

Adding a new Dimension to your BlackBerry Apps - Stereoscopic 3D

(and other advanced applications for output to the HDMI display)

JAM54

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May 14-16, 2013

Agenda

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- What is stereoscopic 3D?
- Integration into your applications
- Real-world applications
- Doing more with the HDMI display
- Lab Time - Let's add this technology into your apps!

What is Stereoscopic 3D?

What is Stereoscopic 3D?

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- Stereoscopic 3D is the technique by which we view two images, one for each eye, such that our eyes perceive the true depth of what is portrayed
- Our brain fuses the two separate images into one in the mind with all of the added depth we normally perceive when we view the world around us



What is Stereoscopic 3D?

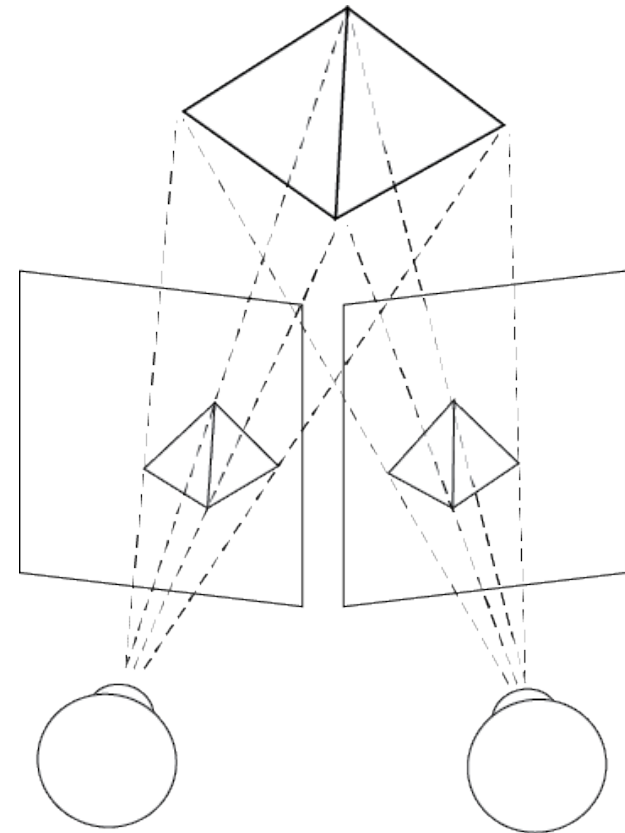
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- Depending on the method used, you may require special glasses such as:
 - ▶ Colored gel glasses (made popular during the 1950s 3D movie era)
 - ▶ Polarized glasses (first introduced in cinemas in the 1980s (Jaws 3D))
 - ▶ LCD shutter glasses (first used for 3D computer graphics and video in the late 1980s)



What is Stereoscopic 3D?

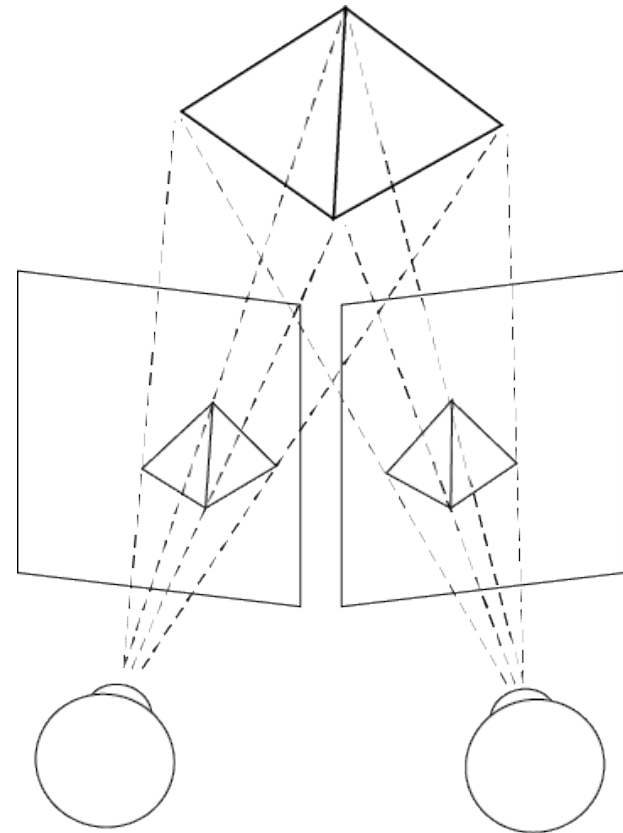
- Images of a scene, whether generated or captured from photographs, should present two slightly different views of a scene. If you were capturing a scene with the same scale as your eye-sight, the distance between the two view points should be 50 to 70 mm



What is Stereoscopic 3D?

