

# Smart Speakers

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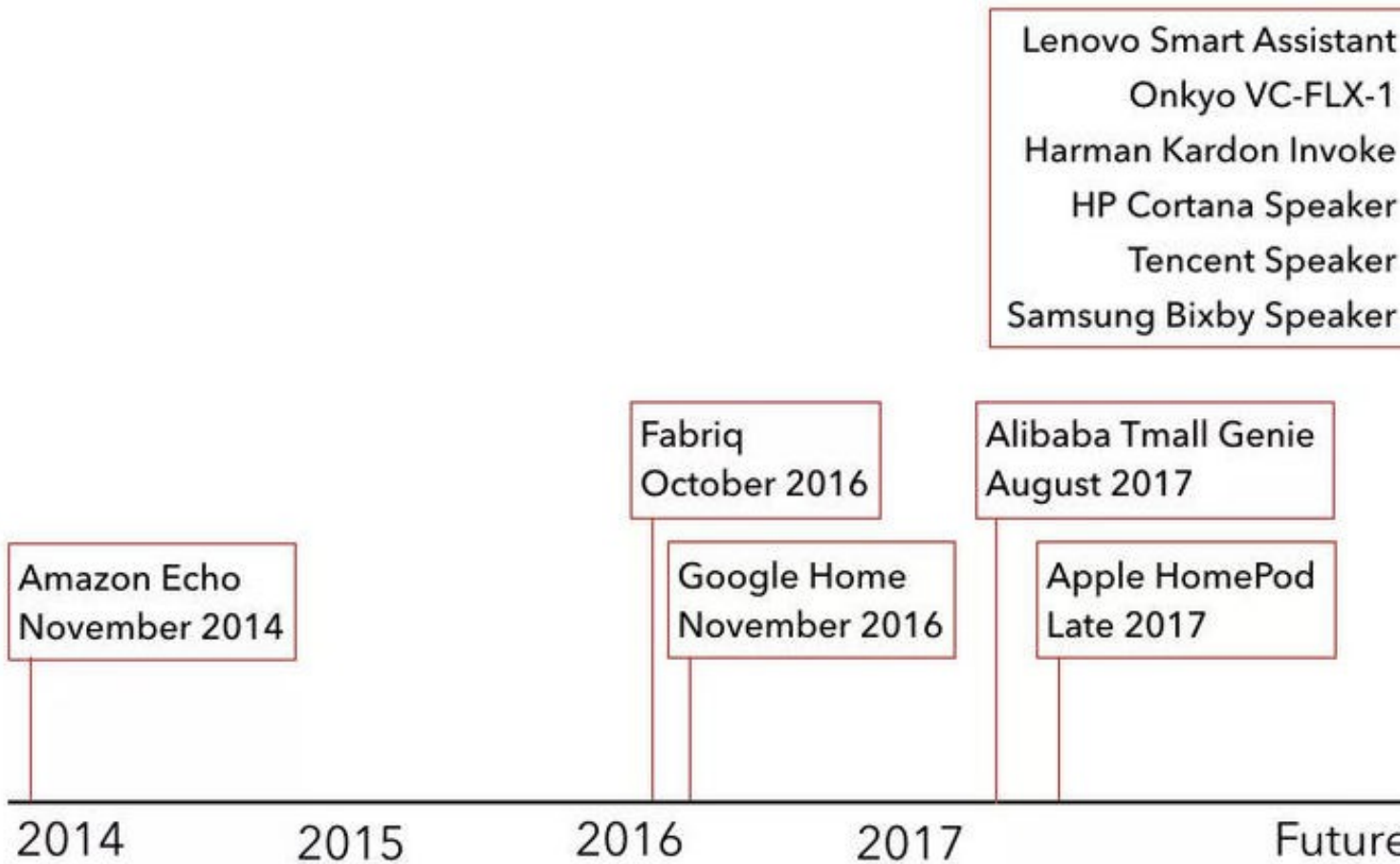
## Objective

