US NON-PROVISIONAL UTILITY PATENT APPLICATION

TITLE:

XXX INVENTION

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CORRESPONDENCE:

Customer number: XXX

Docket number: XXX

NON-PUBLICATION REQUESTED

XXX INVENTION

1. This application claims the benefit of US provisional patent application XX/XXX,XXX.

# Field of the invention

1. The present invention is in the field of … [one sentence to help the patent office dispatch the application to the right examiner group]

# Background

1. [Briefly describe the history of the field for the jury, avoiding terminology used later to describe the invention.]

# Summary of the invention

1. [Briefly describe the problem of conventional approaches and each feature and each variation.]

# Brief description of the Drawings

1. FIG. 1 shows [a caption for the figure] according to an embodiment.

# Detailed Description

1. The following describes various embodiments of the present invention that illustrate various interesting features. Generally, embodiments can use the described features in any combination.

## [Headings outline sections for different features and variations]

1. [Describe the embodiments shown in each figure and every imaginable variation that others might implement.]

## Boilerplate

1. [The following text corresponds to the figures in the drawings template PPT file.]

## The cloud

1. FIG. X shows a user X communicating with a human interface device X coupled, as a client, through a network X to a server X according to an embodiment. The human interface device X receives user speech and sends it to the server X. The server X communicates responses over network X to the client X, which provides responses to the user X.

## CRMs

1. Figure XA shows an example non-transitory computer readable medium X1 that is a rotating magnetic disk. Data centers commonly use magnetic disks to store data and code comprising instructions for server processors. Non-transitory computer readable medium X1 stores code comprising instructions that, if executed by one or more computers, would cause the computer to perform steps of methods described herein. Rotating optical disks and other mechanically moving storage media are possible.
2. Figure XB shows an example non-transitory computer readable medium X2 that is a Flash random access memory (RAM) chip. Data centers commonly use Flash memory to store data and code for server processors. Mobile devices commonly use Flash memory to store data and code for processors within system-on-chip devices. Non-transitory computer readable medium X2 stores code comprising instructions that, if executed by one or more computers, would cause the computer to perform steps of methods described herein. Other non-moving storage media packaged with leads or solder balls are possible.
3. Any type of computer-readable medium is appropriate for storing code comprising instructions according to various embodiments.

## The SoC

1. FIG. XA shows the bottom side of a packaged system-on-chip device X0 with a ball grid array for surface-mount soldering to a printed circuit board. Various package shapes and sizes are possible for various chip implementations. System-on-chip (SoC) devices control many embedded systems and IoT device embodiments as described herein.
2. FIG. XB shows a block diagram of the system-on-chip X0. It comprises a multicore cluster of computer processor (CPU) cores X1 and a multicore cluster of graphics processor (GPU) cores X2. The processors connect through a network-on-chip X3 to an off-chip dynamic random access memory (DRAM) interface X4 for volatile program and data storage and a Flash interface X5 for non-volatile storage of computer program code in a Flash RAM non-transitory computer readable medium. SoC X0 also has a display interface X6 for displaying a GUI and an I/O interface module X7 for connecting to various I/O interface devices, as needed for different peripheral devices. The I/O interface enables sensors such as touch screen sensors, geolocation receivers, microphones, speakers, Bluetooth peripherals, and USB devices, such as keyboards and mice, among others. SoC X0 also comprises a network interface X8 to allow the processors to access the Internet through wired or wireless connections such as WiFi, 3G, 4G long-term evolution (LTE), 5G, and other wireless interface standard radios as well as ethernet connection hardware. By executing instructions stored in RAM devices through interface X4 or Flash devices through interface X5, the CPUs X1 and GPUs X2 perform steps of methods as described herein.

## The server

1. FIG. XA shows a rack-mounted server blade multi-processor server system X0 according to some embodiments. It comprises a multiplicity of network-connected computer processors that run software in parallel.
2. FIG. XB shows a block diagram of the server system X0. It comprises a multicore cluster of computer processor (CPU) cores X1 and a multicore cluster of graphics processor (GPU) cores X2. The processors connect through a board-level interconnect X3 to random-access memory (RAM) devices X4 for program code and data storage. Server system X0 also comprises a network interface X8 to allow the processors to access the Internet. By executing instructions stored in RAM devices X4, the CPUs X1 and GPUs X2 perform steps of methods as described herein.

## The car

FIG. XA shows a side view of an automobile X0. FIG. XB shows an overhead view of automobile X0. It comprises front seats X1 and rear seat X2 for holding passengers in an orientation for front-mounted microphones for speech capture. The automobile X0 comprises a driver visual console X3 with safety-critical display information. The automobile X0 further comprises a general console X4 with navigation, entertainment, and climate control functions, and further comprising a local speech processing module and wireless network communication module. The automobile X0 further comprises side-mounted microphones X5, a front overhead multi-microphone speech capture unit X6, and a rear overhead multi-microphone speech capture unit X7. The side microphones and front and rear speech capture units provide for capturing speech audio, canceling noise, and identifying the location of speakers.

