The present invention relates to a WorldGuide device comprising: 1) an enclosing structure; 2) a main body comprising a multi-media personal computer constituting the main computing unit and serving as the processing system, which unit comprises at least one CPU; sound and input means; a memory system; a storage device; and at least one communication means and/or at least one means of connecting external devices; 3) an input device; 4) an output device; 5) a location and/or direction sensing input device; 6) system software; and 7) a power supply.
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A COMPUTERIZED INSTRUCTIONAL SYSTEM

The present invention relates to a portable device that is essentially a geographically sensitive computing (GSC) device or a time sensitive computing (PTSC) device (hereinafter called "WorldGuide"). The WorldGuide functions in particular as an all-encompassing guide and support system for the traveler and will be described herein in particular with reference to this function. However, it will be shown hereinafter that the WorldGuide is not restricted to tourism and the like and may be used also for other purposes, e.g. as an information gathering device; serve with a special software such as a portable translation system; etc.

In many instances it is desired to move from one place to another. However, in order to find the direction, means such as maps, unhelpful locals who don't understand the language, confusing signs spread all over the location, a guide book, etc. have to be used. It is quite apparent that using a device replacing said various means has a great advantage.

So far no suitable device for this purpose is known.

It has thus been desirable to design a simple device which enables an easy guide for the traveller and for similar purposes.

The present invention thus consists in a WorldGuide device (as herein defined) comprising:
1. an enclosing structure;
2. a main body comprising a multi-media personal computer constituting the main computing unit and serving as the processing system, which unit comprises at least one CPU; sound and input means; a memory system; a storage device; and at least one communication means and/or at least one means of connecting external devices;
3. an input device;
4. an output device;
5. a location and/or direction sensing input device;
6. system software; and
7. a power supply.

The enclosing structure is preferably a rectangular flat box, advantageously made from a metal, e.g. aluminum foam, e.g. of Karman Inc.
The multimedia computer and/or screen and/or location sub-systems may be detached / attached / upgraded at will usage of third-party devices. They do not have to be physically connected to each other as long as the various parts can communicate with each other via a cable or any other suitable means.

The various parts of the main body are, for example, the following:

a. an CPU being advantageously a pentium class processor, running a suitable operating system that supports multi-tasking and multi-user, quite possibly Windows NT, or Unix. The CPU is the main coordinator of the system, taking control of all the sub-systems and synchronizing them.

b. as sound input and output means, e.g. a microphone sound system and a microcontroller;

c. as memory system, e.g. a RAM and/or a ROM; the RAM holds the currently running program for the CPU as well as storing temporary information for the other processors. The unit contains advantageously from 64 Megabytes RAM and upwards.

d. as storage device, e.g. a hard disc, CD-ROM, DVD and a flash memory which may be used to store non-running software, guide lectures, translation dictionaries, user profiles, and all other types of information normally associated with mass storage;

e. as communication means and/or means connecting external devices, e.g. connectors, cables, transmitters/receivers, and phones.

The main body may comprise also graphic display means, e.g. a color LCD.

The input means are, for example, at least one interface button, transmitter/receiver means, antennae, cameras, microphones, cellular phones, keyboards, touch sensitive screens, activating means and any other devices that allow for information of all types to be gathered into the device.

The interface buttons may be selected among the following buttons:

1. a command button, which loads the command vocabulary, activates the "Agent" program, and allows the running of the various functions of the system simply by using
your voice;
2. a guide button which calls the stored lectures that refer to the geographical position at which the user is located or to which he is pointing at.\*This is the button mainly used;
3. forward and backward buttons - which enable the user to scroll through the various explanations within the current lecture as well as choosing functions from the menu;
4. one or two buttons are located on the earphone unit, one for volume and one for RF Gain (not required when the earphone is connected to the main body via a cable). When both of these buttons are pressed simultaneously, they function as a command button.

The Output means are, for example, earphones, loudspeakers, screen displays, e.g. LCD touch screens, VRDs, directional light sources, and any other applicable device that can deliver guidance to the user. The loudspeaker may be part of the box or be a separate earphone.

The location and/or direction sensing input device may be according to the propounded use of the device, for example, a GPS tracking system, a compass, in particular a digital compass and a pedometer, an accelerometer, an altimeter, a video camera, a gyroscope, and any cross-correlating software that enables to analyze input data for the purposes of finding where one is located, and at what one is looking at. There should be as many of these sensing devices as are needed in order to determine the exact position of the device.

The system software may be selected, for example, among appropriate operating systems, databases, geographical location software, and any other suitable software as deemed necessary.

The power supply may be part of the WorldGuide or be a separate unit connected thereto. It is preferably a battery or mains. A mains connector allows the unit to be used when close to a mains supply in order to save battery power. One may also use a rechargeable battery, fuel cells and other suitable energy sources.

The WorldGuide in accordance with the present invention may
be divided into two basic models, namely:
   a. a GPS-based device; and
   b. a non GPS-based device.

GPS is a civil and military positioning system designed to provide its user with accurate positioning information anywhere in the world.

Both devices may be combined, if desired, into one device which may serve all purposes.

In the simplest form the GPS-based WorldGuide has the form of a box which comprises a personal computer, one button, one loudspeaker, a multi-channel GPS tracking system and a power supply.

By pointing the GPS-based WorldGuide in a particular direction and pressing the button, the user is able to hear a vocal description of what the unit thinks it is pointed at. This description is supplied from a database of the descriptions which are located in its storage device.

The inherent advantages inherent of the GPS-based WorldGuide are the ability to use it around the world. However, since GPS reception does not function in a variety of areas e.g. inside buildings, next to cliffs, in heavily wooded areas, etc. The GPS-based WorldGuide cannot be used in those areas. In this case one has to use the non-GPS-based WorldGuide which will be described hereinafter.