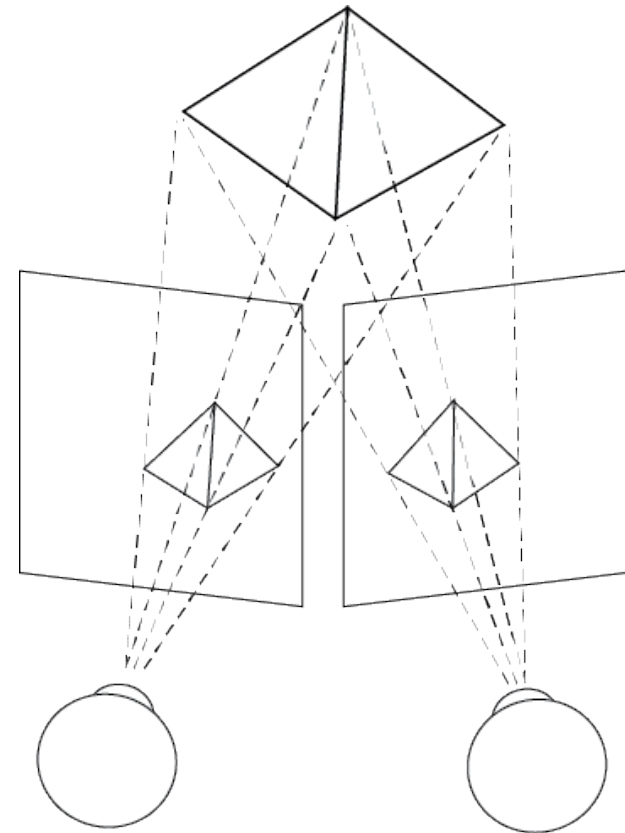
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- The distance between two similar points in both stereoscopic images is referred to as parallax
- For comfortable viewing on a 3D monitor at 50 cm, the parallax should be roughly 1.25 cm
- For large screen 3D TVs, it can be much larger, depending on your distance from the TV



What is Stereoscopic 3D?

- One option is two slightly rotated views, converging at the focal point some distance away
- Some feel that this can be fatiguing for long periods of time so the alternative is two parallel views focusing on the same plane, a fixed distance apart, and then the two images are converged when displayed



Integration into your Applications

Integration into your applications



- It all starts with GoodCitizenCascades
 - ▶ The OpenGL framework developed for that sample has been extended to support the HDMI display
- Add those framework classes into your application
- To display stereoscopic photographs, add in Photo3DView from the Photo3D sample app
 - ▶ a custom OpenGLView developed to display stereoscopic photographs on a 3D TV or monitor via the HDMI output

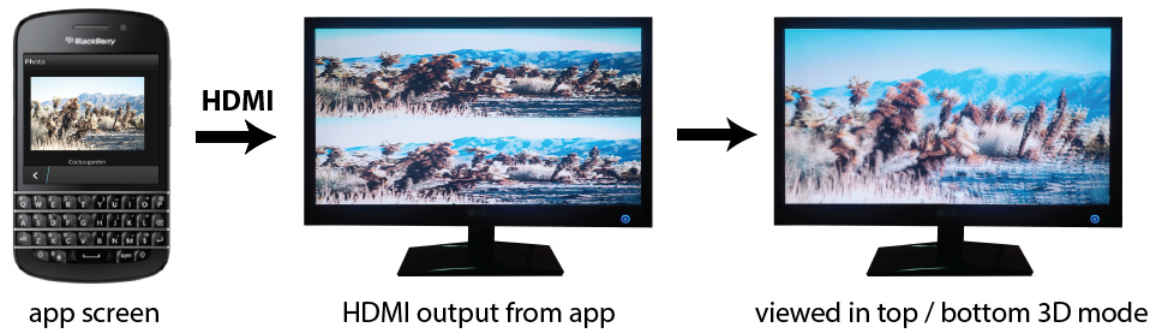
Integration into your applications

- To add Stereoscopic 3D output to your OpenGL app, review Stereoscopic3DView in the Steroscopic3D sample app and develop something similar for your app
 - ▶ Stereoscopic3DView is a custom view to demonstrate how to render a stereoscopic 3D scene to a 3D TV or monitor via the HDMI output
- Integrate these custom classes into your application class in a similar fashion as the sample apps do

