COMPUTER AIDED ARCHIVE SYSTEM FOR PEOPLE WITH MOBILITY, VISIBILLITY, AUDIBLITY AND SPEECH IMPAIRMENTS

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ABSTRACT

In recent years there has been an increasing demand for archiving in a great number of office places, such as police, FBI, IRS, Government, hospitals, embassies, universities, public libraries, military environment places and pretty much every medium- to-large-size business, organization or institution. Much effort has been made to provide access to archive files faster and in a more accessible manner. As we all know, archiving work requires a lot of time, attention and patience. Little attention has been paid, though, to make such work accessible to individuals with impairments. To address this, we have developed a new computer-aided system able to identify in any moment the location of a particular file in an archive by aid of a micro-chip attached to each file. Once an impaired person uses the computer to search a needed file and the Enter key is pressed, the drawer holding that file will automatically open and the file will be pushed up to make it easy for the person to grab it. This system will, therefore, tremendously decrease the time needed to access the files in an archive.

BACKGROUND

The field studies conducted found that many people with motor, visibility, audibility and speech impairments could not comfortably work in an archiving environment using conventional methods; as typical archiving activities require a lot of time, motion and attention. Inspired by this, we would like to utilize a computerized database of the archiving environment that allows the impaired person to access a file by connecting its micro-chip directly to the desktop computer. A person could type the name, author or ID number for the file and click Enter and it will automatically push up the file from any drawer location it is in at that particular moment. The innovative feature that enables a drawer to move up the requested file is a small engine and a piston placed on the sliding component.

Regardless of the person's imparity, the system will make the person's work in an archive much easier and more pleasant. For a visibility impaired person; the system will have a voice enabled feature which will speak the exact location of the file searched, indicating the row and the column. For audibility impaired persons with good sight; they can read the location on the computer screen. As for the mobility impaired persons; they can read the position on the screen and can use the wheel chair to go to the right place and pick up the file. For the speech impaired, the system will also help them with the screen indications.

The proposed system will be able to avoid human mistakes and will also detect immediately and in any moment where a certain file is located, how many times it was accessed and by whom and at what time and date.

STATEMENT OF THE PROBLEM

Our challenge was to develop a more accessible archiving system for impaired persons, and to design software that is able to control and link with the micro-chips attached to the files. The goal is to lower the time and cost of access to the files by pushing up off-the-shelf the requested folders.

RATIONALE

By providing archiving environments with a filing aid that is easier to identify, locate and read, we will increase the number of impaired employees able to perform repetitive filing tasks and increase the productivity of employees currently using manual filing. Employees with visibility, mobility, audibility and speech difficulties can use this computer aided system that is easier to utilize and makes the work more enjoyable.

DESIGN AND DEVELOPMENT

This device is separated in two main sub-systems: the mechanical system and the electrical system. The mechanical design of the archive cabinet is composed of one small engine for each drawer and a sliding stem (both are depicted in Fig.1), a rodless cylinder, a standard cylinder, a plastic pusher (depicted in Fig.2) and a compressor.

Engine and sliding stem representation

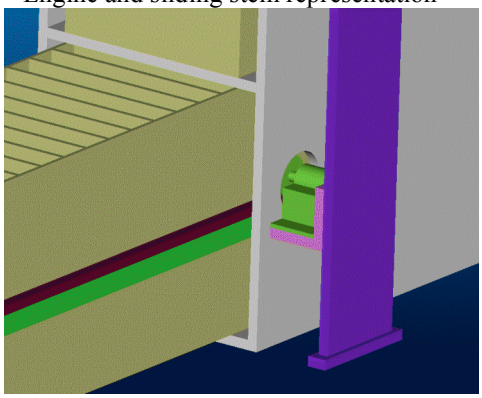

Figure 1

Drawer representation

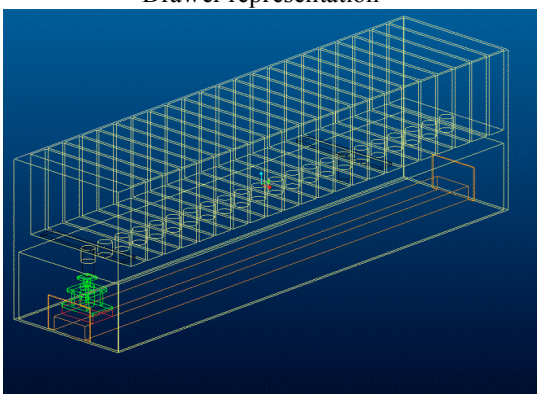

Figure 2

The small engine placed at the front edge of the drawer has the role of opening and closing it, by the aid of the sliding stem and the gearwheel (shown in Fig.3). The rodless cylinder has the role for moving the standard cylinder under each plastic pusher. The compressor will ensure the proper functioning of the rodless and standard cylinders.