- 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)

( 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 )

Query: (( 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 ))

Cluster Cloud CPC Taxonomy

1,576 Patents Found 958 Families Found

Analytics Patents

Expand All Collapse All

- Speech Recognition (149)
  - Speech Recognition (149)
  - Acoustic Model (9)
  - Natural Language Processing (6)
- History Of Human-computer Interaction (201)
  - Speech Recognition (149)
  - Speech Synthesis (41)
  - Touchpad (21)
  - Gesture Recognition (15)
  - Mouse Button (5)
  - Command-line Interface (4)
  - Mousepad (3)
- Biometrics (124)
  - Speaker Recognition (68)
  - Biometrics (52)
  - Voice Analysis (14)
  - Retinal Scan (11)
  - Fingerprint (6)
  - Iris Recognition (5)
- Computational Linguistics (183)
  - Speech Recognition (149)

Year Trends

Top Assignees

Top Geographies

Top CPC Classes



Networked speaker system with follow me

US9699579B2		
Publication Date	20170704	
Application No	US201514974413A	
Application Date	20151218	
Priority No	US201414199137A, US201514974413A	
Priority Date	20140306, 20151218	
Expiry Date	20351218	
Original Assignee	Sony Corp Sony Corporation	
Current Assignee	Sony Corporation	
Norm. Assignee	Sony Corporation	
Inventor	Carlsson Gregory Peter Resch Keith	

Abstract

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 that audio play follows a user as the user moves around the home.

