Touch

Table 7: Patents for Multipurpose Mouse

Application.Id	Title	Invention.Focus
CN244881307	Multifunctional wireless mouse	Multipurpose Mouse
CN232626699	Wireless mouse with multiple purposes	Multipurpose Mouse
CN237706455	Wireless mouse with multiple purposes	Multipurpose Mouse

Table 8: Patents for Charging of Mouse

Application.Id	Title	Invention.Focus
CN207731749	Sensitive type wireless charge type wireless mouse	Charging of Mouse
CN214133257	Novel mouse of charging	Charging of Mouse
CN225031421	Wireless charging technology-based mouse system	Charging of Mouse

Table 9: Patents for Power Generating Mouse

Application.Id	Title	Invention.Focus
CN209332745	Wireless mouse with automatic power generation device	Power Generating Mouse
CN241317159	Self-generating wireless mouse	Power Generating Mouse
CN213400142	Wireless mouse suitable for the old	Power Generating Mouse
CN215329054	Wireless mouse	Power Generating Mouse
CN250469761	Self-powered wireless mouse	Power Generating Mouse
KR245816677	WIRELESS MOUSE WITHOUT POWER SOURCE DRIVEN BY FRICTION	Power Generating Mouse
CN209430640	Wireless mouse	Power Generating Mouse
CN204778696	Wireless mouse with automatic electricity generating device	Power Generating Mouse

Table 10: Patents for Mouse Based on Solar Energy

Application.Id	Title	Invention.Focus
CN234080343	Wireless mouse	Mouse based on Solar Energy

Table 11: Patents for Magnetic Mouse

Application.Id	Title	Invention.Focus
CN225615405	Take magnetic suspension wireless mouse of BDS location	Magnetic Mouse

Visualizations and Analysis

Now, I will try and visualize the 50 patents by plotting year-wise patents,company or applicant wise patent,to see which type of patents are increasing. This will give an idea of technology trend and also are patents increasing each year.

Number of Patents Published Each Year

The number of patents published each year will give an idea about trend of new inventions made in wireless mouse.

Table 12: Number of Patents Published for each year

Number.Of.Patents	Year
5	2020
16	2019
19	2018
10	2017

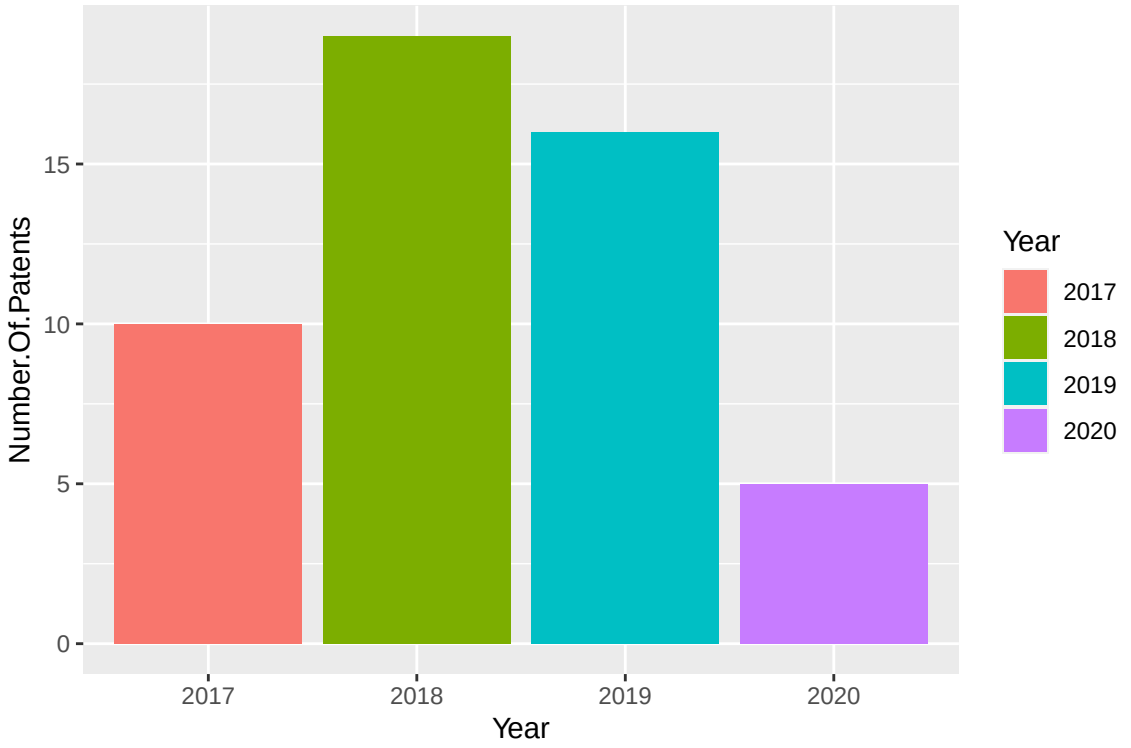


Figure 6: Plot for Number of Patents Published each year

From above plot we can see there is somewhat **increasing trend** from 2017 to 2019.Number of Patents in 2020 are less because that year is not completed yet.

