



The Landscape of Machine Learning from a Patent Perspective

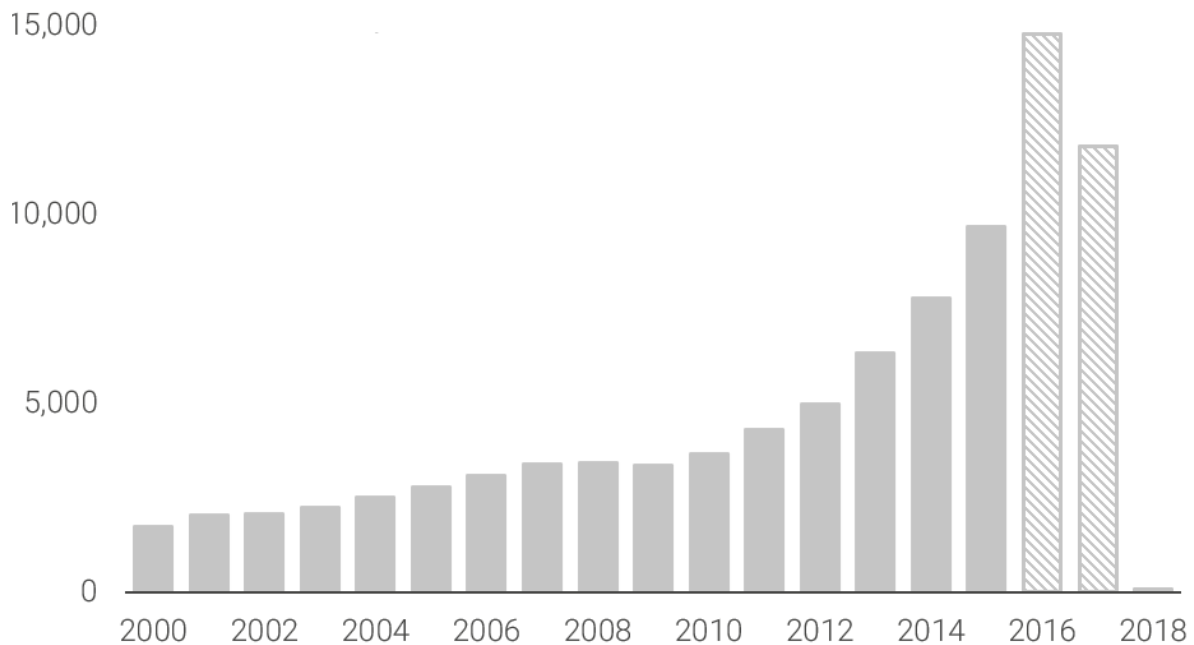
An analysis in cooperation with IAM

A look at the machine learning patent landscape shows that Microsoft and Alphabet currently hold the most - and highest quality - patents. However, the data also shows that leadership positions can change very quickly in this rapidly developing technology field. In particular Chinese companies are among the most prolific filers in this space, nevertheless their patents fall short in terms of impact and quality.

An analysis with LexisNexis PatentSight IP analytics platform in collaboration with ip-search, a commercial patent search service provider of the Swiss Federal Institute of Intellectual Property, provides a detailed look at the machine learning landscape from a patent perspective.

With regards to patent filings the field has seen a tremendous growth over the last two decades. From 2000 the number of applications began to pick up, but the rate of growth accelerated from around 2010 and it is unlikely that this has peaked. Over half of all these patents fall under IPC subclasses G06F (Electrical digital data processing), G06N (Computer systems based on specific computational models) and G06K (Recognition of data; presentation of data; record carriers' handling record carriers).

Portfolio Size of Machine Learning Patents by Year of First Filing



Portfolio Size, number of "simple patent families", in the field of Machine Learning, as defined by CHPTO, by year of first filing. Data as at 19th July 2018. Source: LexisNexis PatentSight

Unsurprisingly, tech companies are at the forefront of the boom. However, in recent years a large proportion of the first filers have originated from China; among the top 20 machine learning patent filers of 2016, the majority were Chinese companies or institutions.