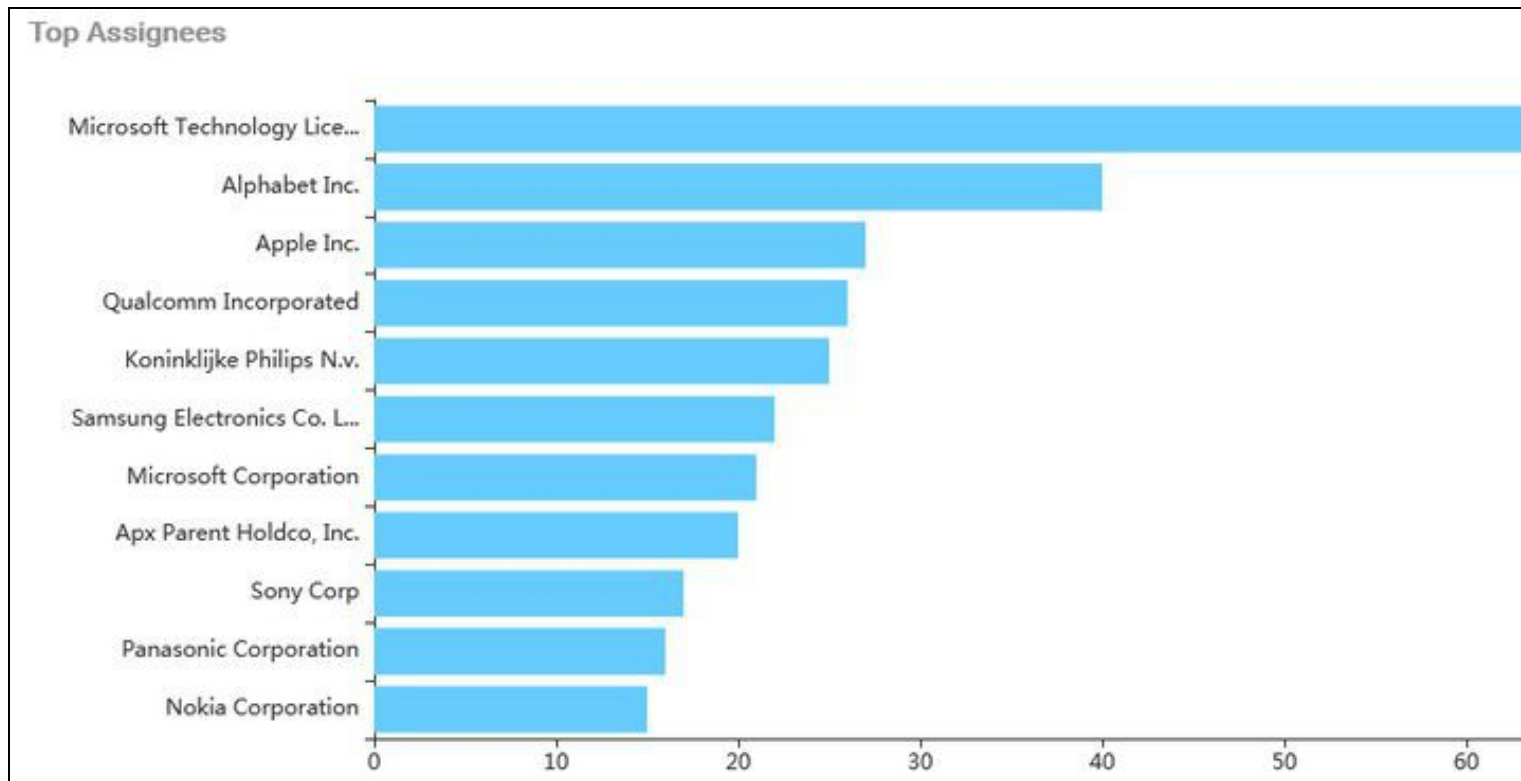
Family Members

US9699579B2, US20160105754A1, US20150256954A1, US9232335B2

Class Codes

CPC	H04N21/44227, H04R2420/07, H04S7/308, H04S7/303, H04R2227/005, H04R27/00, 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, H04N21/43615, H04N21/44227, H04N21/482, H04N21/4852, H04N21/6125, H04N21/6587, H04N21/8106, H04R3/12, H04R27/00, H04R2227/003, H04R2227/005, H04R2420/03, H04R2420/07, H04S7/301, H04S7/303, H04S7/308, H04W64/00, G06F
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"/> <b>US7643985B2</b> Priority Date: 2005-06-27 Application Date: 2005-06-27 Publication Date: 2010-01-05	<b>Context-sensitive communication and translation methods for enhanced interactions and understanding of speakers of different languages</b> A recognized concept or situation is sensed and/or converged upon, and disambiguated with mixed-initiative <b>user interaction</b> with a device of the user. The system performs simplified inferences about user communication goals in working with others who speak ... between the system and a device of the user. The system includes a <b>speaker</b> , and a language opportunity component operated by the processor that improves the <b>speech recognition</b> process by pushing the user to provide one or more terms ... Families: 2 Assignee: Microsoft Corp, Microsoft Corporation CPC Class Code: G10L 15/1822
<input type="checkbox"/> <b>US20140028542A1</b> Priority Date: 2012-07-30 Application Date: 2012-07-30 Publication Date: 2014-01-30	<b>Interaction with devices based on user state</b> The device may prevent or allow <b>user interaction</b> with the device based on the user's state, such as a position relative to the device. ... is: 1. A method, comprising: detecting <b>user interaction</b> with a ... Assignee: Microsoft Corp, Microsoft Corporation CPC Class Code: G06F 3/017