In the simplest form of the non GPS-based WorldGuide it has the form of a box which comprises a personal computer, one button, one loudspeaker, a combination of a digital compass and of a pedometer/accelerometer/inclinater, a power supply and some means of communicating the exact starting position of the unit before it is used, for example, a docking station. In connection with the WorldGuide according to the present invention the docking station will be used to transfer the precise starting point from which the WorldGuide can determine its position.

By pointing this device in a particular direction and pressing the button, the user will be able to hear a vocal description of what the unit thinks it is pointed at. This description is supplied from a database of the descriptions which are located in its storage device.
The inherent advantages of the non GPS-based WorldGuide are the ability to use this device in those areas where the GPS-based model cannot be used. However, in the non GPS-based WorldGuide it is important to feed the exact location from time to time, for example, every five kilometers, into the device in order to retain reasonable accuracy.

In the simplest form of a combined GPS-based and a non GPS-based WorldGuide, said combined WorldGuide has the form of a box which comprises a personal computer, one button, one loudspeaker, a GPS tracking system receiver, a combination of a digital compass and of a pedometer/accelerometer/inclinometer and a power supply.

By pointing this combined WorldGuide in a particular direction and pressing the button, the user will be able to hear a vocal description of what the unit thinks it is pointed at. This description is supplied from a database of the descriptions which are located in its storage device.

The combined WorldGuide can be used in all areas around the world.

It is also possible to introduce another implementation the WorldGuide then does not have an autonomous system to find its location while retaining its orientation-finding sub-system, e.g. the digital compass. In this possibility an external third party supplies the necessary information regarding the location, e.g. Pinpoint Ltd. Systems. The WorldGuide then uses the information in conjunction with the orientation acquition to deliver appropriate multimedia information to the user.

One embodiment of the combined WorldGuide according to the present invention has the form of a rectangular box which comprises the following parts:

A. the main body which comprises:

1. the main computing unit and optionally a multi-functional processor (MFP), e.g. a MPACT-II media processor of Chromatic Inc. or a digital signal processor (DSP), e.g. Texas Instrument TMS320C6x. The computing unit controls all the functions of the WorldGuide including the user-interface, sound input and output, graphics, communications, processing of all types of information,
and enables the presentation, collection and transmis-
sion of lectures and other multi-mea information;
The DSP or MFF may be used for a number of functions.
Due to it's ability to run simple numeric tasks at very
high speeds, it is well suited for functions such as
sound processing (noise reduction, positional analysis
of sound sources etc.), video processing (picture
enhancement etc.) and other mathematically intensive
tasks.
The MFF may also be able to replace functions previously
performed by hardware (graphics I/O, sound output,
modem communications, networking etc.) simply by
loading the correct software;
2. a display being advantageously selected among a LEP, a
bi-stable LCD or a LCD touch screen used for the main
2D and 3D display. Said display displays also hierar-
chical menus and other interface elements. Touching a
menu item evokes a vocal response in the earphone that
advises the user which function has been selected.
Double tapping on the chosen menu function opens either
another menu, or activates the requested function with
an appropriate vocal feedback. The LCD may optionally
be detachable. When detached, it may include the video
camera if present, or any other part of the device;
3. one or two on/off switches. It is enough to press just
one of them in order to switch one of them on.
However, in order to switch the unit off, both switches
must be depressed;
4. power supply;
5. communications means hooked up to a docking station
and/or to a local area network when needed. Various
other sources of data and/or accessories may be
connected to these means, for example, PC-Card's,
Auxiliary audio input, phone connections, etc;
6. at least one of the buttons as defined above;
7. loudspeaker(s), e.g. NXT loudspeaker, through which the
spoken output is channeled when the WorldGuide is being
used by a group of people or when no earphone is avail-
8. a digital compass, e.g. Precision Nav. or a gyroscope, e.g. Hitec RCD Dual Rate Gyroscope, which enables the WorldGuide to determine the exact orientation at any given point of the tour and thus enabling the appropriate lecture to be delivered. The compass is preferably mounted in such a manner as to be directed to the horizon at all times. Some embodiments of the digital compass may comprise suitable gyroscopic devices;

9. an altimeter, e.g. Altitron, if present, which supplies the WorldGuide with the exact information of the height at which the user is located which enables together with the GPS tracking system and the digital compass to determine the exact location; the altimeter may be replaced by an input from at least one contour map cross-correlated with a GPS location output. The presence of an altimeter or of said input is advantageous when the GPS tracking system, if present, is not a multi-channel system.

10. cellular phone or telephone connector, if present, which enable to use the WorldGuide as a standard phone, as a videophone, and to send or to receive updates to the information available at any particular site that the user is located at. The phone may also be used as an additional geographical location input device for the use of a signal strength triangulation;

11. a digital tape measure device/range finder, e.g. Pocket Dimension Master of Calculated Industries, which enables the system to measure the distance between the WorldGuide and the user’s point of view (POV) as well as measuring distances inside buildings when the GPS tracking system is non-operational.

12. a digital camera, if present, which is used to capture a video picture of the surroundings and of signs that the user wishes to translate. Using the camera, it is possible to design a three-dimensional (3D) model of the environment. Having more than one camera will make this easier. Moreover, the inherent 3D modeling
software capability combined with the digital camera enables the reconstruction of travel routes in any
direction including retracing the route in the form of motion/animation. The camera input may also be used to
determine the exact location of the Guide in relation to known visual clues. The actual positioning of the
cameras in the WorldGuide may change according to the requirements;
the digital camera may take a large number of pictures that will be incorporated by the WorldGuide into a
lower number of higher quality pictures. These pictures may be in the traditional form of single or
video motion pictures or be incorporated into panoramic views of the surroundings. The information (i.e. in the
pictures or the movies) may be transmitted by the WorldGuide communication capabilities to a remote
server. This service allows the user to take a large number of pictures, movies (including sound), without
having to use video cassettes, diskettes, etc. The user is thus able to retrieve his information at any
suitable location.

