Alphabet Inc.

Patent Portfolio Analysis

July 2019

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Introduction

Google rebranded itself in 2015 as Alphabet, Inc., a holding company that presides over a collection of companies with Google as the largest among them. Alphabet boasts of a portfolio of companies that delve into different areas, of which some of the major ones are given below.

- **Google** is the largest subsidiary of Alphabet. Google owns the search engine, Android and Android-related services, and all other Google apps such as Maps, YouTube and AdSense.
- **Google Fiber** is the high-speed internet service provider, available in limited cities in the US.
- **Nest** is a smart-home devices company that Google acquired in 2014 and retained it as a separate branded entity.
- **Verily Life Sciences**, previously known as Google Life Sciences, is the medical research company under Alphabet.
- **Google Ventures (GV)** is a venture capital firm that invests in start-ups to encourage innovation.
- **X**, formerly known as Google X, focuses on projects such as autonomous cars, diabetes curing contact lenses, product delivery drones and weather balloon-powered internet service.
- **Sidewalk Labs** is an Alphabet company founded in 2015 that strives to improve urban living by addressing issues such as pollution and energy usage.
- **Calico** is Alphabet's biotech venture that focuses on development of drugs to combat aging and associated illnesses.
- **CapitalG** is Alphabet's growth equity investment fund that focuses on later-stage start-ups.

Alphabet possesses a diverse patent portfolio ranging from cloud, transportation to healthcare. For this report, we have analyzed a total of 54588 currently active published patent applications in the Alphabet's portfolio. Unless otherwise stated, the report displays numbers for published patent applications. The analytics are presented in the various charts and tables that follow. These include the following,

- Portfolio Summary
- Published Applications – Growth
- Key Geographies
- Top Sub-technologies
- Top Forward Citing (FC) Assignees
- Top Sub-technologies cited by the FC Assignees
- Topic Map – Concepts
- Top CPC Codes
- Evolution of the Top CPC Codes
- Patent Quality by Sub-technologies
- Portfolio Taxonomy
- Competitor Comparison by Technology Categories

Insights

- A significant upward trend is observed in the overall number of published patents post 2011.
- The U.S., with a more than 60% share of the published applications, is the preferred home jurisdiction for Alphabet to file in.
- Alphabet's portfolio has an average Relecura Star rating of 2.51 out of 5. Typically, a patent with a Relecura Star rating of 3 or more is deemed as one of high-quality.
- Technologies covered by the CPC codes G06F 3/04842 (Selection of a displayed object) and G06F 16/9535 (Search customisation based on user profiles and personalisation) show the highest year-on-year growth post 2012.
- Technologies covered by the CPC code G06Q 30/02 (Data processing for marketing) display an increased year-on-year growth till 2013, after which the growth has tapered off.

Published Applications - Summary

TOTAL DOCUMENTS COUNT (APPLICATIONS)

54,588

PUBLICATION TYPES

17,158 | 35,402

Applications | Grants

IP TYPES

52,512 | 1,042 | 1,002

Invention | Design | Model

PATENT BY STAR RATING

2.51

420
2,588
25,204
22,827
3,549

Peak Year of Activity

2018 (9,393)

No of technologies (373)

Top Active Jurisdiction

US (32,972)

