

Smart Speakers

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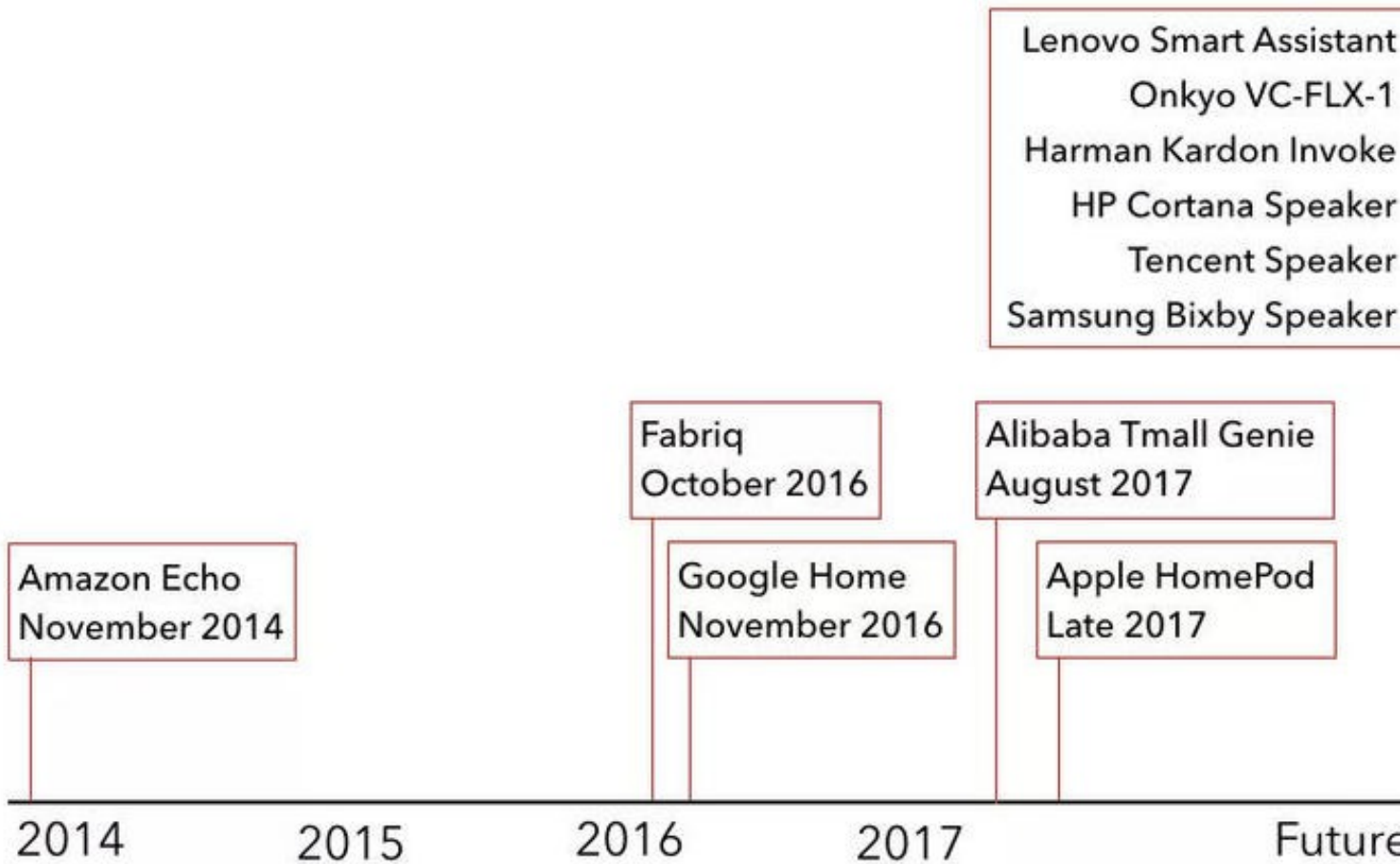
Objective

- Perform a landscape search in the area of Smart Speakers
- Use PCS to derive insights and gain competitive perspective
- Understand the value chain and recent M&A activities

Introduction

A smart speaker is a type of wireless speaker and smart device that utilizes Wi-Fi, Bluetooth and other standards to extend usage beyond audio playback. This can include, but not be limited to, features such as compatibility across a number of services and platforms, peer-to-peer connection through mesh networking, intelligent personal assistants, and others. Each can have its own designated interface and features in-house, usually launched or controlled via application or home automation software.