13. a GPS tracking system, e.g. an Garmin International Personal Navigator, which is used to pinpoint the
geographical location and direction of the user at any given time, whenever it is in an area where it can be
used; the GPS tracking system preferably comprises a receiver for the GPS (Global Positioning Satellite)
transmissions.

14. a pedometer, e.g. of Sinosonic Industrial Co. and/or an
accelerometer, e.g. of Silicon Designs Inc. which
measures the distance walked or traveled. In conjunc-
tion with the digital compass it enables the WorldGuide
to produce the route walked inside buildings, where the
GPS tracking system cannot be used, and thus determines
the precise location of the user and/or the point to
which he is directed.

15. part of a transmitter/receiver pair; the transmitting
and receiving technology used may either be FM (radio)
or infra-red (light). They are used to transfer information between the main body of the WorldGuide and the earphone(s). (Part B).

B. an earphone which comprises

16. a small loudspeaker inserted in the ear, that delivers the command feedback, as well as the main vocal output of the WorldGuide;

17. a microphone the input of which is used as the main audio input for Agent instructions. The audio signal received from the microphone may be filtered via specialized MFP functions, ensuring that the signal is clean of external noises, and thus adding to the accuracy of voice recognition, e.g. IBM's ViaVoice, Dragon Systems;

the earphone may also comprise a volume control, a transmitter/receiver, and an additional command button. Alternatively the command button may be replaced by an FM gain button and then simultaneously pressing the volume and gain buttons will activate the command function. When the earphone is not physically connected to the main unit via a cable, it requires an extra source of power;

the earphone may be used, e.g. for ear testing using the same technology as applied in hearing aids, thus improving the sound pattern of the earphone, and adjusting it to the individual ear as well as allowing the WorldGuide to be used as an advanced hearing aid;

18. at least one of the buttons as defined above;

19. a loudspeaker; and

20. part of the above transmitter/receiver pair.

Another embodiment of the combined WorldGuide according to the present invention comprises in addition to the above parts as a separate part an amulet. Into said amulet certain parts which are located in the previous embodiment in the main body may be moved, e.g. the video camera, the digital tape measure/range finder, the digital compass, and the inclometer.

Moreover, a light indicator may be placed on the amulet. Said light Indicator may also be placed at any other suitable
location. This light indicator may be used to show the way when the WorldGuide is trying to lead the user towards his destination. Said light indicator may be a directable light source, e.g. a laser pointer, which may "point" the way according to the preference of the user. The input for the direction of the light source may be taken, for example, from a positioning and/or orientation module.

The light indicator may be also "virtual light". This enables the controls of the amulet to change intensity, width (focus) and color of the light. Thus, each setting produces a change in the presentation of the illuminated object being. Thus, for example, intensity changes may produce an "X-ray" or cutaway presentation of deeper segments of the illuminated object. The change of width may change the size or depth of the shown area and the change of color may change of the presented details.

When the above mentioned capabilities of the use of the virtual light are combined with machinery condition, monitoring and analysis devices (e.g. Walden enterprises, etc.) WorldGuide becomes a useful tool for technical analysis and maintenance. In this configuration the WorldGuide presents not only the inner mechanism of the device but also enables the detection of possible faulty parts and their repair. Thus, step by step instructions and drawings would lead the technician in this embodiment to detect the faulty parts and to replace same.

A transmitter/receiver or a connecting cable, an additional power supply and a control button are also advantageously incorporated into the amulet.

The operating system and the basic input output system (BIOS) act as a common conduit to all other systems of the WorldGuide. They are connected to the following sub-systems:

a. a user-interface system;
b. a database system;
c. an administrative program system;
d. a travelers guidance system; and
e. a positioning & orientation system.

Preferably they are also connected to:
f. a translation system.

All said systems will be exemplified hereinafter in detail.
The operating system and the BIOS receive requests and satisfy them from other functional software parts of the system.

The following databases are essential for the operation of the WorldGuide:

1. a database manager, e.g. Oracle, Btrieve, Access. etc.;
2. a rule base database;
3. an user profile and history database;
4. a localized database;
5. a geometrical models and texture database;
6. a multimedia site information database;
7. a geographical database; and
8. a system configuration database.

It is readily under stood that many other databases may be part of the device. Said databases are chosen in accordance with the requirements of the customer. Thus, for example, the following additional databases may be part of the device:

a. a dictionary domain database;
b. a grammar and syntax directory database;
c. an OCR database; and
d. a text to voice dictionary database.

The following software programs are essential for the operation of the WorldGuide:

1. a an external update task program;
2. a hardware test program; and
3. a routing algorithm program.

It is readily under stood that many other software programs may be part of the device. Said software programs are chosen in accordance with the requirements of the customer. Thus, for example, the following additional software programs may be part of the device:

a. a network administration program;
b. a maintenance program;
c. an authorization, security and accounting program;
d. an internet interface program;
e. a telephone interface program; and
f. a command interpreter agent.

The basic approach of the World Guide is that when the unit is operational and pointing at something, it tells one where he
is located and at what he is looking. In turn, the user may ask the WorldGuide either vocally, or by touching different parts of the on-screen picture, or buttons, to narrow down the information displayed according to the users specific interests. Small buttons on the screen may recall additional categories that are relevant to the scene.

Since the device is sensitive to both time and location, a wide variety of different functions may be chosen. Thus, the WorldGuide is able to present different information to the user at different times of the day.