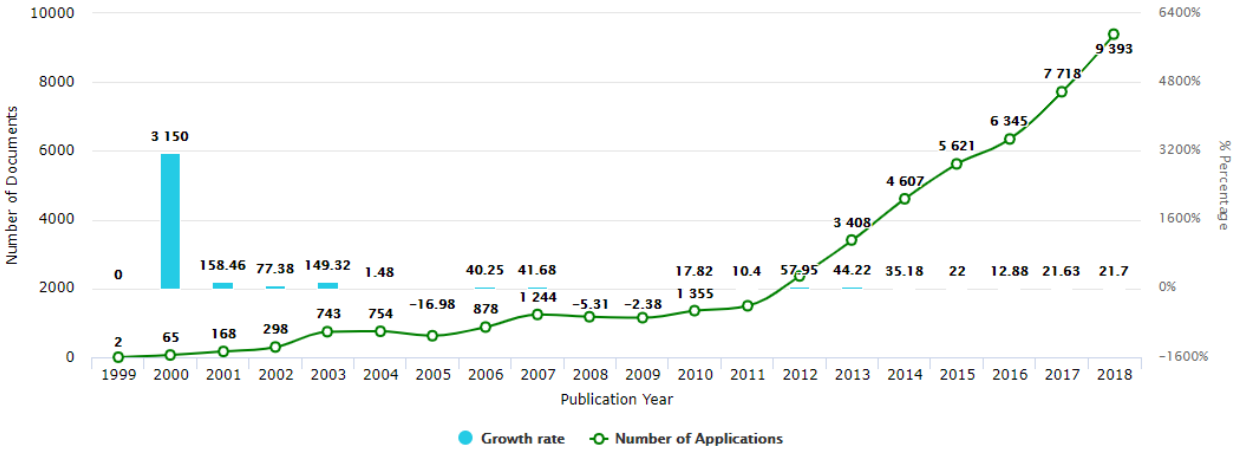
Top Rated

US9454764B2 (5)

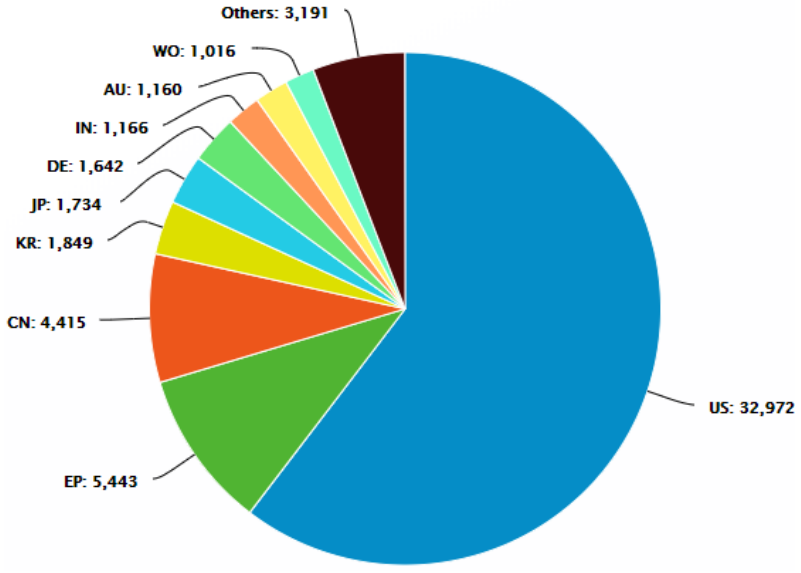
Top Cited

US7716161B2 (983)

