

SOLUTION BRIEF

FPGA Heterogeneous Computing
FPGA-Based Image Processing Accelerator



DarbeeVision Leverages Intel® FPGAs to Enable High-Performance, Real-Time Image Processing

Intel and DARBEE Visual Presence* (DVP) technology are pushing the boundaries of image realism.



Image Processing

- Depth
- Clarity
- Realism
- Detail

Use Cases

- Digital Signage
- Commercial Display
- Holographic or 3D
- Flat Panel Displays
- Post-Production
- Broadcast

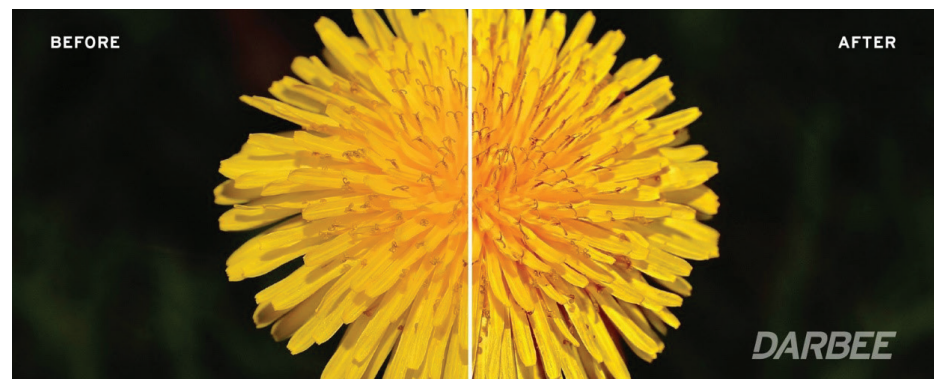
Executive Summary

Intel has a long history driving standardization and bringing its expertise into new areas such as high-performance imaging. The partnership with DarbeeVision, Inc. exemplifies our efforts to work with leading-edge companies to bring high-quality products to the market.

DarbeeVision is an inventor of proprietary image processing technology solutions that significantly improves perceived image quality in real time.

Challenges

- Single-lens cameras have an inherent flaw when trying to replicate an image for our visual system; they cannot capture and process light the same way our eyes and brain do.
- Image capture through a single lens discards important parallax information (right vs. left disparity), resulting in “flat” images. Other solutions focus on improving fidelity factors such as pixel count, color depth, contrast, and sharpness.
- All distributed video is compressed, compromising picture quality. DVP restores lost picture data by amplifying the perceptual qualities of depth, clarity, and realism.



Source: 3316 x 2880, 9.55MP, 24-bit bitmap, YCbCr
Output: DVP, Mode Full Pop, Setting 120

The Solution

- The DarbeeVision Image Processing intellectual property (IP) core uses algorithmic computation to improve the depth, clarity, and realism of videos or images. Images are analyzed on a pixel-by-pixel basis to determine the required luminance adjustment. Once processed, the resulting image contains greater depth information, making the image more lifelike. Real-time performance for these complex algorithms has been achieved using Intel® Cyclone® IV FPGAs and Intel IP cores.
- The DARBEE Visual Presence* (DVP) technology is a comprehensive fidelity solution capable of processing large images or high-definition video, and is compatible with all standard connectivity interfaces. DVP is unique, automatically scaling as pixel data, pixel count, and pixel density increase from Standard Definition, HD, HDR, to 8K video; including high-frame rate video.
- As display formats move into 3D and holographic realms, DVP pixel enhancement provides the optimal viewing experience.
- Intel FPGAs bring real-time, programmable, high-performance solutions to image and video processing. DARBEE Visual Presence technology along with Intel FPGAs bring high-impact image processing to products such as digital signages and interactive flat panel displays.



How It Works

DVP algorithms analyze the image on a pixel basis to compute the lost depth data, similar to the human visual system, and then adjust pixel luminance across the entire image to enhance image quality by adding information required to better see and understand it.



Source: 478 x 358, 0.34MP, 24-bit BMP
Output: DVP, Mode Full Pop, Setting 090

Benefits

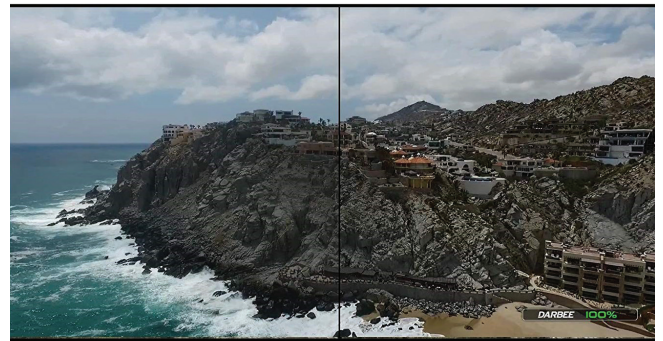
- Efficient, low-power solution
- Easy to use
- Enhances all video formats



Source: 3840 x 2160, 24-bit Apple ProRes* 422HQ
Output: DVP, Mode High Definition, Setting 090



Source: 1024 x 768, 24-bit JPEG
Output: DVP, Mode Full Pop, Setting 090



Source: 1920 x 1080, DJI Drone
Output: DVP, Mode Full Pop, Setting 090

Use Intel Arria® 10 or Intel Stratix® 10 FPGAs with DarbeeVision DVP 4K/UHD IP to enhance the realism of your high-resolution images.

Learn More

Since 2009, DarbeeVision has focused on developing and marketing DVP and several other digital image processing solutions. Currently, the number of DVP nodes in homes now exceeds 200K units. The company is building on its success in consumer products by expanding into commercial applications, and is currently developing 4K solutions to satisfy OEM demand.

DarbeeVision is headquartered in Orange, California and recently opened a business unit in Shenzhen, with funding from Plug and Play China, and established accelerator partnerships with Vanke (Beijing) and LeaguerX (Shenzhen).



Intel® Cyclone® IV FPGA used for the DARBEE Visual Presence, DVP-5000S