Top 20 first filers in Machine Learning in 2016

Owner	Portfolio Size
IBM	677
Microsoft	271
Chinese Academy of Science	246
Baidu	218
State Grid Corp	195
Alphabet	177
Samsung	141
Intel	113
Siemens	104
Fujitsu	102
Tianjin University	95
Tsinghua University (China)	93
Facebook	90
Beijing University of Technology	85
Xidian University	83
Zhejiang University	82
Cisco	75
UESTC	75
Adobe	75
South China University of Technology	72

Portfolio Size, number of “simple patent families”, in the field of Machine Learning, as defined by CHPTO, first filed in 2016.

Data as at 19th July 2018.

Source: LexisNexis PatentSight

However, a different picture emerges when examining the top 20 patent owners. The table below lists the leading companies in machine learning based on Patent Asset Index™ – a measure for the innovative strength of an enterprise, a specific business area, or an entire technology field – as well as total portfolio size. What is immediately apparent is the drop-off in Chinese companies, with all but one – Baidu – disappearing. So, behind the flurry of Chinese filing activity, there appears to be a lack of quality.

Top 20 owners in Machine Learning with highest qualitative strength measured by Patent Asset Index

Active Portfolios of top 20 companies by Patent Asset Index™ in the field of Machine Learning, as defined by CHPTO.

Data as at 19th July 2018.

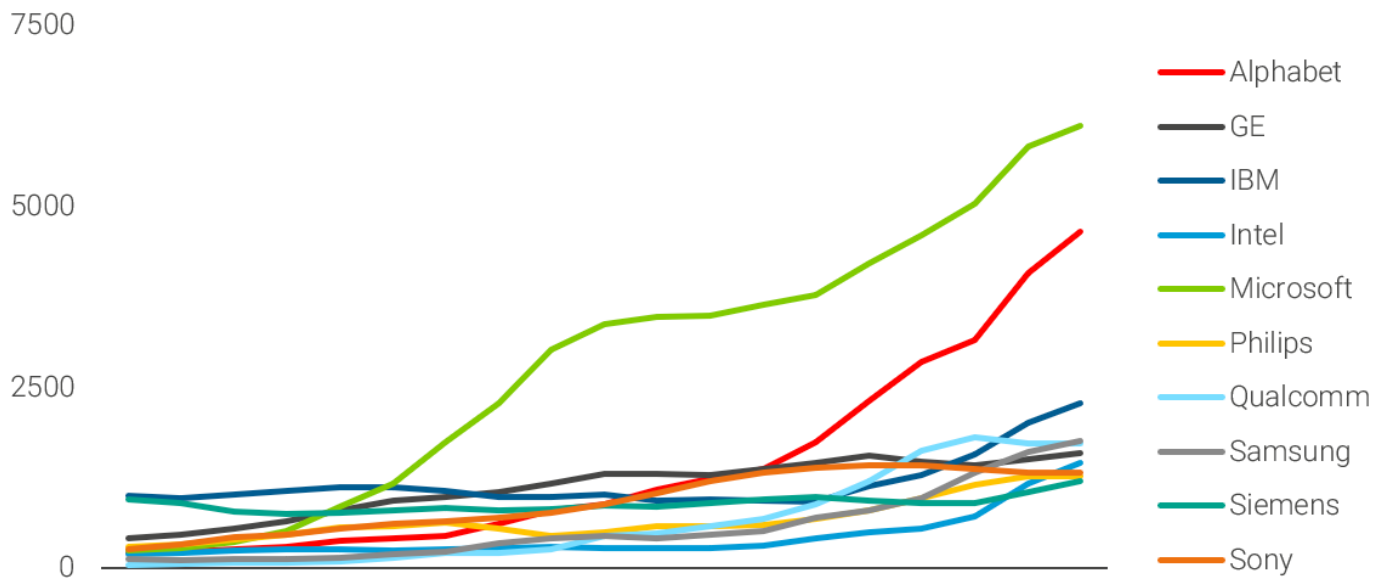
Owner	Patent Asset Index™	Portfolio Size
Microsoft	6,114	2,075
Alphabet	4,641	1,185
IBM	2,275	2,266
Samsung	1,761	838
Qualcomm	1,716	373
GE	1,589	558
Intel	1,454	502
Sony	1,316	470
Philips	1,273	366
Siemens	1,198	721
Apple	979	217
GM	930	436
Honeywell	908	239
Amazon	858	341
Emerson Electric	810	129
Toyota Motor	808	282
Baidu	797	559
Canon	766	503
Nuance	715	354
Verizon	705	397

Source: LexisNexis PatentSight

It will certainly be worth keeping an eye on how the list of the top owners in this space changes – this is especially true considering that the top companies are far from dominant.