Published Applications – Growth



Key Geographies



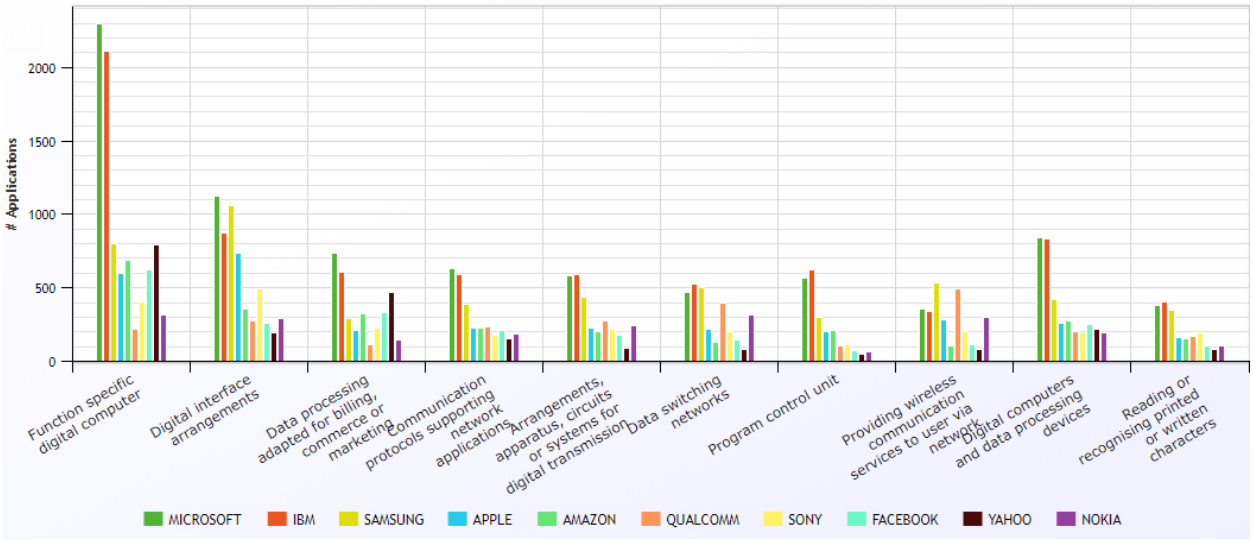
Top Sub-technologies

Sub-Technologies	# Applications
Function specific digital computer	12512
Digital interface arrangements	8883
Data processing adapted for billing, commerce or marketing	5514
Communication protocols supporting network applications	5180
Arrangements, apparatus, circuits or systems for digital transmission	5072
Data switching networks	4271
Program control unit	3807
Providing wireless communication services to user via network	3780
Digital computers and data processing devices	3603
Reading or recognising printed or written characters	3587

Top Forward Citing (FC) Assignees

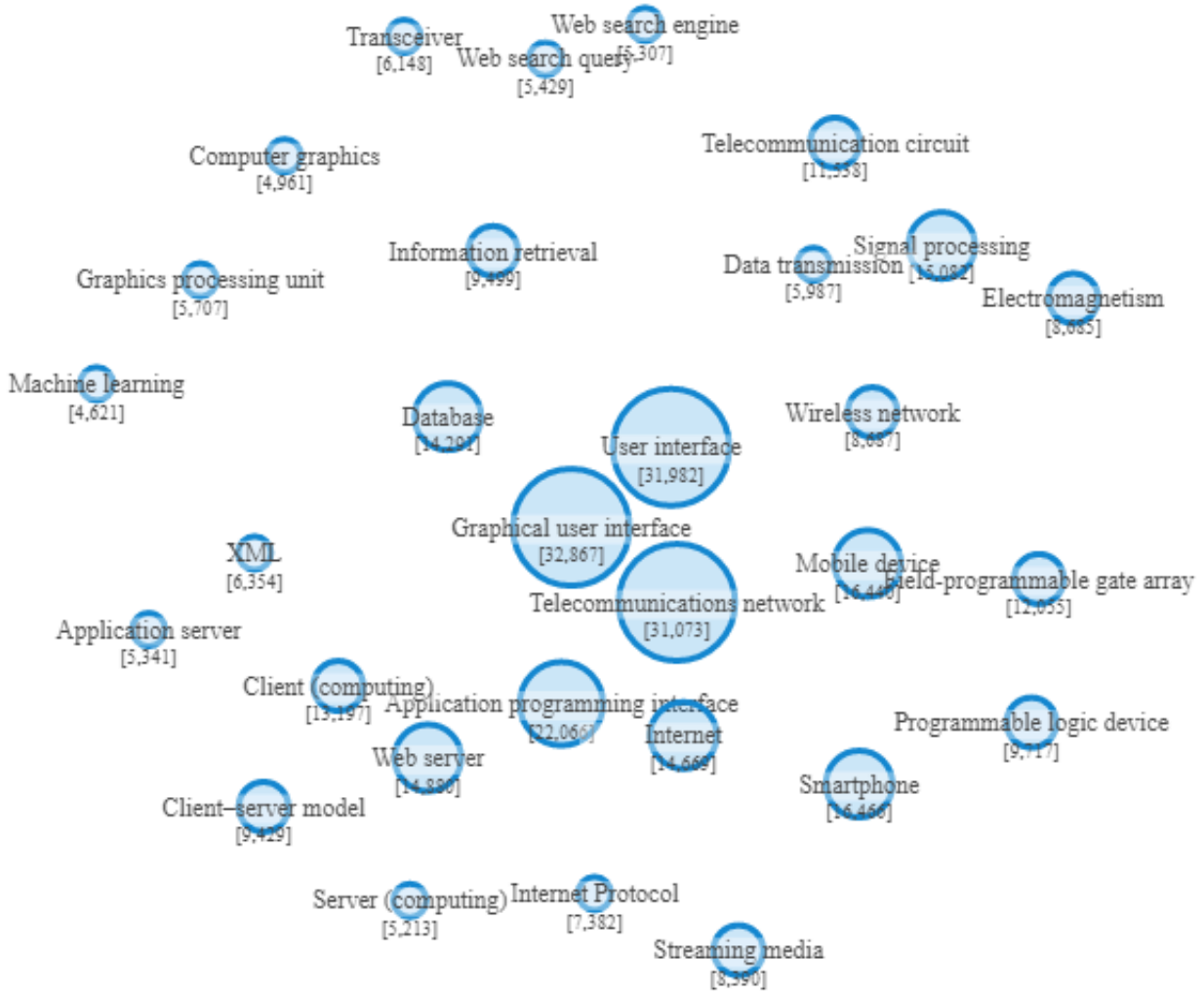
FC Assignees	# Applications
MICROSOFT	6271
IBM	6043
SAMSUNG	5432
APPLE	3017
QUALCOMM	2958
SONY	2397
INTEL	2323
NOKIA	2238
AMAZON	2093
LG	2055