Voice Speaker Timeline



Source: Jackdaw Research

Search in PCS

A search on PCS for Smart speaker was performed with the following search strategy:

(tac:speaker AND tac:home automation) OR (tac:music system and tac:user-interaction) OR (tac:speaker AND tac:user interaction and text:home) OR (tac:speaker AND tac:voice command and text:smart-home) OR (tac:speaker and tac:automation and text:music) OR ((tac:bluetooth speaker OR tac:wireless speaker OR tac:NFC connected speaker OR tac:wifi speaker OR tac:wifi connected speaker) and text:smart home) OR (tac:smart speaker OR tac:intelligent speaker OR tac:networked speaker OR tac:talking speaker or tac:interactive speaker) OR (tac:user interactive music system) OR (tac:speaker and text:on demand music) OR (tac:speaker and tac:user tracking and text:home) OR (tac:speaker and tac:intelligent user-interface) OR (tac:music and text:intelligent user-interface) OR (tac:speaker and tac:user-interaction) OR (text:voice controlled speaker) OR (text:voice controlled music system) OR (text:speech controlled speaker) OR (text:speech controlled music system)

[illegible]

1,576 Patents Found 958 Families Found

Analytics Patents

Year Trends

Priority Year Application Year Publication Year

250
200
150
100
50
0

1983 1987 1991 1995 1999 2003 2007 2011 2015

| Company | Number of Patents |
|-------------------------------|-------------------|
| Microsoft Technology Licensee | 65 |
| Apple Inc. | 40 |
| Koninklijke Philips N.V. | 28 |
| Microsoft Corporation | 25 |
| Sony Corp | 20 |
| Nokia Corporation | 15 |


| Geography | Count |
|-----------|-------|
| US | 803 |
| WO | 383 |
| KR | 153 |
| CA | 53 |
| AU | 33 |
| GB | 13 |

| CPC Class | Count (approx.) |
|-----------|-----------------|
| G06F | 440 |
| H04M | 280 |
| G10L | 220 |
| H04W | 150 |
| G08B | 110 |
| G05B | 70 |



US-9699579-B2

US9699579B2

 Original Document

| | |
|----------|---------------------------------------|
| Inventor | Carlsson Gregory Peter Resch Keith |
|----------|---------------------------------------|