<input type="checkbox"/> <b>US20160155443A1</b> Priority Date: 2014-11-28 Application Date: 2015-04-01 Publication Date: 2016-06-02	<b>Device arbitration for listening devices</b> An electronic device in a topology of interconnected electronic devices can listen for a wake phrase and <b>voice commands</b> . The device determines when and how it responds so that a single device responds to <b>voice commands</b> . 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"/> <b>US20150097958A1</b> Priority Date: 2013-10-07 Application Date: 2014-10-07 Publication Date: 2015-04-09	<b>Smart-home security system with keypad device resistant to anomalous treatment</b> ... claim 14, further comprising: a <b>speaker</b> configured to generate an audible alert at a lower volume than the horn, wherein the processor is configured to activate the <b>speaker</b> 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 <b>speaker</b> ... Assignee: Google Inc    CPC Class Code: H04L 12/2825
<input type="checkbox"/> <b>US20160018959A1</b> Priority Date: 2014-07-15 Application Date: 2014-07-15 Publication Date: 2016-01-21	<b>Adaptive background playback behavior</b> ... 3, wherein the behavioral model is defined by a server using <b>user interactions</b> 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"/> <b>EP2898485A1</b> Priority Date: 2012-09-21 Application Date: 2013-09-20 Publication Date: 2015-07-29	<b>Devices, methods, and associated information processing for the smart-sensored home</b> This patent specification relates to apparatus, systems, methods, and related computer program products for providing <b>smart home</b> objects to each other and/or with a central server or a cloud-computing system to provide any of a variety of useful <b>smart home</b> objectives. Families: 3    Assignee: Google Inc    CPC Class Code: G08B 17/113