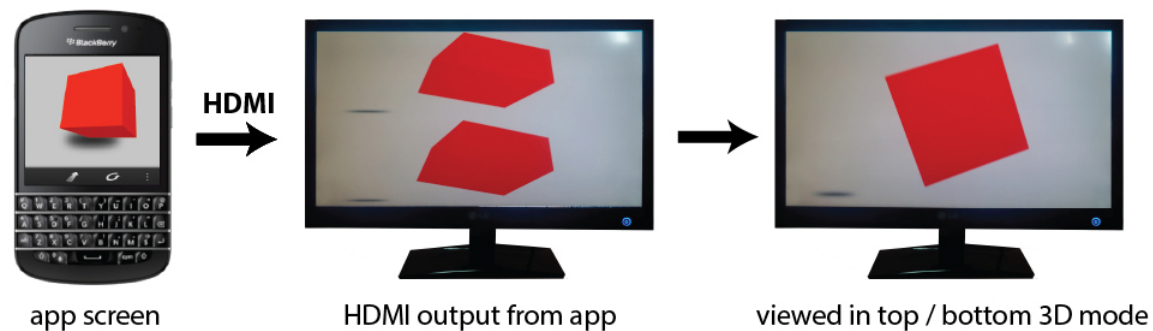
Stereoscopic Techniques

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Stereoscopic Photography



Stereoscopic 3D



Stereoscopic Photography

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- Combine both views on the HDMI display using OpenGL in a format your monitor converts to 3D
- Top / Bottom layout shown in the photo is the most efficient layout for 3D TVs and monitors and preserves the most resolution



Stereoscopic Photographs / Video

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- Import both photos and convert to OpenGL textures
- Arrange polygons in both top and bottom halves and map the textures on to them
- Side by Side works in an analogous fashion



Stereoscopic Photographs / Video

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- This is what the monitor displays after switching it to Top / Bottom mode
- In the case of a passive 3D monitor, the images are interlaced



Stereoscopic Photographs / Video

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- What about regular TVs?
Go with Anaglyphs
- Load the two photos and merge them into one texture, combining the appropriate color components into one composite image
- Map that image to a quad that covers the screen



Stereoscopic 3D

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- Render both views of the same 3D scene using OpenGL in a format that your monitor converts to 3D
- Setup one view shifted to the left, render that view in top half of the screen
- Setup another view to the right and render in the bottom half of the screen



Stereoscopic 3D

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Real-World Applications

Stereoscopic Photography

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- NASA uses stereoscopic photography for analyzing Martian terrain via the stereoscopic cameras on their rovers
- Image analysis (people can see more detail when they review an image in stereoscopic 3D, useful in fault detection for example)
- Stereoscopic 3D slideshows presented on your 3D monitor or TV for your house guests, parties and other events
- Stereoscopic 3D kiosk / advertising in retail stores or mall displays

Stereoscopic 3D

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- 3D modelling and rendering on the go
 - ▶ Work on small models or details when near a 3D TV and then transfer to your workstation later
- 3D presentations that wow your audience
 - ▶ 3D slides, graphs, photos, etc.
- 3D games with an extra edge over their competitors
 - ▶ Enhanced stereoscopic display of on-device display on the HDMI monitor
 - ▶ A second view of the game for the 3D TV / monitor for group play

Doing More with the HDMI Display

Doing more with the HDMI display

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- For a statistics or reporting app, use the HDMI display to show business graphics and diagrams while the underlying data are displayed in tabular form on the device display
- For any type of game, consider the HDMI screen as a second display showing extra information for group play like a map for a multiplayer game or an overhead view if the device displays a first person view
- Use the HDMI display with mouse input to create an interactive way to navigate your data, interface with the game, or implement another UI (albeit limited)

Doing more with the HDMI display

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- If you write a monitoring app with different screens for different instrumentation, display a multi-instrument view or dashboard on the HDMI display as the connected monitor probably has more screen real estate or it can be projected on a wall
- One accessibility use case is an alternative display on HDMI output for users who have vision problems and just cannot see much on a small device display
- What else can you think of?

Lab Time!

Let's briefly discuss your idea and then we're here to help you enhance your apps!

References

References

- StereoGraphics Developers Handbook
 - ▶ <http://www.cs.unc.edu/Research/stc/FAQs/Stereo/stereo-handbook.pdf>
- Session presentation and Sample Code
 - ▶ <https://github.com/blackberry/Presentations/tree/master/2013-BlackBerryJam-Americas/JAM54>

THANK YOU

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