The research reveals that Microsoft and Alphabet have so far been the runaway leaders in terms of portfolio strength. As seen in the graph below, the other leading players have also demonstrated an improvement in their machine learning portfolios but at a much slower rate.

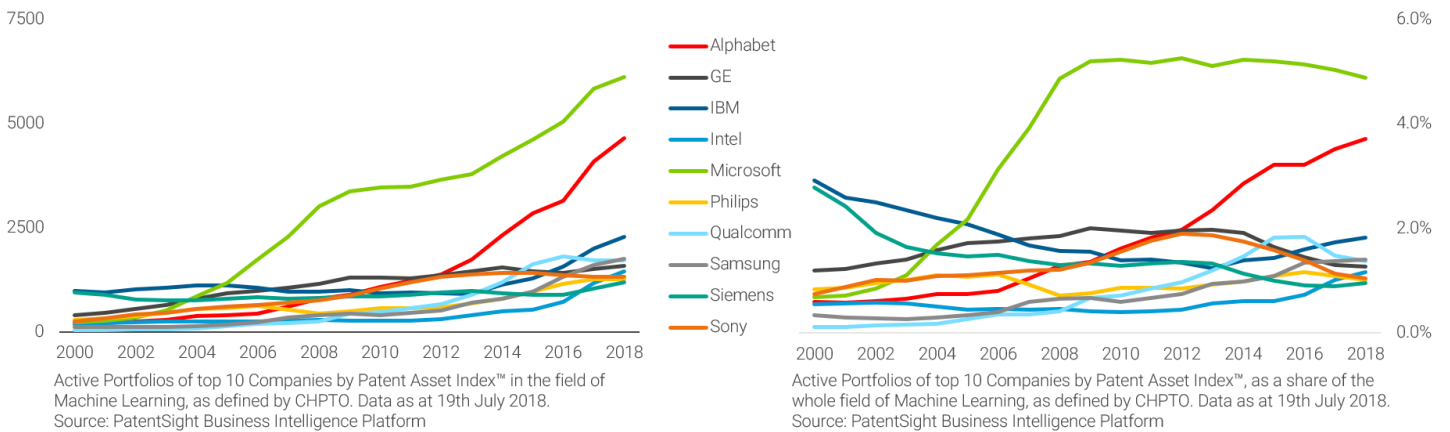
Patent Asset Index of Machine Learning patents of top 10 owners



Active Portfolios of top 10 Companies by Patent Asset Index™ in the field of Machine Learning, as defined by CHPTO.
Data as at 19th July 2018. Source: LexisNexis PatentSight

However, when looking at each company’s total share of the patent market, most are being outpaced by the rate of development of the technology field. Both Microsoft and Alphabet are exhibiting strong growth in absolute terms, but when looking at relative growth, it is only Alphabet that is increasing its share of the field. Other notable names that are growing their share include IBM and Intel.

Share of Patent Asset Index of all Machine Learning patents for top 10 owners



Active Portfolios of top 10 Companies by Patent Asset Index™ in the field of Machine Learning, as defined by CHPTO. Data as at 19th July 2018. Source: LexisNexis PatentSight

In terms of those citing Alphabet’s patents in this field, a significant number of established players – such as Microsoft, Qualcomm, Facebook, Amazon and Samsung – make reference to work done by Google’s parent company. So, while Microsoft currently leads the pack, Alphabet is the main company to keep an eye on.

That said, even Microsoft and Alphabet each take less than a 5% share of the field, while the next eight leading players each take between 1% and 2%. In other words, the machine learning field is still relatively nascent and we are far away from a situation where the top 10 companies are way ahead of anyone else. Thus, we could yet see a dramatic shift in the positions of the leading players or the rise of new challengers in this highly lucrative and competitive space, especially from Chinese contenders.

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- Licensing & Monetization
- Portfolio Optimization



Patent Asset Index™

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