The invention has so far been described as a device used for tourism, however this is, as indicated above, only one of the uses for which it may be applied. As indicated above the WorldGuide is essentially a geographically sensitive computing (GSC) position or a time sensitive computing (PTSC) device. In other words, a device that acts differently or displays different information when found in different locations at different times. This principle may be applied to other fields such as:

a. Professional Uses:

A maintenance engineer may move about his factory, visiting different locations, each location having a different machine. The WorldGuide will automatically display the relevant technical drawings and other needed documents, will deliver multimedia instructions as to how to maintain each particular machine as well as collect new data about modifications to the existing machinery etc. The same principles may apply to other business uses.

b. Electronic Newspapers, Books and other Media Sources:

The WorldGuide may be used to deliver a specific publication to its user at different times and at different places. It may perform additional services, e.g. translation, reading aloud, etc.

c. Home Uses:

The WorldGuide may be used as an active errands list, displaying your grocery list when entering the supermarket, reminding you to go to the post office, etc.

d. School Children/Students:

Using a WorldGuide, a student may receive various
information such as textbooks depending on which lecture hall he is in and on the time of the day. The student may also use the WorldGuide as an interactive device, writing his notes, with an optional stylus, on it instead of using a standard notebook.

e. Music:

Sheet music and personal notes may be changed according to location. Different pieces of music are displayed when moving from one location to another. Moreover, new notes and instructions may be received from the conductor’s WorldGuide.

f. Esoteric:

Astronauts, Deep Sea Divers, Mountain Climbers, may benefit from the advantages offered by the concept of PTSC.

g. An alternative use - the floating network:

This configuration requires one earphone per user, and at least one centralized computing engine. Optionally a number of amulets may be part of the floating network. The command buttons on the earpiece are used for requesting certain functions and services from the server. The kind of services required may be a personal conversation between two "linked" members of a group wishing to converse or exchange information with each other exclusively. When using the floating network, a number of advantages are apparent. One speaker may hear a lecture on the historical background of the site, while another may listen to the music of the period. Multiple users of the network may use a variety of Guide units, or varying capabilities and processing power, and use the various resources available on the network through its links - either locally, or around the world.

h. The Electronic "Sneaker-Net":

Since the WorldGuide is a geo-positional computing system and usually incorporates a communications device, it is the ideal tool for receiving and transmitting positional related information. The information does not have to relate to anyone’s particular work, as the Guide may be used as a message carrier for other parties, where transmission of information is triggered by location and/or request.

i. Guide Geo-positional Security:

Since the WorldGuide is, as indicated above, a geo-positional computing system, it may also be used to limit access
to certain information based on its position and time. Moreover, the WorldGuide may recognize its user by using appropriate software e.g. through the video camera (facial features), voice prints etc. and in a situation where the user is not authorized to receive information, deny access to said information and services when the user is outside a certain physical area. If the user is not recognized by the WorldGuide, different rules may be applied to the data access, for example, the device may secretly call security, i.e. the WorldGuide may use the phone to notify a Security Officer about a potential breach.

The WorldGuide according to the present invention has thus the following features and capabilities:

1. It uses the geographical positioning and/or the time of the day to determine the type and content of information displayed or presented in other forms through the WorldGuide.

2. It uses all available sources of information to determine the exact position of the WorldGuide and the direction at which it is "looking".

3. It can supply the user with active guidance from one point to another using a variety of means.

4. It can present information of many different kinds.

5. It can use the displayed 3D model interactively such as allowing the user to touch a particular building on the screen, causing the WorldGuide to call the owner of that building without the user’s knowing the address or name of the owner. (This can be done by cooperating with the local Phone Company). Or touching a storefront, and seeing on the screen, the products available inside.

6. It can be used as an advertising device, for example, when the user passes close to a store, the WorldGuide may present an on-screen advertising banner.

7. The user may select different "virtual guides" to explain specific aspects of the site in which he is located in his own language.

8. The WorldGuide may enable the user to "summon" a direct human guide to explain about the site. The human guide may be located in any remote location but may see exactly what
the user is seeing by having the video input channeled directly to him, and his explanations channeled directly back to the user's WorldGuide.

9. The WorldGuide may employ an intelligent agent program that uses mostly vocal output to communicate with the user. The Agent helps with the setup of the initial operation, provides help in use, mediates in conferences, alerts the user to possible problems, and manages communications including phone, network, Internet, and specifically call centers. The Agent may use a neural network to track and analyze user requirements initially using a pre-loaded rule database and then building a dynamically changing rule database personalized to the user.

10. The system may accept an input from other sources and by applying suitable software processes can integrate and present the information to any user.

11. The system may act as a data collection unit, for example, using its camera and microphone to record events and places that are directly connected to both time and position.

12. The system user interface may be both textured and touch operated, with immediate vocal feedback to ensure easy operation for people for whom it is difficult to see and/or to read. Moreover, when leaving the finger touching one of the functions for longer than a specified and changeable period of time, an explanation will be given, either vocally or visually, of the function selected.

13. The WorldGuide has the capacity for auditory testing of the user's ear to ensure an properly adjusted audio output. This is ascertained by employing auditory testing software, or pre-loading such testing results from an existing diagnostic system. Thus, the WorldGuide may also function as a hearing aid by using software which corrects vocal output to the users ear which has been previously diagnosed.

14. The WorldGuide enables the use of the device by people with no technological training and by people having various disabilities.

15. The WorldGuide may comprise a handshaking protocol, which enables different units to communicate with each other, and
transfer information. Moreover, different WorldGuides will be able to transfer the internal encryption parameters to ensure private conversations.

16. The WorldGuide may be used as an advanced security device, by enabling external parameters to determine when and where specific types of information will be displayed and when and where not.

17. All radio and/or infra-red communications may be performed by using an individual coding and encryption scheme, thus ensuring both privacy, and integrity in local operation.