Top Sub-technologies cited by FC Assignees



Topic Map – Concepts

- The bubble size corresponds to the total number of patent applications for each concept.
- The bubble proximity corresponds to the "relatedness" of the individual concepts.

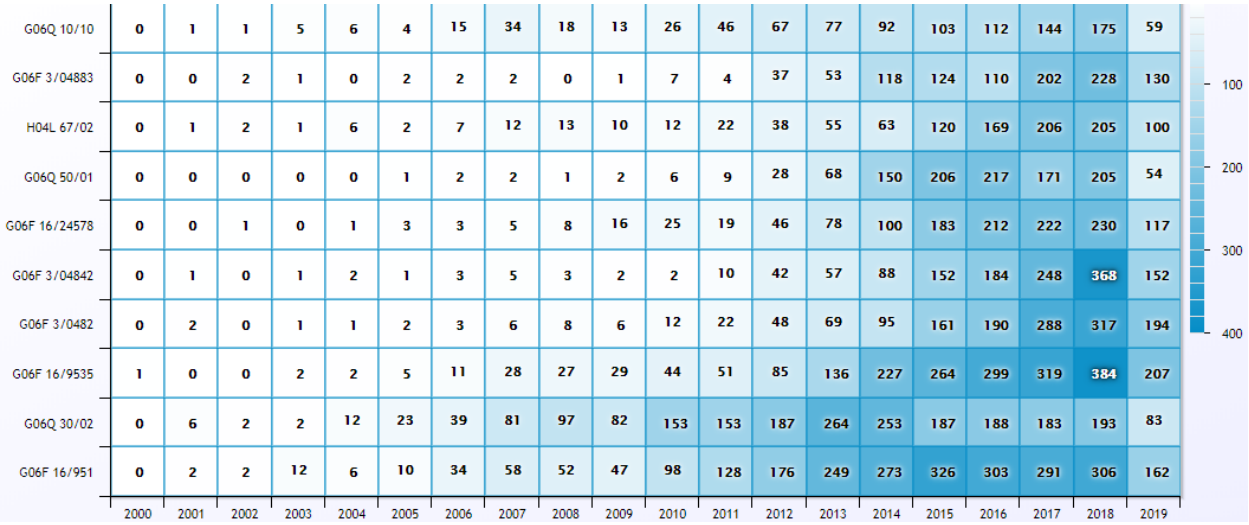


Published Applications - Top CPC Codes

CPC Code	Description	# Applications
G06F 16/951	Indexing; Web crawling techniques	2,533
G06Q 30/02	Data processing adapted for billing, commerce or marketing >> Marketing	2,188
G06F 16/9535	Search customisation based on user profiles and personalisation	2,119
G06F 3/0482	Digital interface arrangements >> interaction with lists of selectable items, e.g. menus	1,423
G06F 3/04842	Digital interface arrangements >> Selection of a displayed object	1,319
G06F 16/24578	Using ranking	1,267
G06Q 50/01	Data processing adapted for business sector >> Social networking	1,122

CPC Code	Description	# Applications
H04L 67/02	Communication protocols supporting network applications >> involving the use of web-based technology	1,044
G06F 3/04883	Digital interface arrangements >> for entering handwritten data	1,023