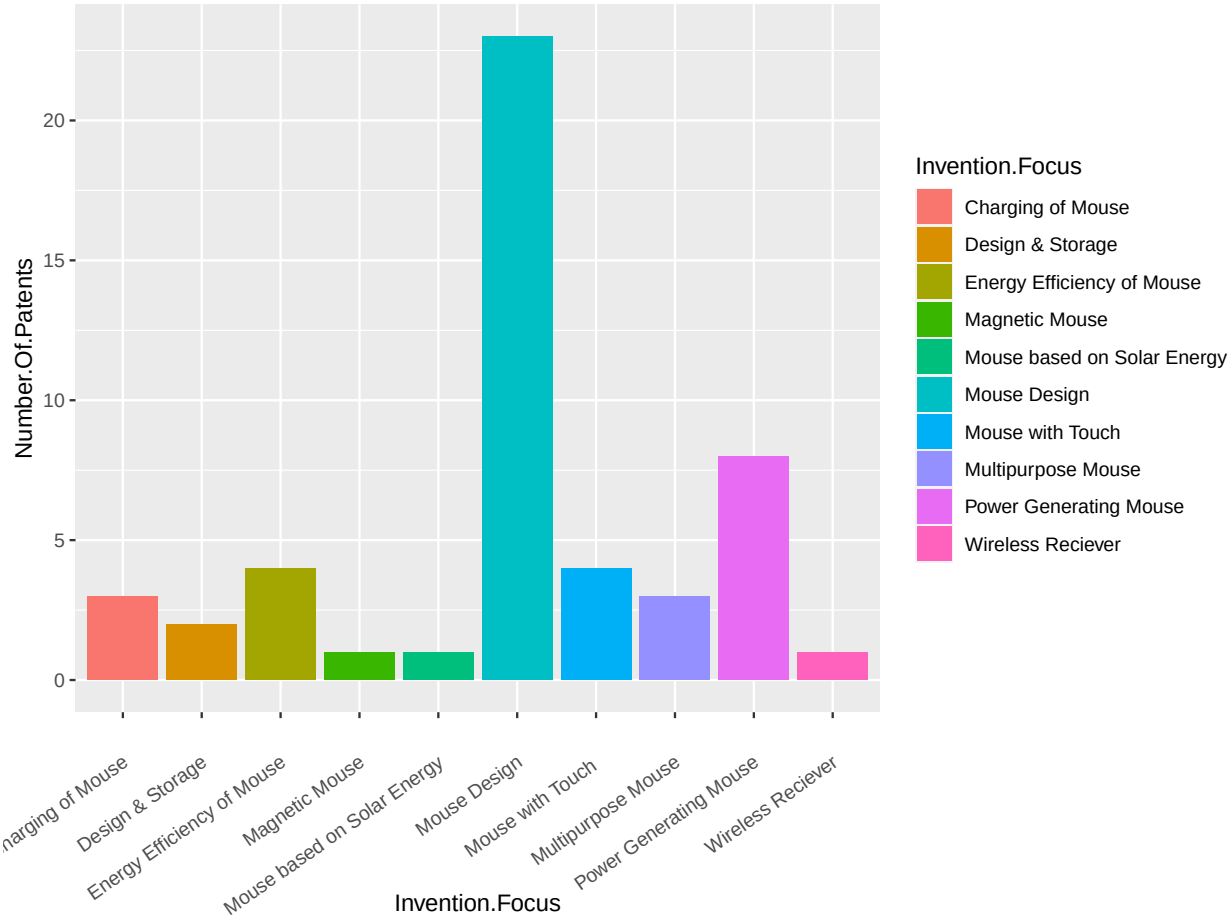
Technology Trend

Number of Patents published for each Invention Focus will give an idea about which are the most active areas for inventions i.e which aspects of wireless mouse inventors are working on most.

Table 13: Number of Patents Published for Each Invention Category

Invention.Focus	Number.Of.Patents
Design & Storage	2
Mouse Design	23
Wireless Reciever	1
Energy Efficiency of Mouse	4
Mouse with Touch	4
Multipurpose Mouse	3

Invention.Focus	Number.Of.Patents
Charging of Mouse	3
Power Generating Mouse	8
Mouse based on Solar Energy	1
Magnetic Mouse	1



So, from above plot it is clear that **Mouse Design** is the most active area for new inventions, it is followed by **Power Generating Mouse** and then at third is **Energy Efficiency of Mouse**.