The WorldGuide according to the present invention may be combined with a party stress and distress analysis equipment, e.g. SDI – Security Devices, e.g. HIGuard 2000, etc. Said combination enables the WorldGuide to summon help when required.

The WorldGuide according to the present invention may be combined in addition to the party stress and distress analysis equipment also with voice recognition and/or voice signature recognition equipment. The presence of such additional equipment may prevent false alarms which result from the speaking or shouting of the speaker.

The WorldGuide which utilizes the location system for indoor and outdoor positioning in a combination with the above party stress and distress analysis equipment and/or the user recognition and/or the voice signature equipment forms a distress system that can function both indoors and outdoors.

The present invention will now be illustrated with reference to the accompanying drawings without being limited by same. Identical parts will be marked by the same numerals.

In said drawings:

Fig. 1A shows the basic configuration of a combined WorldGuide according to the present invention;

Fig. 1B shows the hardware block diagram of the WorldGuide shown in Fig. 1A;

Fig. 2A shows the basic configuration of another embodiment of a combined WorldGuide according to the present invention;

Fig. 2B shows the hardware block diagram of the WorldGuide shown in Fig. 2A;

Fig. 3 shows the main system block diagram (detailed in
Figs. 4 - 9);

Fig. 4 shows a main translation system block diagram;
Fig. 5 shows an user-interface system block diagram;
Fig. 6 shows a database system block diagram;
Fig. 7 shows an administrative program system block diagram;
Fig. 8 shows a positioning and orientation system block diagram;
Fig. 9 shows a travelers guidance system block diagram; and
Fig. 10 shows a general operation of a touch screen user-interface.

Fig. 1A shows an embodiment of the WorldGuide in which main body 1 of the device comprises LCD touch screen 2, on/off buttons 3, power source 4 (mains or battery), communication connector 5, buttons 6, loudspeaker 7, digital compass or gyroscope 8, altimeter 9, cellular phone 10, digital tape measure 11, digital camera 12, GPS tracking system 13 and pedometer/accelerometer 14 and a transmitter/receiver 15.

Main body 1 sends information to earphone body 16 from transmitter/receiver 15 to transmitter/receiver 15'. Earphone body 16 comprises power source 4' and buttons 6' and is connected to microphone 17.

Fig. 1B shows the hardware of the configuration shown in Fig. 1A. The hardware of main unit 1 comprises in Fig. 1B, in addition to those shown in Fig. 1A, MFP 18, AD-D/A amplifier 19, RAM + ROM 20, additional CPU 21 and storage means 22.

Earphone 16 in Fig. 1B comprises, in addition to those parts shown in Fig. 1A, amplifier 19 and microcontroller 23.

The embodiment shown in Fig. 1B shows one possible embodiment. Possible alternative embodiments may include parallel buses, bridges, direct connections between various components, such as direct memory attached to the DSP, separate busses connecting graphics and or memory to CPU and being separate from the main bus. Said embodiments are customary in computer design in general.

Fig. 2A shows a further embodiment of the WorldGuide. Said embodiment comprises in main body 1 LCD touch system 2, on/off
buttons 3, communication connector 4, buttons 6 loudspeaker 7, altimeter 9, cellular phone 10, GPS tracking system 13, pedometer/accelerometer 14 and transmitter/receiver 15 or connecting cable 15.

Said embodiment comprises as separate part amulet 24. Into amulet 24 certain parts which are located in the embodiment shown in Figs. 1A and 1B in main body 1 have been moved, namely digital compass/gyroscope 8, digital tape measure 11 and digital camera 12. Moreover, it comprises an additional power source 4", additional buttons 6", and a transmitter/receiver or cable 15". Moreover it comprises light indicator 25.

Fig. 2B shows the hardware of the configuration shown in Fig. 2A. All parts are identical to those shown in Fig. 2A.

Fig. 3 shows the main functionality diagram of the software of a WorldGuide according to the present invention, i.e. it shows the different operational systems that are part of the system. (Said operational system will be shown in detail in Fig. 4 - 9). The operating system and the BIOS act, as indicated above, as a common conduit to all other functional software systems designated by the blocks appearing in Fig. 3. They receive and satisfy same from other functional software systems of the system. Thus, when, e.g. the setup program wants to receive an input from the user-interface it has to pass the operating system.

Fig. 4 shows the main translation block diagram in which the general process of language recognition and translation is explained.

In said process the video input of a pictured text is passed through the translation system (OCR) in which it is translated from the pictorial domain into text. The resulting text is injected into the language recognition engine where the language is recognized. The text is then passed on to the language translation engine, which uses external databases such as dictionaries, grammar, etc in order to translate the text into a different language. The new text string is moved to the text to a speech output engine where another database of pronunciation and accents is used to convert the text to a spoken language. Additional inputs and outputs may optionally be used, for
example, spoken sound, screen and printer.

Fig. 5 describes the different parts of the user-interface. The LCD Touch screen is used both as an input and output device. When first turned on and from then onwards, the WorldGuide uses the touch screen to display simple menus and pictures from the lectures and from the surroundings e.g. via the camera that may be activated by the user by touching. When a menu option is touched, the user receives immediate verbal feedback on its function. This enables the illiterate and the visually impaired to operate the WorldGuide efficiently. Double-tapping a menu item activates it, either by opening a sub-menu, or by performing an action, accompanied by a verbal response from the WorldGuide. This process is further explained hereinafter in Fig. 10.

The microphone is used to introduce the voice commands of the user into the Agent. The microphone is also used when the Guide is used as a cellular phone or as a communications network.

The loudspeaker is used to project vocal portions of the lecture from the WorldGuide.