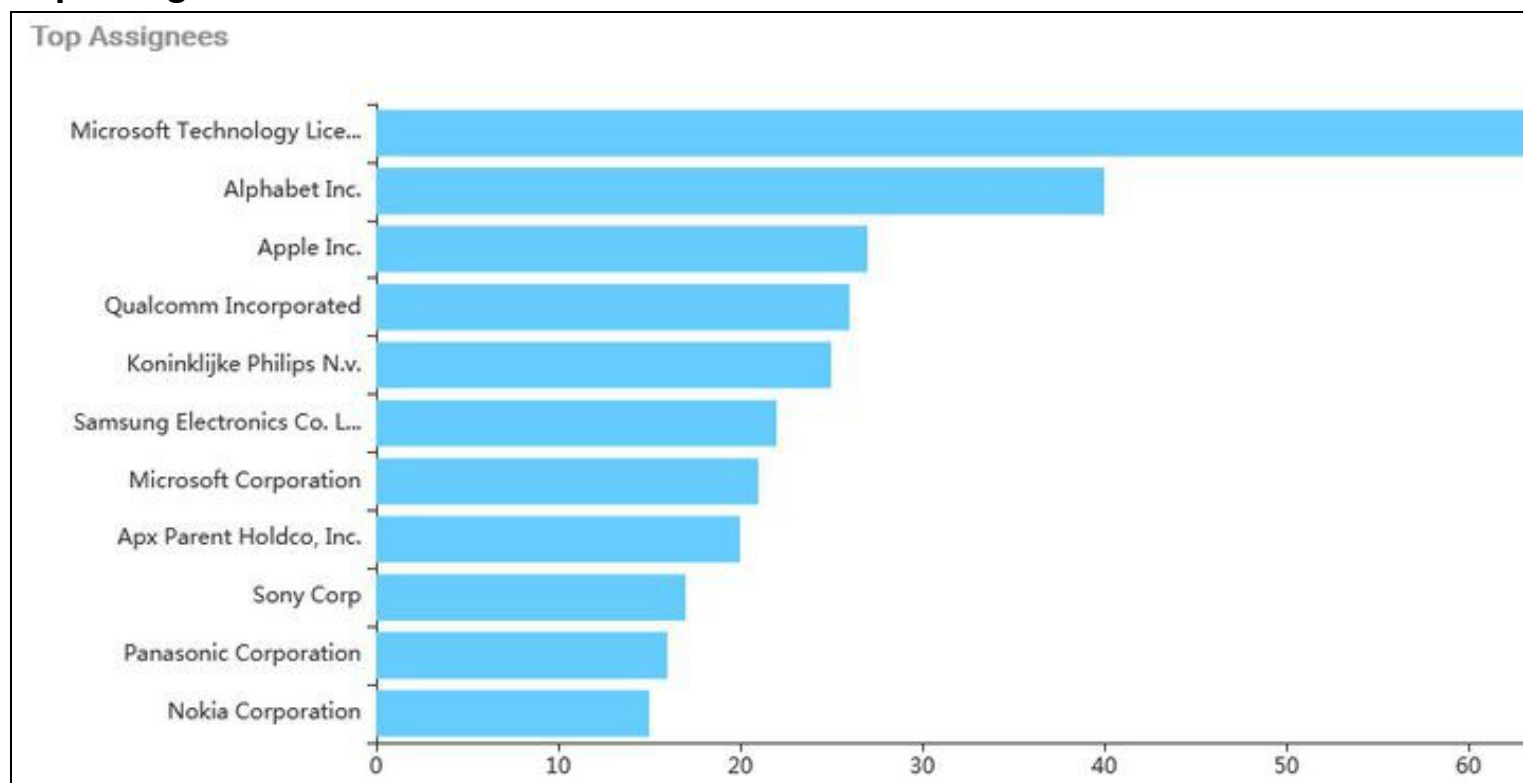
In a multi-**speaker** audio system for, e.g., a **home** entertainment system or other entertainment system, each **networked-speaker** (wired or wireless) is activated or deactivated as appropriate so that audio play follows a user as the user moves around the **home**.

US9699579B2, US20160105754A1, US20150256954A1, US9232335B2

CPC H04N21/44227, H04R2420/07, H04S7/308, H04S7/303, H04R2227/005, H04R27/0
H04R3/12, H04R2420/03, H04S7/301, H04R2227/003, H04S7/301, H04R2420/03,
H04N21/44227, H04R27/00, H04R3/12, H04S7/308, H04R2227/005, H04R2420/07
H04S7/303, H04R2227/003, H04H20/71, H04N21/25891, H04N21/4108, H04N21/4
H04N21/43615, H04N21/44227, H04N21/482, H04N21/4852, H04N21/6125, H04N
H04N21/6587, H04N21/8106, H04R3/12, H04R27/00, H04R2227/003, H04R2227/0
H04R2420/03, H04R2420/07, H04S7/301, H04S7/303, H04S7/308, H04W64/00, G0

IPC H04R27/00, H04B3/00, H04N21/442, H04R3/12, H04S7/00

Top Assignee



- All Top Players have Smart speakers products in market.