## The robot

1. FIG. X shows an exciting anthropomorphic robot assistant. It comprises a speaker X on each side to output audio. The robot comprises a microphone array X, which comprises several microelectromechanical system (MEMS) microphones, physically arranged to receive sound with different amounts of delay. The robot comprises an internal processor that runs software that performs digital signal processing (DSP) to use the microphone array X to detect the direction of detected speech. The robot X further comprises a module X with two cameras to provide stereoscopic image and video capture. Further DSP software runs neural network-based object recognition on models trained on human forms to detect the location and relative orientation of one or more person. The robot X further comprises a display screen X that can output visual content such as JPEG still images and MPEG video streams. The robot X further comprises a wheel Xa and a wheel Xb, each of which can turn independently or in unison. By turning in accordance, the robot can move, such as to follow a person around. By turning independently, the robot can turn, such as to face and monitor the movement and activity of a person. The robot X further comprises a power switch X, which a person can use to shut the robot up if it becomes annoying.

## The earpiece

1. FIG. XA shows a first view of a speech recognition earpiece X1. It comprises a power switch X2 to turn the device on and off; a battery charging port X3 to allow charging an internal batter; an ear hook X4 that can suspend the device comfortably over a user’s ear; a microphone slot X5 for receiving speech; and a speaker X6 for providing spoken responses to the user. FIG. XB shows a second view of the speech recognition earpiece X1 in which power switch X2, ear hook X4, and speaker X6 are visible. FIG. 14C shows a third view of the speech recognition earpiece X1 in which battery charging port X3, ear hook X4, and speaker X6 are visible. Also visible is mode button X7, which allows a user to enable and disable speech recognition.

## Special boilerplate

1. Examples shown and described use certain spoken languages. Various embodiments operate, similarly, for other languages or combinations of languages. Examples shown and described use certain domains of knowledge. Various embodiments operate similarly for other domains or combinations of domains.
2. Some embodiments are screenless, such as an earpiece, which has no display screen. Some embodiments are stationary, such as a vending machine. Some embodiments are mobile, such as an automobile. Some embodiments are portable, such as a mobile phone. Some embodiments are for implanting in a human body. Some embodiments comprise manual interfaces such as keyboard or touchscreens. Some embodiments comprise neural interfaces that use human thoughts as a form of natural language expression.
3. Some embodiments function by running software on general-purpose programmable processors (CPUs) such as ones with ARM or x86 architectures. Some power-sensitive embodiments and some embodiments that require especially high performance such as for neural network algorithms use hardware optimizations. Some embodiments use application-customizable processors with configurable instruction sets in specialized systems-on-chip, such as ARC processors from Synopsys and Xtensa processors from Cadence. Some embodiments use dedicated hardware blocks burned into field programmable gate arrays (FPGAs). Some embodiments use arrays of graphics processing units (GPUs). Some embodiments use application-specific-integrated circuits (ASICs) with customized logic to give best performance. Some embodiments are in hardware description language code such as code written in the language Verilog.
4. Some embodiments of physical machines described and claimed herein are programmable in numerous variables, combinations of which provide essentially an infinite variety of operating behaviors. Some embodiments herein are configured by software tools that provide numerous parameters, combinations of which provide for essentially an infinite variety of physical machine embodiments of the invention described and claimed. Methods of using such software tools to configure hardware description language representations embody the invention described and claimed. Physical machines can embody machines described and claimed herein, such as: semiconductor chips; hardware description language representations of the logical or functional behavior of machines according to the invention described and claimed; and one or more non-transitory computer readable media arranged to store such hardware description language representations.
5. Hardware blocks, custom processor instructions, co-processors, and hardware accelerators perform neural network processing or parts of neural network processing algorithms with particularly high performance and power efficiency. This provides long battery life for battery-powered devices and reduces heat removal costs in data centers that serve many client devices simultaneously.

## General boilerplate

1. Practitioners skilled in the art will recognize many modifications and variations. The modifications and variations include any relevant combination of the disclosed features.
2. Various embodiments are methods that use the behavior of either or a combination of humans and machines. Some embodiments are systems of one or more non-transitory computer readable media arranged to store such instructions for methods described herein. Some embodiments are physical devices such as semiconductor chips; hardware description language representations of the logical or functional behavior of such devices; and one or more non-transitory computer readable media arranged to store such hardware description language representations.
3. Descriptions herein reciting principles, features, and embodiments encompass both structural and functional equivalents thereof. Elements described herein as coupled have an effectual relationship realizable by a direct connection or indirectly with one or more intervening elements.

# Claims

What is claimed is:

1. A method comprising:

[doing a first step to produce a type of intermediate result]; and

[doing a second step on the intermediate result to produce a final result],

wherein:

[a useful distinguishing attribute of the method].

2. The method of claim 1 comprising [a further limitation].

3. A non-transitory computer readable medium storing code comprising instructions that, if executed by a computer processor would cause a machine to:

# Abstract

 [Up to 150 words describing the invention, but not its advantages.]