The optional keyboard together with an optional external monitor, e.g. small eye screens, (Kopin), an VRD (direct laser onto the retina), etc. enable the WorldGuide to be used as a personal multi-media computer and may also be used when first setting up the system.

An enhancement to the above small eye screens is to implement small head up displays preferably mounted on a 90° pivot at the top or along the side of conventional eyeglasses. The screen takes the form of at least one narrow aspect ratio rectangle, upon which messages and graphics may be displayed.

The telephone (cellular) which functions as an extended communications device, enables the WorldGuide to be used as a videophone, or as part of an unit implementation for communication and/or triangulation. The digital camera option is indicated in the description of Fig. 4 as a source for a video input.

Adjacent to the operational system of the user-interface the optional software agent is located. Its role is to verbally help, comment and/or guide the user throughout the operation of the WorldGuide. The agent is also responsible for carrying out the user's commands when in command mode, activated by pressing
the "Command Button".

The database system block diagram shown in Fig. 6 describes the databases that are used in the operation of the WorldGuide.

Central to all database functions is the database manager. It is used to organize information into different tables, and in general is the only way to get access these tables.

Since the WorldGuide deals with sound, noise, text, video, different users and a variety of needs, a large number of databases that relate to these subjects have to be used.

Thus, for incoming sound, the noise database contains known noises to be recognized by the system for the purpose of elimination. The accent database identifies type and origin of a given voice. The voice and video recordings are recordings of spoken conversations, tapes or CD's, for example, of lectures, which the user has chosen to introduce into the system for future use.

For the translation of the incoming text from one language into another, grammar and syntax dictionaries are, for example, used. The OCR database contains information which enables the WorldGuide to translate video snapshots of local signs.

The dictionary domains contain sets of vocabularies. The handwriting forms are required for the optional handwriting recognition software used for general screen applications. The facial features database enables the WorldGuide to provide user face recognition when using a video camera.

The text to voice dictionary is used for the outgoing text to generate the voice and in conjunction with the accents database, to provide an authentic spoken sound.

A rule base database (optionally designed as a neural network, e.g. 4 Thought of Cognos Inc.) enables the WorldGuide to improve its voice recognition capabilities by learning from the users training when the agent has been included. Said database also uses the user profile and history database, which enables the WorldGuide to plan preferred routes, sites and the specific information that may interest the user. Furthermore, this database will maintain specific parameters such as aural profiles for individual compensation (e.g. a hearing aid), names and other personal particulars which are later used to select and define individual areas of interest and lectures, and other
information that the WorldGuide believes may be of interest to the user.

The localized database contains information pertinent to the country or region in which the WorldGuide is in at the moment. It contains information such as emergency numbers (ambulance, police etc.), names of local cities, restaurants, hotels etc.

The geographical database is important for the operation of the WorldGuide. Said database contains e.g. maps such as contour maps, bi-regional maps; magnetic anomalies and other relevant information. This information may be used by the positioning and orientation software module that allows the Guide to determine where exactly the user is located at any particular moment in terms of elevation as well as orientation. Based on this information, the same parameters for the point of view (POV) or target may also be found. The main entry into this database is via the coordinates supplied by the positioning & orientation module, although it is possible to feed the Guide with verbal positioning when the GPS tracking system is not-operational.

The geometrical models and textures database comprises 3 dimensional representations of the locality in which the user is interested in. Using this database, the WorldGuide can reconstruct a 3 dimensional walk through open areas and more significantly through interiors of buildings.

The multimedia site information database contains information relevant to the POV, e.g. where one is located, at which point one is looking at, etc. and any other services, through to the exotic, e.g. how a particular site looked 2000 years ago, etc. This is the main source of information that is displayed on the screen of the WorldGuide and may be as a group of Hyper Text Markup Language (HTML) pages.

The external update task run in the background and calls for further geographically linked information through the internet or any other source of readily available information. It may also transmit newly acquired information back to a central database, or to any other interested parties.

The administrative programs block diagram of Fig. 7 shows the different service and maintenance programs used in the system. When the WorldGuide is powered up, the hardware test
program is run. Every sub-system in the WorldGuide is tested for correct operation, and thus the system configuration is updated. Thus, for example, if the GPS tracking is found to be inactive, the system may not be able to function properly, and will then alert the user to the error.

The network administration program, is basic to transferring information to and from the different parts of the WorldGuide, and is also used when the basic unit is networked to other units or docking stations.

Maintenance programs, which are optional, may include disk de-fragmentation, system backup and restore, etc.

The authorization, security and accounting program, which is also optional, takes care of billing when applicable (e.g. connection to the internet, system rental, etc.), enables the user to "lock" his WorldGuide by a keyword, code or phrase, voice print, and/or face recognition.

The internet interface, which is also optional, may be used for the following four functions:

a. it enables the external update task to exchange "fresh" information about any particular site;
b. it may connect the WorldGuide transparently to a translation server, when required;
c. the module may used for the videophone; and
d. for the retrieval of e-mail and general Internet access.

The telephone Interface, which is also optional, may be used to enable the user to place and receive calls via the standard telephone network. When the user wishes to make a call, a numeric keypad is shown on the LCD touch screen to enable phone number entry.

The agent or command interpreter is an advanced artificial intelligence (AI) program which is able to dispatch commands taken from the users spoken input, and intelligently apply them to other parts of the system. The agent may also be used to match the user's personal preferences as taken from his or her input. The inclusion of the Agent is optional and preferably requires command voice recognition.

