Provisional Patent Application for a method of correcting posture using real-time volume adjustment based on the angle of the head

I, Oliver R. Song, have invented a method of correcting posture using an electronic setup modified from a set of generic headphones. The method is to use information gathered from a sensor regarding the angular position of the head relative to gravity to adjust relative volume of the left and right ears' volume outputs. The angle sensor is a gyroscopic sensor, powered by a standard battery pack. Information regarding angle directly changes the volume of the earpieces. The gyroscopic sensor outputs values centered at 5 volts. The two earpieces are controlled by a voltage dependant resistor. The value of the voltage dependant resistor varies with the earpiece. A power switch turn "correction" mode on and off.

People tend to fall asleep while listening to music, slumping across the desk. This gives rise to bad posture, muscle cramping, and back problems. My headphone-sensor setup would act just like normal headphones when the posture is correct, but when the posture is irregular the headphones "remind" the user of it by playing audio in a ratio other than 50%-50% (left to right). The ratio would be proportional to the angle of tilt of the head. The concept is illustrated in Fig. 9.

I have included four drawing sheets:

FIG. 1 is an isometric view sketch of the sensor mounted on the headphone

FIG. 2 is a top view sketch of the headphone-sensor set up

FIG. 3 is a flow chart demonstrating volume adjustment process of voltage controlled resistor and gyroscopic sensor

FIG. 4 is a circuit diagram displaying some of the possible circuit elements in the headphone-sensor setup

FIG. 5 is a graph of Tilt angle vs. Voltage output of gyroscopic sensor

FIG. 6 is a graph of percent output of each earpiece vs. input voltage received from gyroscopic sensor

FIG. 7 is a modified ratio of Tilt Angle vs. Voltage Output to achieve the same results with slightly more appropriate rate of voltage change.

FIG. 8 is a modified ratio of Percent Output vs. Voltage Input to achieve the same results with slightly more appropriate rate of percent output change at each earpiece.

FIG. 9 is a conceptual drawing of the headphone-sensor setup.

The components of my invention, as shown in Fig. 1 and Fig. 2, are:

- A set of headphones with plastic strap extending around head (2) and wires running down from individual earpieces (3)
- A battery pack (4)
- An assortment of voltage controlled resistors 5
- An on/off switch (6)
- A gyroscopic sensor outputting voltage values centered at about 5 volts(7)
- A calibration button 8 to switch the default angle of 0 degrees to a different angle

The method or arrangement of wiring or connecting the above electronic components and mounting them in a pair of headphones will be well known to those with ordinary skill in the electronic and mechanical arts.

My headphone-sensor setup achieves its result as follows: Embedded into the top plastic band of the headphones is a gyroscopic sensor. This angle sensor receives power from the standard battery pack. The angle sensor outputs a value between 0 and 10 in volts directly varying with the angle of the tilt. Values of voltage between 0 and 5 signify left tilt. Values of voltage between 5 and 10 signify right tilt. These concepts are shown in Fig. 5 and Fig. 6. This output is the input for the array of voltage controlled resistors which will balance the volumes of each earpiece. When the head is tilted to the left, the right earpiece's volume is greater, and the left earpiece's volume is smaller. When the head is tilted to the right, the left earpiece's volume is greater, and the right earpiece's volume is smaller.