G06Q 10/10	Data processing in relation to administration and management >> Office automation	998
H04L 67/10	Communication protocols supporting network applications >> in which an application is distributed across nodes in the network	996
G10L 15/22	Speech recognition >> Procedures used during a speech recognition process	972
G06F 3/0481	Digital interface arrangements >> based on specific properties of the displayed interaction object or a metaphor-based environment	908
G06F 16/29	Geographical information databases	904
G06F 16/9537	Spatial or temporal dependent retrieval	872
G06F 3/017	Digital interface arrangements >> Gesture based interaction	838
G06N 20/00	Machine learning	809
H04W 4/029	Providing wireless communication services to user via network >> Location-based management or tracking services	786
G06F 16/248	Presentation of query results	775
G06F 3/167	Digital interface arrangements >> Audio in a user interface	742

Evolution of Technologies - CPC Code Analysis



Refer to the previous table for the CPC code descriptions.

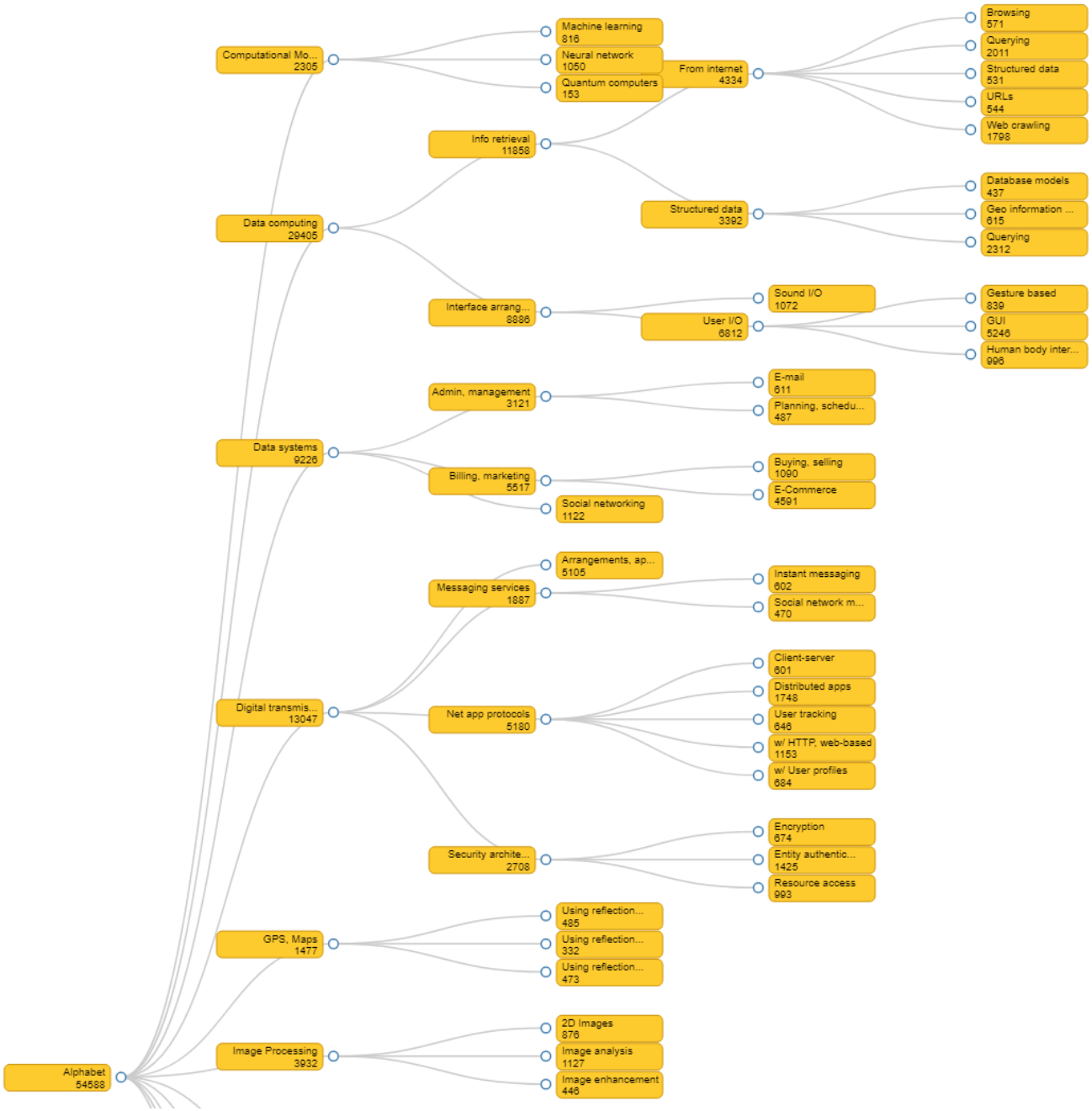
High Quality* Patents - Top Sub-technologies Covered