The positioning and orientation program of Fig. 8 shows the
separate parts required in order to determine the geographical position of the user and his point of view at any time. The main input to the system advantageously comes from the GPS tracking system. It may be supplemented by the input from various other suitable sources such as visual clues from the camera, orientation from the digital compass, and distance measurement via the digital tape measure and pedometer and/or accelerometer. All this information is cross-correlated in the self-positioning and orientation analysis module. The resulting coordinates are fed into the target acquisition module, which in turn uses the incoming coordinates in order to retrieve information from the geographical database. The final resulting geographical location may then be displayed on the screen and a vocal message may be played. At this stage, the user may decide to override the result for a number of reasons, e.g. the GPS tracking system has made an error, the user has made an error, etc. etc.). There are two different sub-processes that may be run:

a. When the GPS tracking system is operational (i.e. when the user is outside and the system is functioning properly), the above described process is used;

b. when the user has entered a building or in any other situation where the reception of the GPS tracking system is obstructed, the geometrical database is accessed with information taken directly from the Pedometer and/or accelerometer, digital compass, camera and/or digital tape measure.

The inputs determine the geometry of the enclosure that the user is currently in, and enables this information to be cross-correlated with the 3D model contained within the geometrical database to determine accurate positioning and point of view.

The travelers guidance system of Fig. 9 describes the main function of the WorldGuide. The WorldGuide takes the positioning information from the positioning and orientation module, and retrieves, via the database manager, pertinent lecture information from the multimedia site information database. This information may be, e.g. in the form of lectures, poems, stories, visual art, video clips, audio, etc. all in languages adapted to the user's profile. When the user has requested directions to a
particular location, the routing algorithm module calculates an appropriate route according to information obtained from various sources including the user profile. The route is forwarded to an 3D rendering engine, when a screen is present or to a vocal output.

Fig. 10 describes the general operation of a touch screen interface.

The WorldGuide functionality is mostly accessed via the interface components. Hierarchical menus are displayed on the LCD touch screen, and user input is received both from the touch screen and from the buttons. When a function is required, the user taps the menu item on the screen, upon which a vocal response explaining the function is played through the earphone. Double-tapping the same menu item will cause a response, either moving to another menu, or running an actual function.
Claims

1. A WorldGuide device (as herein defined) comprising:
   1. an enclosing structure;
   2. a main body comprising a multi-media personal computer
      constituting the main computing unit and serving as the
      processing system, which unit comprises at least one
      CPU; sound and input means; a memory system; a storage
      device; and at least one communication means and/or at
      least one means of connecting external devices;
   3. an input device;
   4. an output device;
   5. a location and/or direction sensing input device;
   6. system software; and
   7. a power supply.

2. A WorldGuide device according to Claim 1, wherein the
   enclosing structure is a rectangular flat box which is made
   from an aluminum foam.

3. A WorldGuide device according to Claim 1 or 2, wherein the
   multimedia computer abd/or screem and/or any location sub-
   system is detached / attached or upgraded comprising usage
   of thrd-party devices.

4. A WorldGuide according to any of Claims 1 to 3, wherein the
   CPU of the main body is a pentium class processor.

5. A WorldGuide device according to any of Claims 1 to 4,
   wherein the sound and input means of the main body are a
   microphone sound system and a microcontroller.

6. A WorldGuide device according to any of Claims 1 to 5,
   wherein the memory system of the main body is a RAM and/or
   a ROM.

7. A WorldGuide device according to any of Claims 1 to 6,
   wherein the storage device of the main body is selected
   among a hard disc, CD-ROM, DVD and a flash memory.

8. A WorldGuide device according to any of Claims 1 to 7,
   wherein the main body comprises graphic display means.

9. A WorldGuide device according to any of Claims 1 to 8,
   wherein the input means are selected among at least one
   interface button, transmitter/receiver means, antennae, cameras, microphones, cellular phones, keyboards, touch
sensitive screens and activating means.

10. A WorldGuide device according to Claim 9, wherein the interface button(s) is selected among a command button, a guide button, forward and backward buttons and buttons located on the earphone unit.

11. A WorldGuide device according to any of Claims 1 to 10, wherein the output means are selected among earphones, loudspeakers, screen displays, VRDs and directional light sources.

12. A WorldGuide according to Claim 11, wherein the screen display is a LCD touch screen.

13. A WorldGuide according to Claim 11 or 12, wherein the loudspeaker is a separate earphone.

14. A WorldGuide device according to any of Claims 1 to 13, wherein the location and/or direction sensing input device is selected among a GPS tracking system, a digital compass, a pedometer, an accelerometer, an altimeter, a video camera and a gyroscope.

15. A WorldGuide device according to any of Claims 1 to 14, wherein the power supply is a separate unit being connected to the device.

16. A World Guide device according to any of Claims 1 to 15, being

a GPS-based WorldGuide which has the form of a box which comprises a personal computer, one button, one loudspeaker, a multi-channel GPS tracking system and a power supply.

17. A World Guide device according to any of Claims 1 to 16, being a non GPS-based WorldGuide which has the form of a box which comprises a personal computer, one button, one loudspeaker, a combination of a digital compass and of a pedometer/accelerometer/inclinometer, a power supply and some means of communicating the exact starting position of the unit before it is used.

18. A WorldGuide device being a combination of the devices according to Claims 16 and 17 which has the form of a box which comprises a personal computer, one button, one loudspeaker, a GPS tracking system receiver, a combination of a digital compass and of a pedometer/accelerometer/inclinomet-
er and a power supply.

19. A World Guide according to any of Claims 14 to 18, wherein an external third-party system supplies the information regarding the location.

20. A World Guide device according to Claim 18 which has the form of a rectangular box which comprises the following parts:

A. 1. the main body;
  2. a display;
  3. one or two on/off switches;
  4. power supply;
  5. communications means;
  6. at least one of the buttons according to Claim 9;
  7. loudspeaker(s);
  8. a digital compass;
  9. an altimeter or an input from at least one contour map cross-correlated with a GPS location output.
  10. cellular phone or telephone connector;
  11. a digital tape measure device/range finder;
  12. a digital camera;
  13. a GPS tracking system;
  14. a pedometer;
  15. part of a transmitter/receiver pair;

B. an earphone which comprises
  16. a small loudspeaker inserted in the ear;
  17. a microphone;
  18. at least one of the button according to Claim 9;
  19. a loudspeaker; and
  20. part of the above transmitter/receiver pair.