## B) Apple Inc.

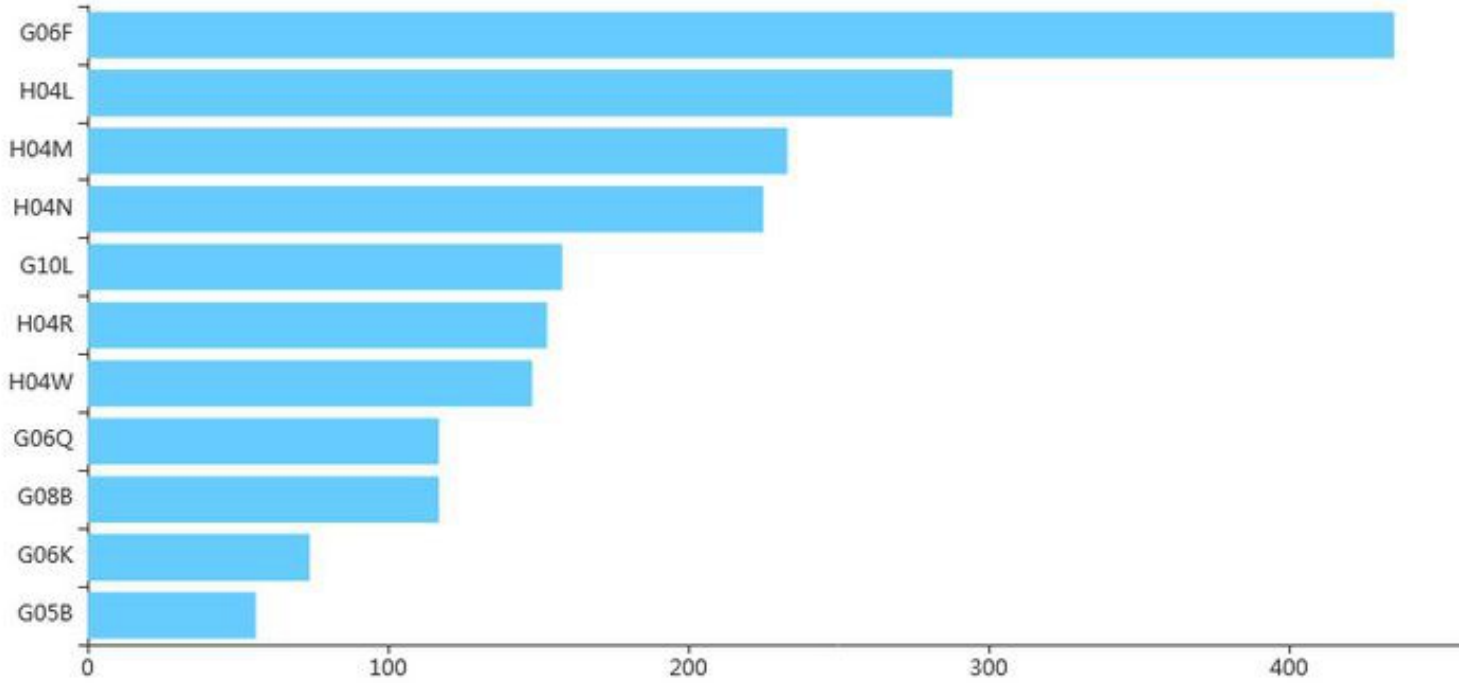
- Apple has patents related to smart speakers as shown below