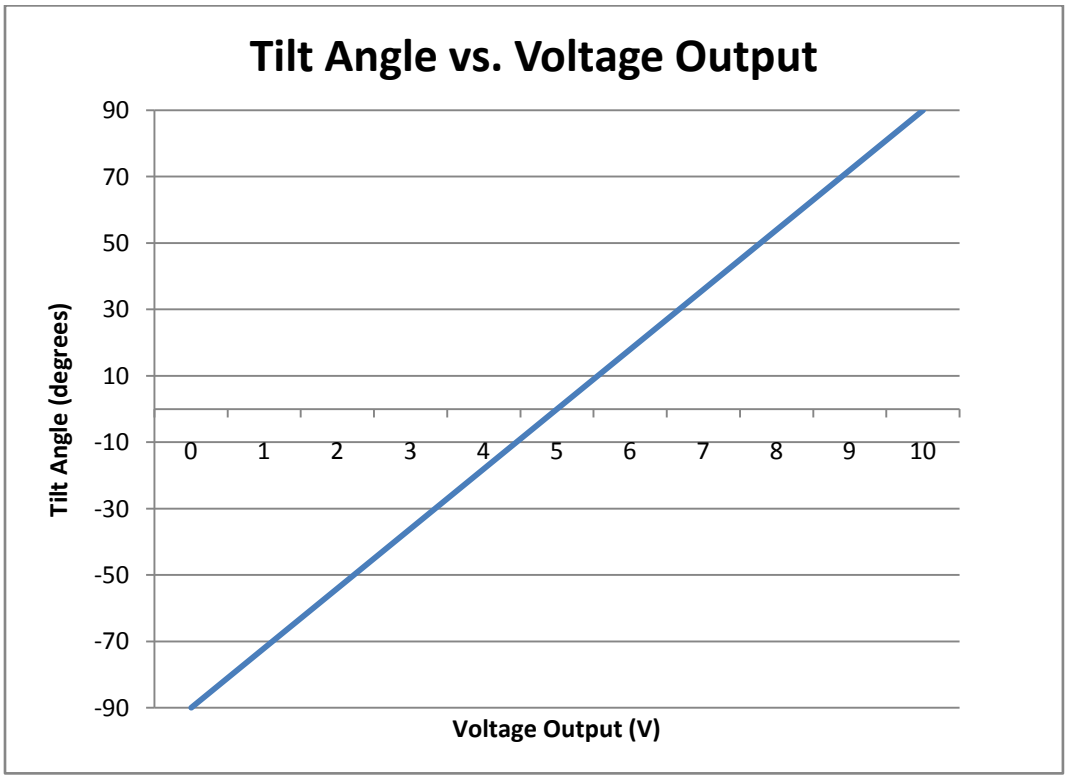

Fig. 5

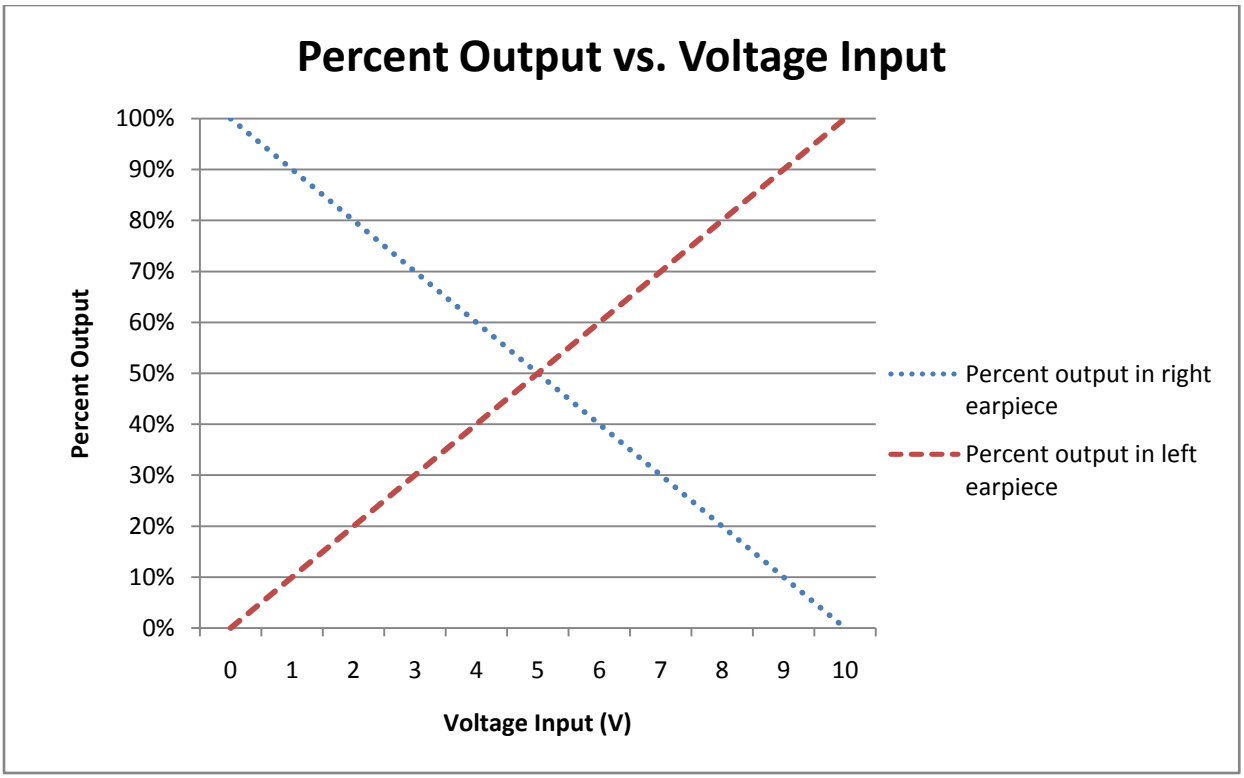

Fig. 6

When a user decides that he/she may be in a situation that will compromise their posture, they will flip the switch to the "ON" position. The headphones will enter "correction" mode and go through the process in Fig. 3.

There are many alternative ways that my headphone-sensor setup can be implemented:

- Instead of with the headphone band with the sensor on it going over the top of the head, the headphone band can be going behind the head.
- Instead of using a standard 3.5 mm headphone jack coupled with a small battery pack, a mini-USB cable can achieve the same results with appropriate extra circuitry added as well, such as analog to digital converters.