Country Wise Patents

To see which country is most involved in new inventions of Wireless Mouse.

Table 14: Number of Patents Published for different countries

Number.Of.Patents	Country
47	China
3	Korea

China has almost all patents i.e 47 out of 50 new inventions between **2017-2020** are made by China, they are followed by **Korea**.

Technology Trend Over Time

Technology Trend Over Time will give an idea if an area of invention is increasing over years or its trend is decreasing over years.So it will tell us which field or area is expanding as years progress.

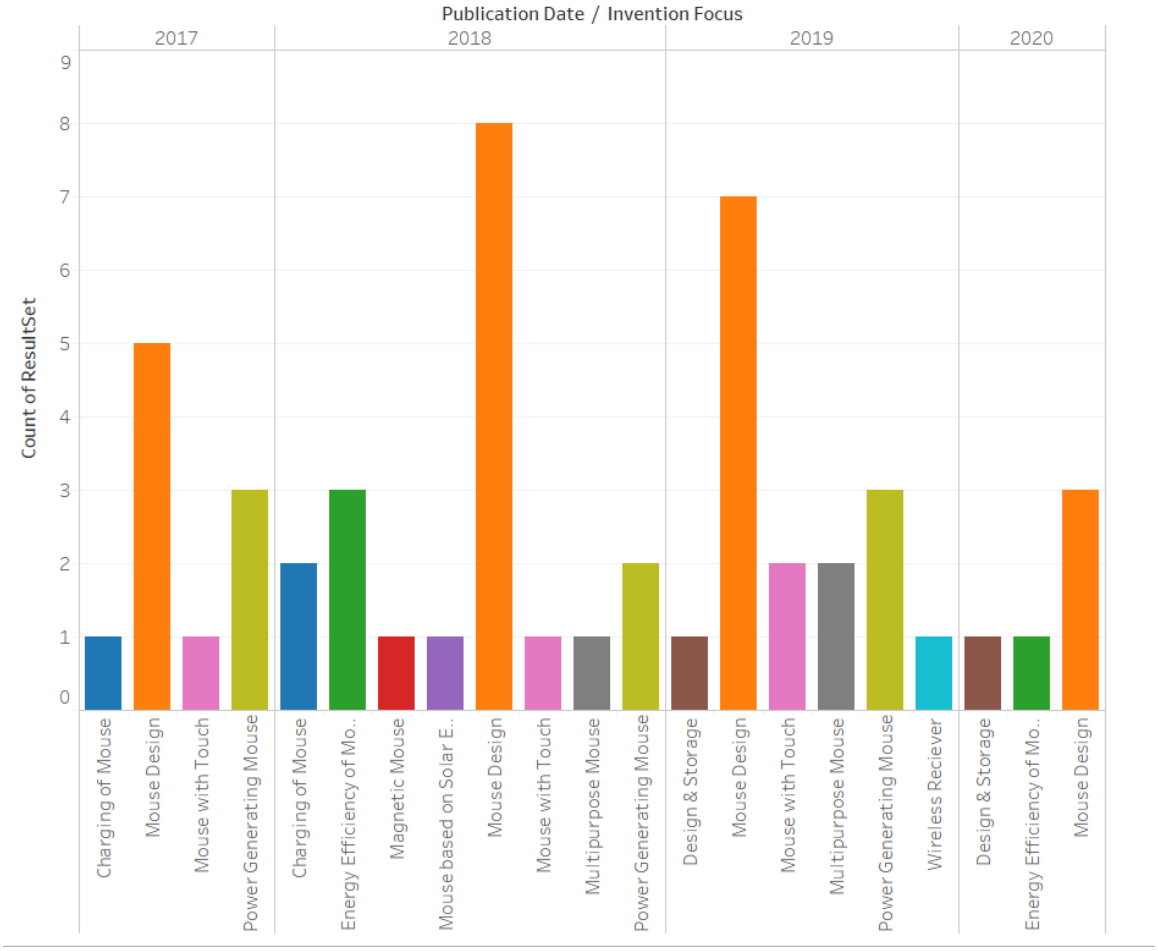


Figure 7: Technology Trend Over the Years

The Above Plot shows number of patents for each category of Invention Focus in different years.This is done so that we can see if number of patents are increasing for any specific category. As Year 2020 is not yet complete so Patents are less for that year So, Plot clearly show that patents on **Mouse Design** are always at top in every year it's trend is somewhat increasing from year 2017, there is also slight increase in number of patents for **Mouse with Touch** all other categories are almost constant and also there is no specific trend in them.