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

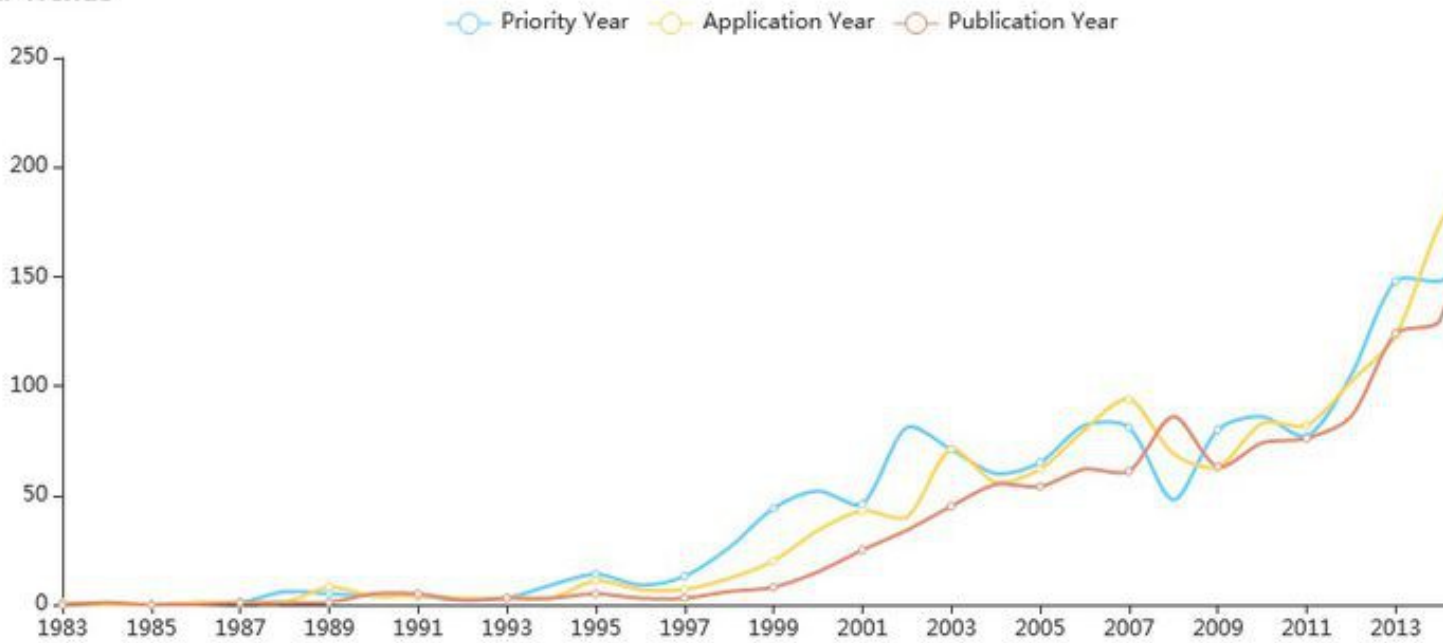
### Top CPC Classes



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

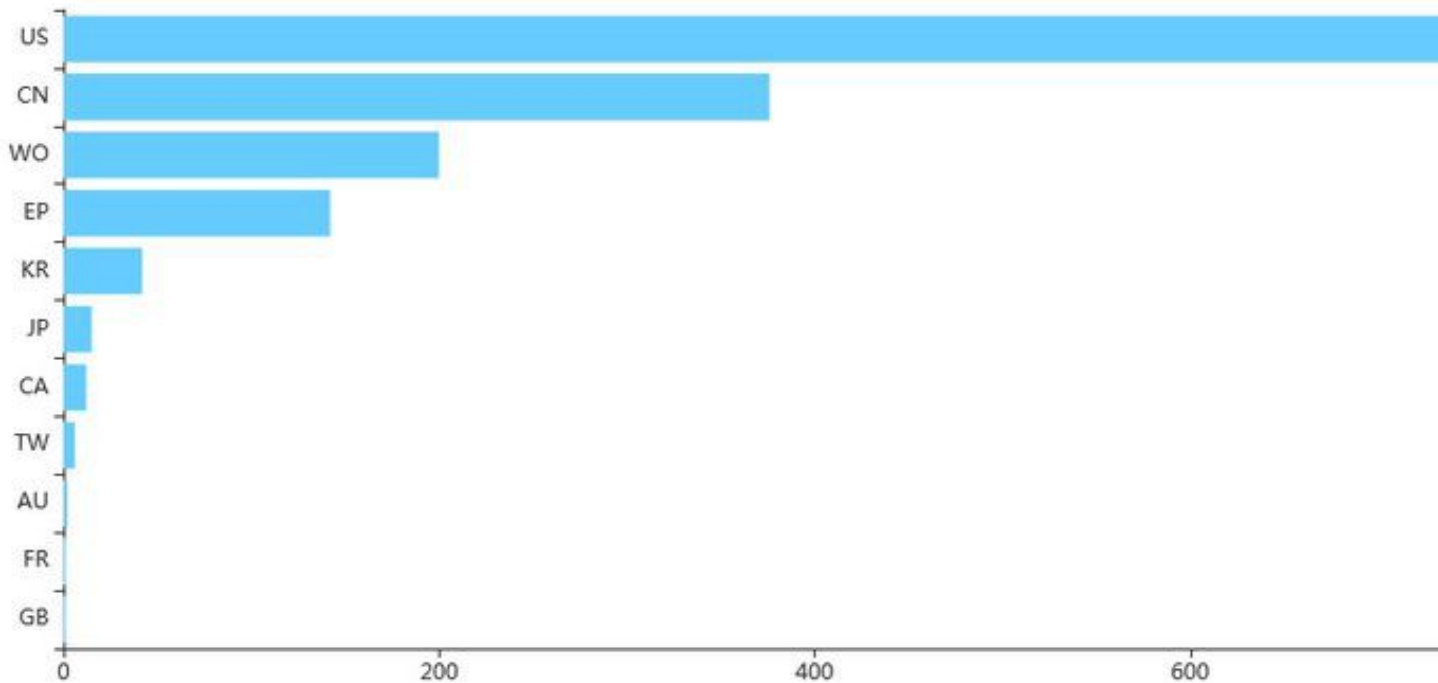
### IP Activity:

#### Year Trends



### Geographical Distribution

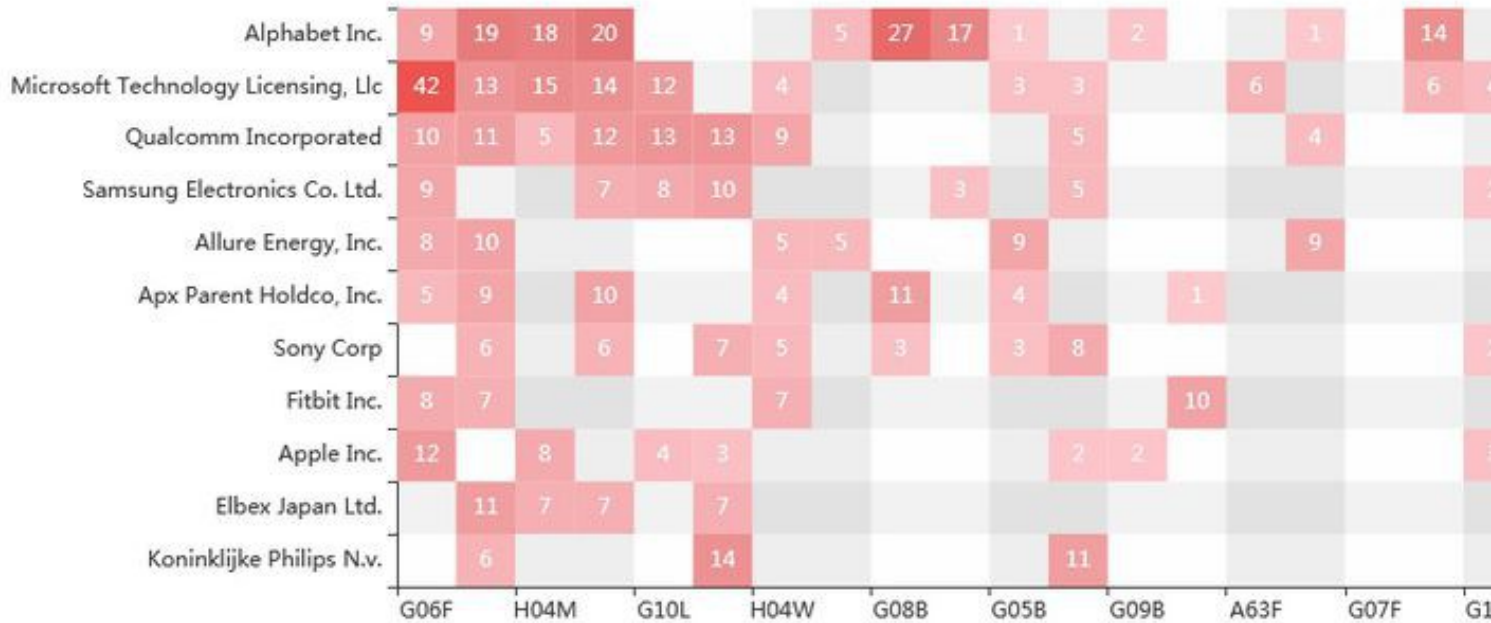
### Top Geographies



### Technical Insights: CPC Distribution in Top Assignees:

CPC Distribution:

#### Assignee - CPC Code



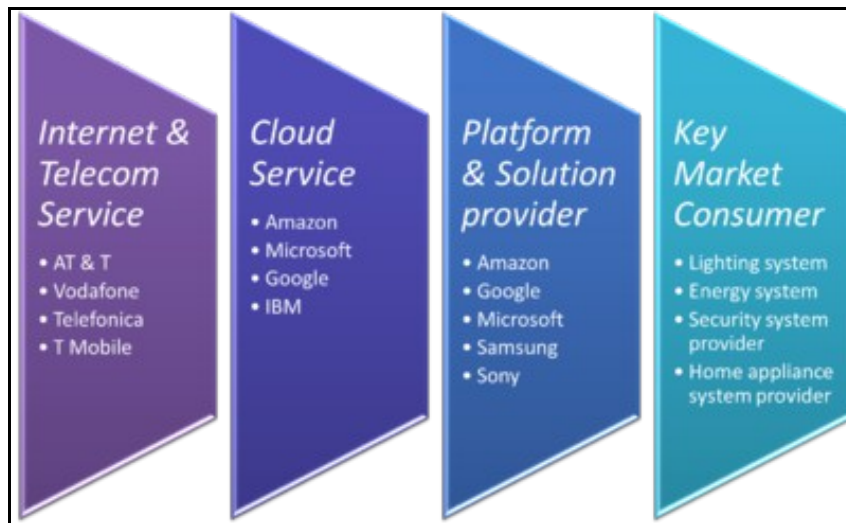
### Technical Insights: Concepts vs Top Assignees

Technology Concepts:

## Assignee - Concept

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

## 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)