- An LED may be placed into the circuit to signal when correction mode is turned on.
- Alternative setups of Tilt Angle vs. Voltage Output and Percent Output vs. Voltage Input can be set as needed into the logic chip, as shown in Fig. 7 and 8.
- The "default" angle, normally set to 0 degrees, may be calibrated by the user to fit his or her most comfortable head position.
- Gyroscopic sensor output voltage can be centered at any voltage that is applicable.
- The battery can be replaced by a mini USB connection through which audio input will be able to travel as well as appropriate voltage

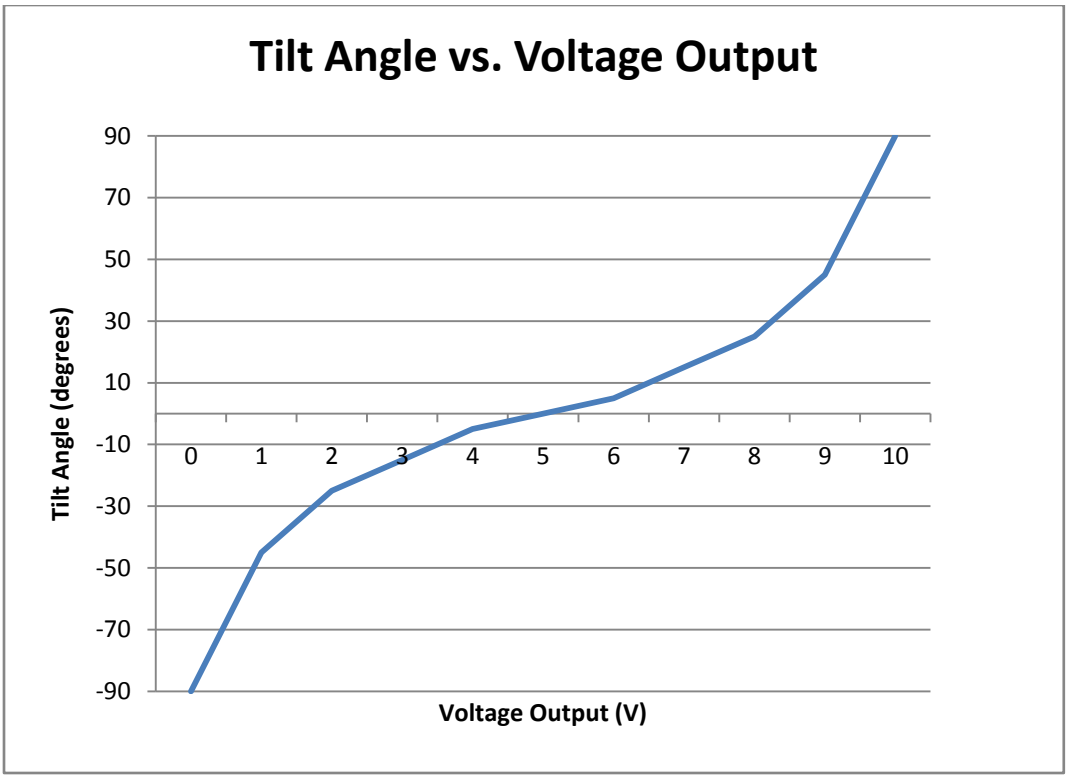
Tilt Angle vs. Voltage Output
Tilt Angle (degrees)
90
70
50
30
10
-10
-30
-50
-70
-90
0 1 2 3 4 5 6 7 8 9 10
Voltage Output (V)

