Dynamic Display

Sanjay Kumar Batra

Hewlett Packard Enterprise

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Dynamic Display

Introduction

Over 4 billion people in the world wear glasses. As people reach an age of 40+, they start facing issues with near sight and needing reading glasses to read books, papers or computer screens. Most of the people using glasses feel some kind of stress and discomfort while wearing glasses. The key idea here is to dynamically adjust the monitor’s display settings as per the users’ eye lens power.

Dynamic Display Adjustment

All computer users have to first login to an account to be able to use a computer. These accounts, mostly unique to each user, are either stored locally within the computer or stored centrally in a database, such as, for example, the Active directory in Windows-based operating systems or LDAP (Lightweight directory access protocol – UNIX/Linux world). As a part of this solution, we plan to add a few extra fields in AD/LDAP to store a user’s eye lens power. The OS will also need to have an in-built algorithm to convert the visual parameters stored into a display setting that would be most suitable to that user. And then when a user logs in, the OS will adjust the monitor’s display as per the users’ eye lens power. For example if a user has near sight and has been prescribed a reading lens, then based on the users’ lens power the font size can be increased or decreased. Even the size of icons can be adjusted. This way we can enable the users to work on a computer screen without wearing the glasses.

A proof of concept was done by storing the users’ eye lens power in a text file and then adjusting the display parameters in the windows’ registry. The initial results have been positive.
In the above drawing a user is reading with spectacles in the first display. In the second display, spectacles are not required since the font size has been adjusted dynamically as per the user’s eye lens power. The user can therefore work without spectacles.

Converting Lens Power to Display Settings

The algorithm to arrive at lens power and convert it to display settings would be as below.

This is a sample prescription of eye-lenses.

<table>
<thead>
<tr>
<th>RIGHT</th>
<th>LEFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sph</td>
<td>Cyl</td>
</tr>
<tr>
<td>+1.50</td>
<td>-0.75</td>
</tr>
<tr>
<td>Add</td>
<td>+1.50</td>
</tr>
</tbody>
</table>

In the above prescription, near sight is the parameter that is more important for people with near sight. Based on the Axis value, the display can be changed dpi (dot per inch) as allowed by the Windows operating system. The solution can be further extended to adjust the brightness, contrast and other display parameters. Since most computers are equipped with a webcam and some devices are even equipped with a retina display, there is a way to measure the distance between the display and the user. Using this measurement, the sharpness of the display can be adjusted to further improve display quality. The display could also guide the user on whether the user is too far or too near the display. This will help the user to maintain proper distance and thereby prevent computer related injuries.

Caveats

- What if both of the user’s eyes have different power? In this case, the algorithm can calculate and arrive at a number that could be close to suit both eyes. If it is not possible to arrive at the common ground, then the algorithm can either take the higher value or disable the dynamic display.
- What if multiple users are seeing the same screen? In this case, the dynamic display mode may be displayed in favor of using default values.

Prior Solutions

In Microsoft Windows there is a Magnifier provided for users that need to zoom in their computer screen. This cannot work for each user as per their eye power requirements. Moreover this is not very convenient to use as the user can zoom only an area of the screen that is pointed to.
Advantages

Some of users may be able to work on their desktops/laptops without having to wear glasses. This would relieve them of the stress they feel when to work on computers.

The solution is not a one size fit all approach like the Magnifier lens provided by Microsoft in the Windows operating system. This solution will calculate the display size as per users’ requirement.

Disclosed by Batra Sanjay Kumar, Hewlett Packard Enterprise