21. A World Guide according to Claim 20, wherein the earphone contains an additional part selected among a volume control, a transmitter/receiver, an additional command button and a FM gain button.

22. A World Guide device according to Claim 20 or 21, wherein the main body comprises the computing unit and a MFP and/or a DSP.

23. A World Guide device according to any of Claims 20 to 21 wherein the LCD screen is detached and includes a video
camera.

24. A WorldGuide device according to any of Claims 20 to 23, wherein the digital compass comprises a gyroscopic device.

25. A WorldGuide device according to any of Claims 20 to 24, wherein the GPS tracking system comprises a receiver for the global positioning satellite (GPS) transmissions.

26. A WorldGuide device according to any of Claims 20 to 25, which comprises a light indicator.

27. A WorldGuide device according to any of Claims 20 to 26 which comprises as additional part an amulet.

28. A WorldGuide device according to Claim 26 into the amulet of which have been moved the video camera, the digital tape measure/range finder, the digital compass and the light indicator.

29. A WorldGuide device according to Claim 26 or 27 in the amulet of which are incorporated a transmitter/receiver or a connecting cable, an additional power supply and a control button.

30. A WorldGuide device according to any of Claims 1 to 29 which comprises an operating system and a basic input output system (BIOS) which are connected to the following sub-systems:
   a. a user-interface system;
   b. a database system;
   c. an administrative program system;
   d. a travelers guidance system; and
   e. a positioning & orientation system.

31. A WorldGuide device according to Claim 30, wherein the operating system and the BIOS are also connected to:
   f. a translation system.

32. A WorldGuide device according to any of Claims 1 to 31 which comprises the following databases:
   1. a database manager;
   2. a rule base database;
   3. an user profile and history database;
   4. a localized database;
   5. a geometrical models and texture database;
   6. a multimedia site information database;
7. a geographical database; and
8. a system configuration database.

33. A WorldGuide device according to any of Claims 1 to 32, which comprises one or more additional database selected among the following databases:
   a. a dictionary domain database;
   b. a grammar and syntax directory database;
   c. an OCR database; and
   d. a text to voice database.

34. A WorldGuide device according to any of Claims 1 to 33, which comprises the following software programs:
   1. an external update task program;
   2. a hardware test program; and
   3. a routing algorithm program.

35. A WorldGuide device according to Claim 34 which comprises one or more of the following software programs:
   a. a network administration program;
   b. a maintenance program;
   c. an authorization, security and accounting program;
   d. an internet interface program;
   e. a telephone interface program; and
   f. a command interpreter agent.

36. A WorldGuide device as defined in Claim 1, substantially as hereinbefore described with reference to the accompanying drawings.

37. A WorldGuide device according to any of Claims 1 to 36 in combination with a party stress and distress analysis equipment.

38. A WorldGuide device according to any of Claims 1 to 37 in combination with a voice recognition and/or voice signature equipment.

39. A WorldGuide device according to any of Claims 1 to 36 being a floating network.

40. A WorldGuide device according to any of Claims 1 to 37 being a electronic sneaker-net.

41. A WorldGuide device according to any of Claims 1 to 36 being a geospatial and time-related computing security device.

42. A WorldGuide device according to any of Claims 1 to 36 being
a multimedia position and time related computing device.
FIG. 2A
FIG. 2B
FIG. 3
FIG. 6
FIG. 7
FIG. 8
FIG. 9
12/12

Power On

Welcoming message

Press Command

"Ready"

Menu (main or sub-menu)

Tap Menu Item

Hold Menu Item

Double Tap Menu Item

Menu Item Highlighted

Vocal Description

Vocal Description

Activate Function

FIG.10
# INTERNATIONAL SEARCH REPORT

**International Application No:**

PCT/IL 99/00535

## A. CLASSIFICATION OF SUBJECT MATTER

**IPC 7**

G06F15/02

According to International Patent Classification (IPC) or to both national classification and IPC:

## B. FIELDS SEARCHED

**Minimum documentation searched**

(classification system followed by classification symbols)

- IPC 7: G06F G09B G08G G01C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched:

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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<td>13,17,18</td>
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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"X" Special categories of cited documents:

- **A** document defining the general state of the art which is not considered to be of particular relevance
- **E** earlier document but published on or after the international filing date
- **L** document which may throw doubts on priority claims(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- **O** document referring to an oral disclosure, use, exhibition or other means
- **P** document published prior to the international filing date but later than the priority date claimed

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

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Date of the actual completion of the international search: 11 February 2000

Date of mailing of the international search report: 25/02/2000

Name and mailing address of the ISA:

European Patent Office, P. B. 5816 Patentlaan 2 NL - 2280 HV Rijswijk
Tel: (+31-70) 340-2040, Tx: 31 651 epo nl, Fax: (+31-70) 340-3016

Authorized officer: McDonagh, F
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<tr>
<td>X</td>
<td>FR 2 730 083 A (BOUCHAND) 2 August 1996 (1996-08-02) the whole document</td>
<td>1,7,11</td>
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<td>&quot;Digital camera with global positioning satellite to record location with image&quot; RESEARCH DISCLOSURE, vol. 41, no. 413, September 1998 (1998-09), XP002130392 UK the whole document</td>
<td>9,14</td>
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Form PCT/ISA/210 (continuation of second sheet) (July 1992)
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<tr>
<td>JP 10185609 A</td>
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<td>GB 2298539 A</td>
<td>04-09-1996</td>
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