- Microsoft - The Invoke
- Google - Google Home
- Apple - Homepod

Top Assignee Insights

A) Microsoft technology Licensing

- **Microsoft** has patents related to smart speakers as shown below

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> US7643985B2 Priority Date: 2005-06-27 Application Date: 2005-06-27 Publication Date: 2010-01-05 | Context-sensitive communication and translation methods for enhanced interactions and understanding of speakers of different languages A recognized concept or situation is sensed and/or converged upon, and disambiguated with mixed-initiative user interaction with a device. The system performs simplified inferences about user communication goals in working with others who speak ... between the system and a device of the type of the speaker , and a language opportunity component operated by the processor that improves the speech recognition process by pushing ... of one or more terms ... Families: 2 Assignee: Microsoft Corp, Microsoft Corporation CPC Class Code: G10L 15/1822 |
| <input type="checkbox"/> US20140028542A1 Priority Date: 2012-07-30 Application Date: 2012-07-30 Publication Date: 2014-01-30 | Interaction with devices based on user state The device may prevent or allow user interaction with the device based on the user's state, such as a position relative to the device. ... is: 1. A method, comprising: detecting user interaction with a ... Assignee: Microsoft Corp, Microsoft Corporation CPC Class Code: G06F 3/017 |
| <input type="checkbox"/> US20160155443A1 Priority Date: 2014-11-28 Application Date: 2015-04-01 Publication Date: 2016-06-02 | Device arbitration for listening devices An electronic device in a topology of interconnected electronic devices can listen for a wake phrase and voice commands . The device ... when and how it responds so that a single device responds to voice commands . Families: 2 Assignee: Microsoft Technology Licensing LLC CPC Class Code: G06F 1/3203 |

B) Alphabet Inc.

- **Alphabet** has patents related to smart speakers as shown below

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> US20150097958A1 Priority Date: 2013-10-07 Application Date: 2014-10-07 Publication Date: 2015-04-09 | Smart-home security system with keypad device resistant to anomalous treatment ... claim 14, further comprising: a speaker configured to generate an audible alert at a lower volume than the horn, wherein the processor is configured to activate the speaker in response to determining that the position of the ... changed while the security keypad device is in state. 16. The security keypad device of claim 15, wherein the audible alert generated by the speaker ... Assignee: Google Inc CPC Class Code: H04L 12/2825 |
| <input type="checkbox"/> US20160018959A1 Priority Date: 2014-07-15 Application Date: 2014-07-15 Publication Date: 2016-01-21 | Adaptive background playback behavior ... 3, wherein the behavioral model is defined by a server using user interactions with the media viewer. 5. The method of claim 1, wherein ... 12. The non-transitory computer-readable storage medium of claim 11, wherein the behavioral model is defined by a server using ... with the media viewer. ... Families: 3 Assignee: Google Inc CPC Class Code: H04N 21/6379 |
| <input type="checkbox"/> EP2898485A1 Priority Date: 2012-09-21 Application Date: 2013-09-20 Publication Date: 2015-07-29 | Devices, methods, and associated information processing for the smart-sensored home This patent specification relates to apparatus, systems, methods, and related computer program products for providing smart home objects to each other and/or with a central server or a cloud-computing system to provide any of a variety of useful smart home objectives. Families: 3 Assignee: Google Inc CPC Class Code: G08B 17/113 |

B) Apple Inc.