Assignee or Applicants Trend

This will show which companies or organizations are patenting on Wireless Mouse

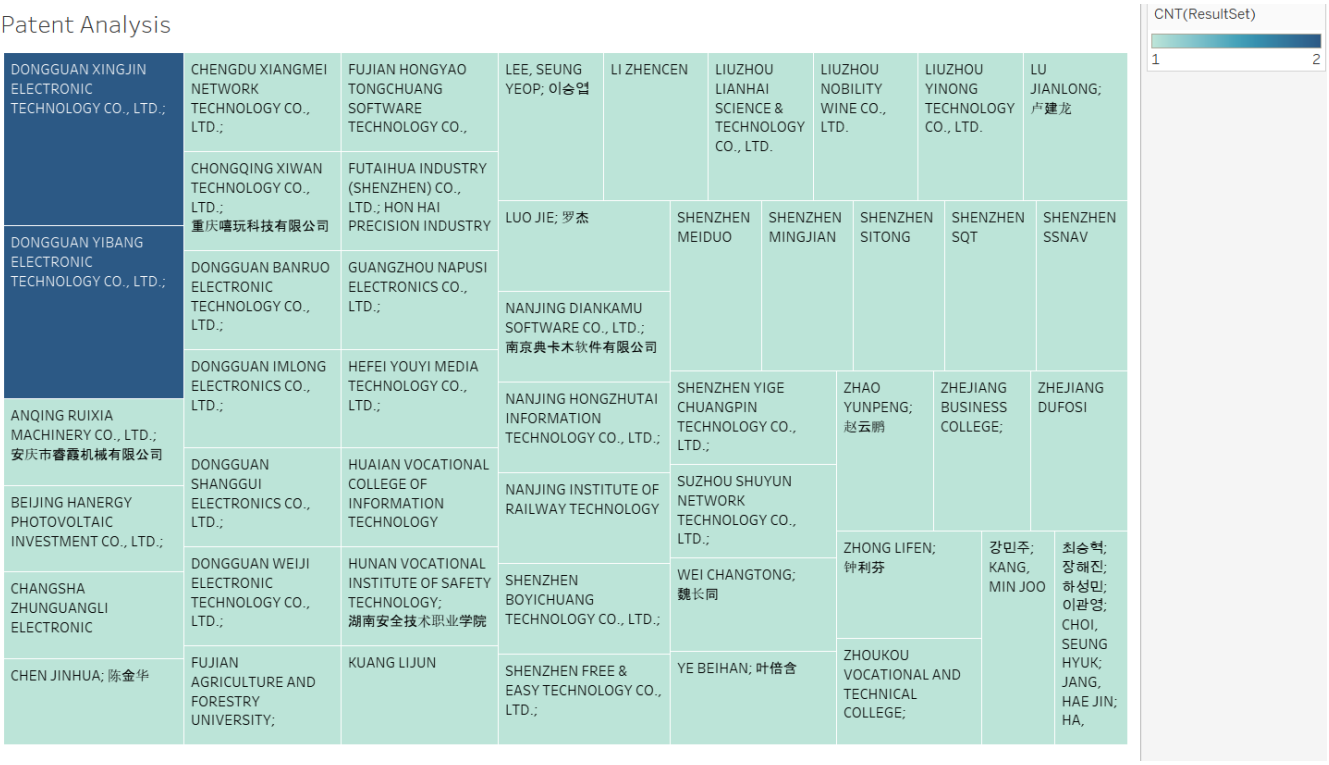


Figure 8: Various Assignees or Applicants Heat Map

The above chart represents various assignees and the color represents number of patents,Darker Blue Color means more patents.The top assignees are **DONGGUAN XINGJIN ELECTRONIC TECHNOLOGY CO., LTD** and **DONGGUAN YIBANG ELECTRONIC TECHNOLOGY CO., LTD.** both of them are from China. All other assignees have max 1 patents only and mostly all are from China.

Conclusions

After searching and analysing the patent data for wireless mouse we can conclude following

1) There is a slight increasing trend in number of patents on Wireless Mouse from 2017 to 2019.
2) **Mouse Design** is the main area of invention as it has the most number of patents published, it is foloowed by **Power Generating Mouse**.
3) **China** has the most number of patents for Wireless Mouse.
4) There is an increasing trend in inventions pertaining to **Mouse Design**.
5) **DONGGUAN XINGJIN ELECTRONIC TECHNOLOGY CO., LTD** and **DONGGUAN YIBANG ELECTRONIC TECHNOLOGY CO., LTD.** are the top assignees with 2 patents each.