*(*High Quality ~ Relecura Star Rating 3 or more on a scale of 5)*

Sub-technologies	Relecura Star Rating				
	3	3.5	4	4.5	5
Function specific digital computer	1,311	356	229	108	1
Digital interface arrangements	946	300	203	99	1
Data processing adapted for billing, commerce or marketing	600	147	134	70	1
Arrangements, apparatus, circuits or systems for digital transmission	629	165	107	30	0
Communication protocols supporting network applications	597	187	108	39	0
Digital computers and data processing devices	554	165	90	36	0
Data switching networks	529	160	98	43	2
Providing wireless communication services to user via network	472	153	108	52	0
Reading or recognising printed or written characters	418	111	91	51	0
Data processing in relation to administration and management	382	105	83	45	2
Arithmetic operations, Asynchronous digital pipeline	359	112	98	39	0
Program control unit	356	91	59	23	0
Architecture for network security	357	91	58	22	0
Interactive TV, Video on demand	346	97	43	27	0
Data security and security of computers and components	353	77	61	20	0
Telephone substation equipment	276	97	85	33	0
Other data processing equipment	259	93	76	28	0
Hardware or software aspects of TV signals	283	80	42	23	0
TV systems	265	90	44	20	0
User-to-user messaging in packet-switching networks	276	79	39	19	0