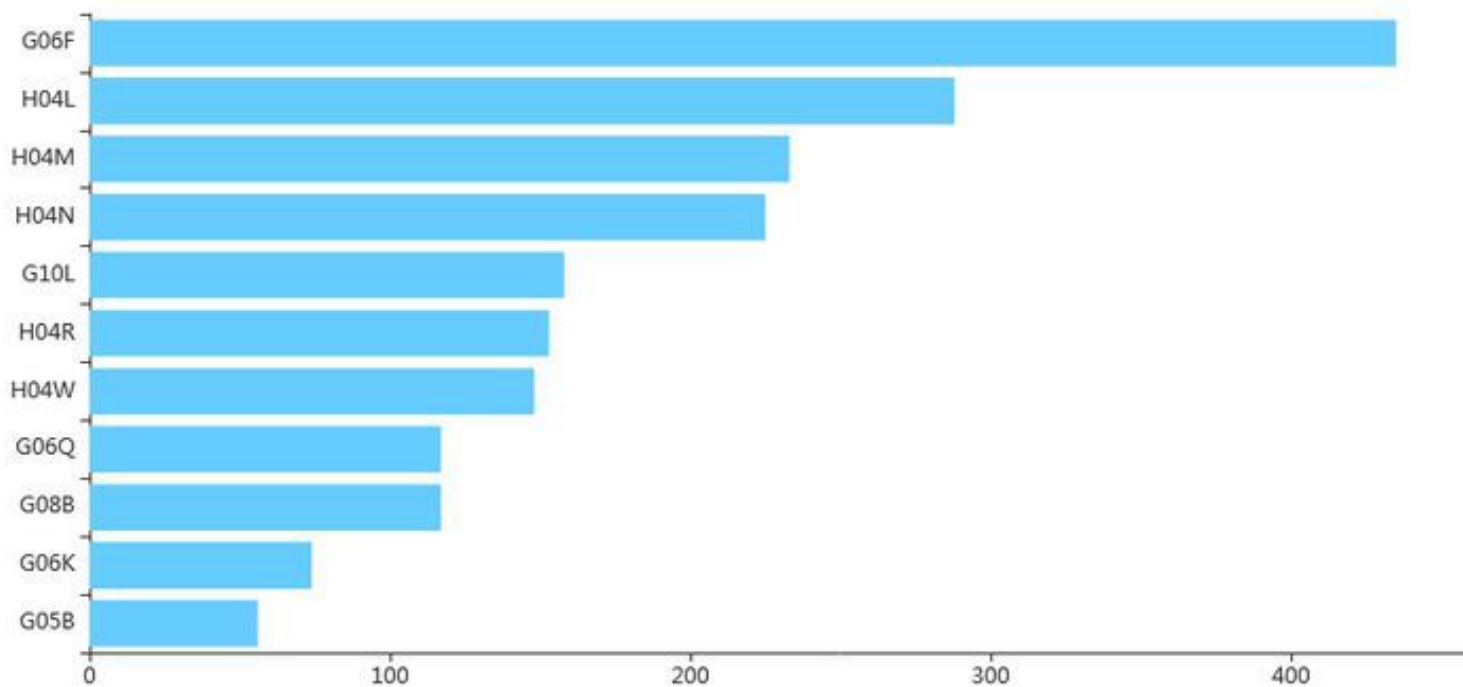
- Apple has patents related to smart speakers as shown below

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> EP2761860A1 Priority Date: 2011-09-30 Application Date: 2012-09-20 Publication Date: 2014-08-06 | Automatically adapting user interfaces for hands-free interaction ... modes are available for user interaction with the computing device, and wherein: responsive to detection that the device is in a hands-free mode, at least one of the steps of prompting the user for input, receiving user ... 21. The computer program product of claim 20, wherein at least one of the interaction modes are available for user interaction with the computing device, ... Families: 3 Assignee: Apple Inc CPC Class Code: H04M2250/74 |
| <input type="checkbox"/> US9697822B1 Priority Date: 2013-03-15 Application Date: 2014-04-28 Publication Date: 2017-07-04 | System and method for updating an adaptive speech recognition model A method for updating an adaptive speech recognition model is provided. ... a first mobile communication device is engaged in a call over a communications network and providing an adaptive speech recognition model The method also includes analyzing an outbound audio communication from the first mobile communication ... Families: 2 Assignee: Apple Inc CPC Class Code: G10L 15/30 |
| <input type="checkbox"/> US20080084981A1 Priority Date: 2006-09-21 Application Date: 2006-09-21 Publication Date: 2008-04-10 | Audio processing for improved user experience ... A method as recited in claim 1, wherein the portable electronic device has first and second speakers associated therewith, and wherein the processor controlling operates to direct audio signals for the audio playback to the first speaker ... user interaction with the audio control inverse volume levels for the communication channel and the mono audio output channel. 14. A method as recited in claim ... Families: 2 Assignee: Apple Computer, Apple Computer Inc CPC Class Code: H04M 3/56 |