Fig. 7

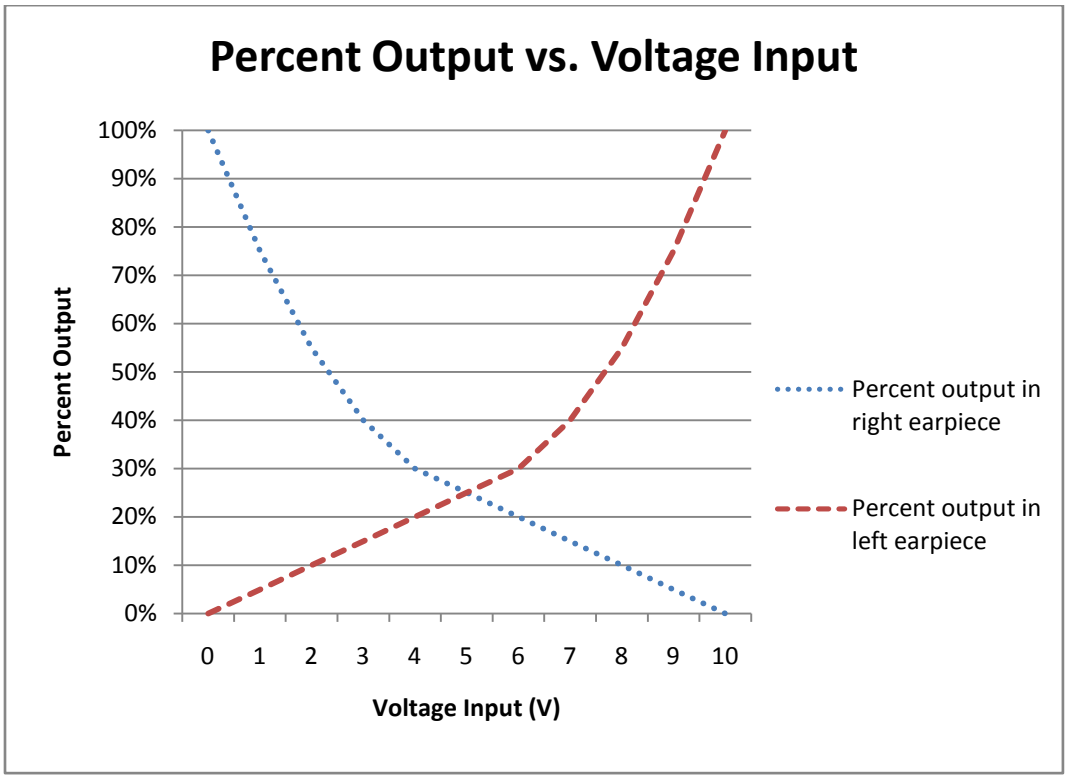
Percent Output vs. Voltage Input
Percent Output
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 1 2 3 4 5 6 7 8 9 10
Voltage Input (V)
Percent output in right earpiece
Percent output in left earpiece

Fig. 8

Prior art/reference:

There are a few previous inventions related to my invention.

Virtual sound source system By Bernard T. Wilson (Pat. 4,227,050, 1980)

Virtual sound system for the visually handicapped By Austin N. Stanton (Pat. 4,322,744, 1982)

Apparatus for the creation of a desirable acoustical virtual reality By Barry S. Goldfarb (Pat. 6,075,868, 2000)

However these do not deal with the adjustment of volume in each earpiece as a function of the headphones. Rather they involve virtual reality systems for accurately projecting audio signals, as a function of programs in the computer.