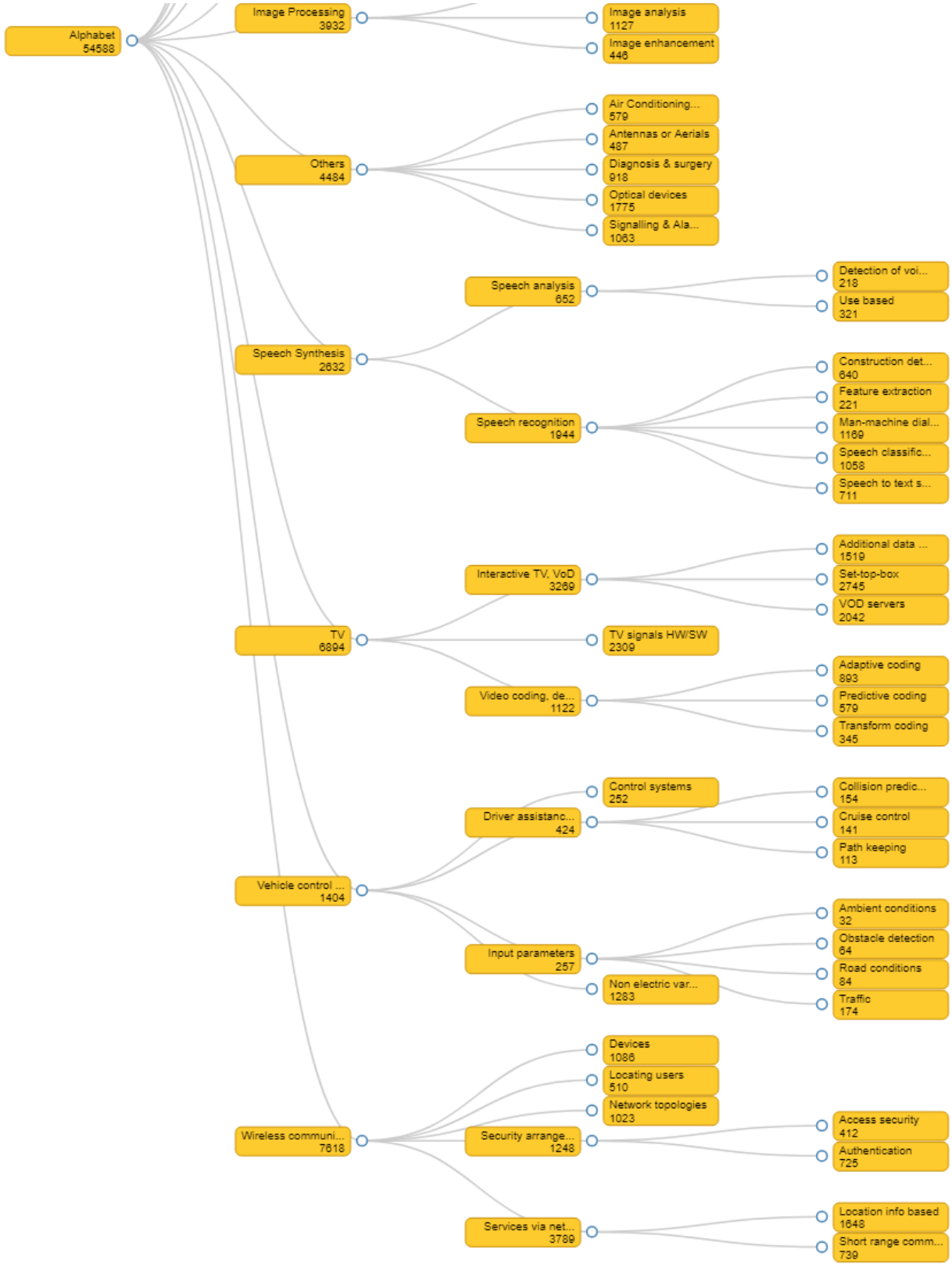
Portfolio Taxonomy

Part A



Portfolio Taxonomy

Part B



Competitor Comparison – Break-up by Technology Categories

(# Applications given for color-coded categories)