Drawer opening

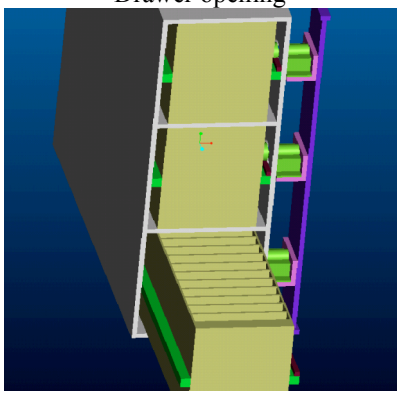

Figure 3

The electrical subsystem consists of one microchip attached to the upper part of the file cover, one or more computers, and a wireless network.

The whole system functions in several stages:

A. **Storing**: - Files are placed in their covers, and the microchip attached to the covers contains the file ID that uniquely identifies the particular file in the archive system. All file IDs are stored in a computerized database of the archive. These covers are placed in the above-mentioned drawers, and can be randomly stored without the need for specific arrangement. Replacing a file in a drawer will be done by the available microchips in the system.

B. **Searching and filing**: - By accessing the computerized database of the archiving environment, an impaired person can search a particular file by name, ID number, SSN# if the case required it. The database will be accessed using a user friendly graphical interface for people with other impairments than visibility. For visibility impaired individuals the system will provide them with a prominent keyboard helping them to enter the information. An additional feature for the latter is a voice enabled interface that indicates the postion or the location of the file. Once a choice is made, by clicking the computer Enter key, which means that the system will locate the file by using the wireless network. In this moment, the microchip will be activated and will provide the position of the file in the system, the engine will also get activated and will open the drawer, and the rodless cylinder will place the standard cylinder under the file that contains the activated microchip. By aid of the cylinder and the plastic pusher, the file will be driven up, making it easy for the impaired person to take it.

The mechanical and electrical design is focused on simplicity and easiness of use.

A general representation of a system consisting of a three drawer cabinet can be seen in Fig.4 and Fig.5.

The system for a three drawer cabinet

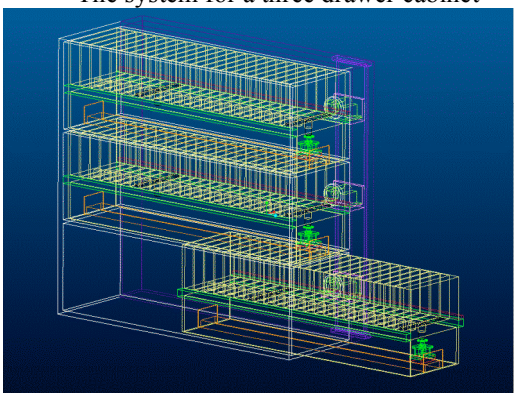

Figure 4

A three-drawer cabinet

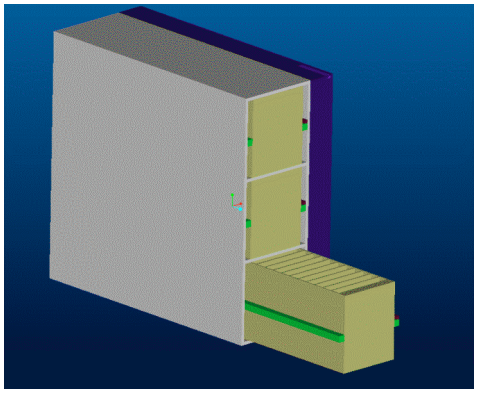

Figure 5

EVALUATION

In this stage, we will evaluate the mechanical and electrical design of the above proposed system. We intend to perform field research in order to test the system's efficiency and ease of use and to measure how it performs related to the needs of different impaired persons working in an archive environment. According to the results obtained after such tests, we will improve the necessary parts of the system accordingly.

DISCUSSION AND CONCLUSIONS

The proposed project aims to implement a system that offers a chance for vision, audio or speech impaired people to work in an archive environment. The innovation in this system is mainly demonstrated through the fact that files don't need to be put in order and the time to find them is significantly decreased. In a world in which people want everything to be faster and faster, this can bring a significant advantage. The proposed system is able to where a certain file is located, how many times it was accessed and by whom and at what time and date. Furthermore, the ease of access and manipulation of the archive files constitutes a major advantage for impaired persons.

Another idea similar to this one would be to use one or more robotic arms in conjunction with proposed system. While more costly, the combination of systems would be more effective at moving files and save even more time and space.

ACKNOWLEDGEMENTS

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ALTERNATIVE TEXT

Figure 1:

This figure shows the engine and the sliding stem which are part of the mechanical subsystem and have the role of opening and closing the drawer. The figure (3D) was generated using Pro/Engineer.

Figure 2:

This figure shows an assembly view of a drawer that is composed of one small engine, a sliding stem, a rodless cylinder, a standard cylinder and a plastic pusher for each file.

Figure 3:

This figure shows the drawer opening.

Figure 4 and Figure 5:

These figures show assembly views for the case of an archive cabinet having three drawers.

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