Bibliographic Analytics

Main CPC?s:

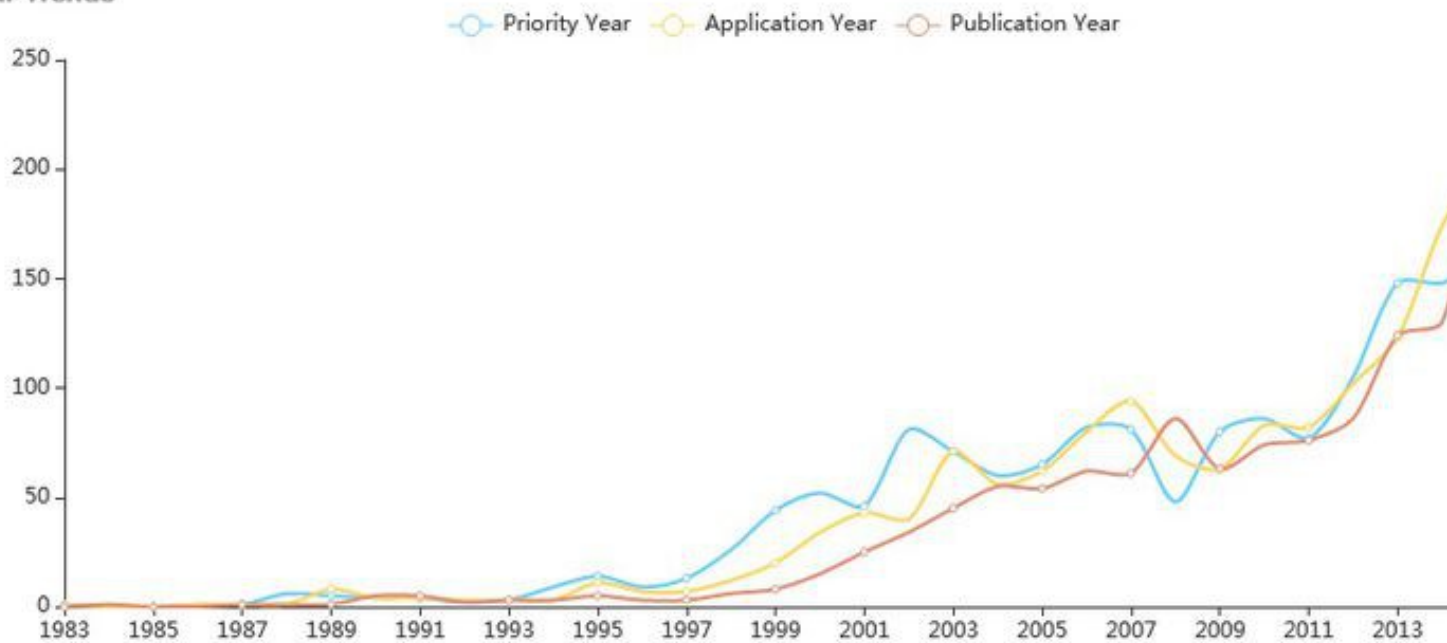
Top CPC Classes



• **G06F** - Physics---> Computing;calculating;counting ---> Electrical digital data processing