Technology categories				Alphabet	Microsoft	Amazon	Apple	Alibaba	Tencent	Baidu
Computational Models	Machine learning			816	1138	159	85	164	90	202
	Neural network			1050	480	58	31	183	208	445
	Quantum computers			153	142	0	0	0	0	0
Data computing	Info retrieval	From internet	Browsing	571	521	150	128	194	177	51
			Querying	2011	1729	207	349	370	280	259
			Structured data	531	501	124	91	218	140	44
			URLs	544	477	85	51	202	152	35
			Web crawling	1798	1254	193	85	288	127	188
		Structured data	Database models	437	802	149	59	172	69	38
			Geo information databases	615	253	16	94	114	33	65
			Querying	2312	2476	387	293	416	191	167
	Interface arrangements	Sound I/O		1072	1071	250	1121	113	155	173
		User I/O	Gesture based	839	1682	173	738	84	85	37
			GUI	5246	11317	870	6603	1363	2049	550
			Human body interaction	996	2186	212	472	104	145	77
Data systems	Admin, management	E-mail		611	1628	32	230	29	100	0
		Planning, scheduling		487	1920	360	126	476	108	93
	Billing, marketing	Buying, selling		1090	1075	1570	459	1383	350	127
		E-Commerce		4591	3007	1107	673	1323	785	293
	Social networking			1122	1680	106	132	198	671	40
Digital transmission	Arrangements, apparatus			5105	11282	3012	2680	4128	5746	1325
	Messaging services	Instant messaging		602	1333	41	297	481	926	30
		Social network messaging		470	478	39	45	139	582	12
	Net app protocols	Client-server		601	698	337	96	293	291	29
		Distributed apps		1748	3881	1333	641	842	895	161
		User tracking		646	913	187	144	238	253	36
		w/ HTTP, web-based		1153	1999	564	293	537	622	104
		w/ User profiles		684	1415	258	270	246	379	41
	Security architecture	Encryption		674	1215	377	277	302	226	31
		Entity authentication		1425	3040	867	818	1251	721	106
		Resource access		993	2193	680	483	464	357	44
GPS, Maps	Using reflection of EM waves			485	404	33	156	1	3	132
	Using reflection of radio waves			332	59	14	32	6	1	31
	Using reflection of waves			473	322	26	153	0	1	95
Image Processing	2D Images			876	1948	164	639	148	336	87
	Image analysis			1127	1325	260	591	169	270	296
	Image enhancement			446	664	50	400	76	204	70
Others	Air Conditioning Systems			579	25	56	2	14	8	72
	Antennas or Aerials			487	373	107	1326	8	0	1
	Diagnosis & surgery			918	406	11	458	21	19	22
	Optical devices			1775	2255	534	1126	58	37	24
	Signalling & Alarming Systems			1063	369	222	409	33	18	27
Speech Synthesis	Speech analysis	Detection of voice signals		218	114	61	77	40	31	51
		Use based		321	173	85	54	55	127	120
	Speech recognition	Construction details		640	276	161	177	35	63	122
		Feature extraction		221	181	56	39	47	53	136
		Man-machine dialogue		1169	784	325	488	88	82	379
		Speech classification		1058	936	271	353	86	114	308
		Speech to text systems		711	495	176	266	82	104	243
TV	Interactive TV, VoD	Additional data generation		1519	1233	235	455	109	547	86
		Set-top-box		2745	2707	362	1095	292	1357	224
		VOD servers		2042	1515	305	461	160	840	135
	TV signals HW/SW			2309	3137	511	2259	148	401	99
	Video coding, decoding	Adaptive coding		893	1615	34	694	60	247	9
		Predictive coding		579	1066	13	411	18	106	3
		Transform coding		345	974	15	344	1	59	1
Vehicle control systems	Control systems			252	32	4	33	1	7	147
	Driver assistance systems	Collision prediction		154	15	5	9	1	4	60
		Cruise control		141	0	0	1	2	4	40
		Path keeping		113	1	0	0	0	0	22
	Input parameters	Ambient conditions		32	11	0	0	0	1	23
		Obstacle detection		64	13	2	2	0	0	21
		Road conditions		84	0	0	1	0	2	38
		Traffic		174	2	0	1	0	3	27
	Non electric variables			1283	114	424	111	9	55	407
Wireless communication	Devices			1086	1001	75	1858	114	154	25
	Locating users			510	492	42	390	97	68	71
	Network topologies			1023	808	98	1121	109	135	27
	Security arrangements	Access security		412	405	74	445	163	115	8
		Authentication		725	750	144	780	353	275	29
	Services via network	Location info based		1648	1297	285	1009	337	459	171
		Short range communication based		739	378	76	629	138	133	11

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