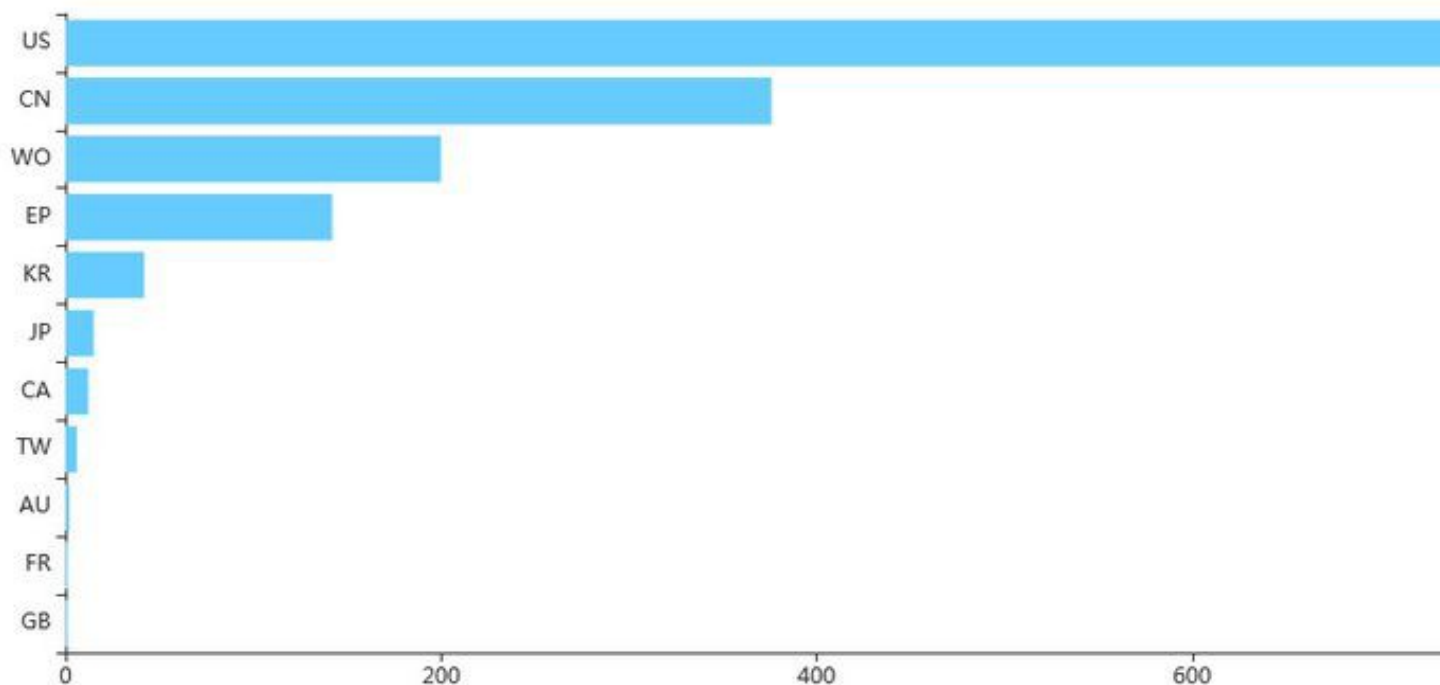
IP Activity:

Year Trends



Geographical Distribution

Top Geographies



Technical Insights: CPC Distribution in Top Assignees:

CPC Distribution:

Assignee - CPC Code

| Assignee | G06F | H04M | G10L | H04W | G08B | G05B | G09B | A63F | G07F | G10K |
|-------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Alphabet Inc. | 9 | 19 | 18 | 20 | 5 | 27 | 17 | 1 | 2 | 14 |
| Microsoft Technology Licensing, LLC | 42 | 13 | 15 | 14 | 12 | 4 | 3 | 3 | 6 | 6 |
| Qualcomm Incorporated | 10 | 11 | 5 | 12 | 13 | 13 | 9 | 5 | 4 | 4 |
| Samsung Electronics Co. Ltd. | 9 | | 7 | 8 | 10 | 3 | 5 | | | 2 |
| Allure Energy, Inc. | 8 | 10 | | | 5 | 5 | 9 | | 9 | |
| Apex Parent Holdco, Inc. | 5 | 9 | 10 | 4 | 11 | 4 | | 1 | | |
| Sony Corp | | 6 | 6 | 7 | 5 | 3 | 3 | 8 | | 1 |
| Fitbit Inc. | 8 | 7 | | 7 | | | | 10 | | |
| Apple Inc. | 12 | | 8 | 4 | 3 | | 2 | 2 | | 1 |
| Elbex Japan Ltd. | | 11 | 7 | 7 | 7 | | | | | |
| Koninklijke Philips N.V. | | 6 | | 14 | | | 11 | | | |

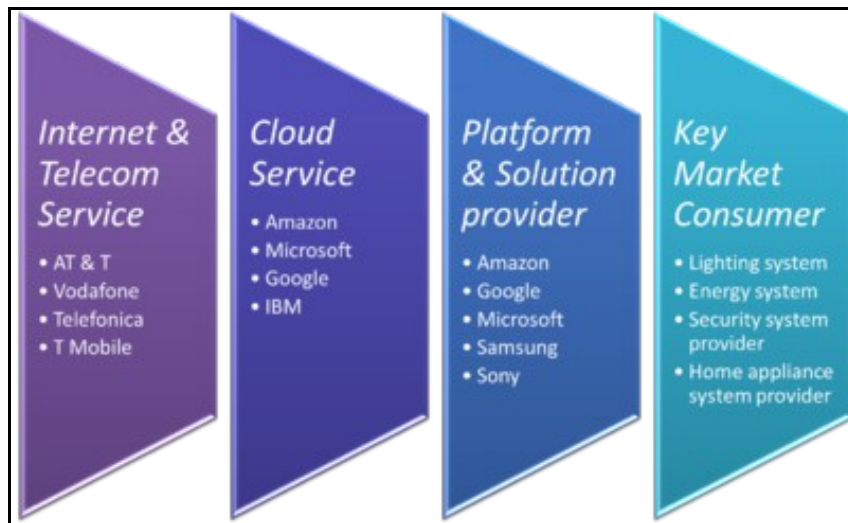
Technical Insights: Concepts vs Top Assignees

Technology Concepts:

Assignee - Concept

| | | | | | | | | | | |
|-------------------------------------|--------------------|----|------------|---|------------|---|-------|---|-------------------|--|
| Microsoft Technology Licensing, LLC | 8 | 12 | 4 | 9 | 9 | 2 | | 4 | 4 | |
| Alphabet Inc. | 4 | 4 | 1 | 5 | 1 | 2 | 2 | 4 | 3 | |
| Apple Inc. | 1 | 1 | | 1 | 5 | 3 | | | | |
| Qualcomm Incorporated | | 2 | 1 | 2 | 1 | 6 | 3 | | 2 | |
| Koninklijke Philips N.V. | 1 | 1 | 1 | 1 | | 1 | | 1 | | |
| Samsung Electronics Co. Ltd. | 4 | 4 | 2 | 4 | 1 | | | | | |
| Microsoft Corporation | 2 | 2 | 1 | 2 | 1 | 2 | | | 2 | |
| Apx Parent Holdco, Inc. | 3 | 3 | | 3 | | | | 3 | | |
| Sony Corp | 3 | 5 | 1 | 3 | 1 | | 3 | | 2 | |
| Panasonic Corporation | 7 | 7 | 7 | 7 | 8 | | | | | |
| Nokia Corporation | 1 | 2 | | 3 | 2 | | 1 | | | |
| | Speech Recognition | | Biometrics | | Multimedia | | Wi-fi | | Computer Keyboard | |

Value Chain Analysis



Latest M&A Activity in the Space

Implementation of virtual personal assistants are expected to positively impact the smart speaker market growth. This technology can stream music and audio books with single voice commands. The launch of Amazon Echo has caused disruption in the market, with several other companies such as Google and Apple following suit.

Multiple companies are acquiring startups. Here's the quick snapshot of the M&A activity in this space

- Microsoft acquired Solair IoT services based Italian company and Groove machine learning based company in 2016. Also automation technology solution company for house id8 Group R2 studio acquired in 2013.
- Samsung actively acquiring Innoetics and Melaud regarding speech experts and smart headphones. Harman (audio product system), Viv (intelligent interface), Smartthings (monitor and control home) and mSpot (mobile music service and provides cloud solution) acquired by Samsung.
- Apple acquired Workflow, Camel audio (provid tools for music production), Beats electronics (premium consumer headphones) and Novauris (voice recognition system)
- Sony acquired Orchard music distribution, marketing and sales company
- Google acquired Symphony (secure and effective communication workflow application) and Magic Leap (wearable technology and digital device solution company)