SAFFRON TYPE SYSTEM

The Saffron Type System (Saffron) is a breakthrough approach to rendering high quality type on digital displays[1]. Built on a core of patented Adaptively Sampled Distance Field (ADF) technology, Saffron achieves its superior results without the liabilities of current approaches. Saffron is a key enabling technology for the display of rich textual content on the next generation wireless devices and flat panel displays.

Advantages:

- Highly legible type even at very small font sizes without the use of labor intensive manual hinting.
- Unparalleled adaptability for flat panel display technologies including new materials such as OLED.
- Unique Continuous Stroke Modulation (CSM) provides interactive user tuning of type for enhanced viewing comfort and personal preference.
- Backward compatible with the thousands of outline fonts already available in OpenType, Type 1, and TrueType format.
- Full support for rendering compressed stroke fonts.
- Automatic high quality outline-based and stroke-based CJK rendering.
- Computationally clean rendering pipeline straightforward to implement in silicon.
- Supports advanced applications such as pen-based input, 3D type, animation, and special effects.
- Patently distinct from coverage/image based rendering approaches.

Details:

Saffron provides an alternative font rasterizer that can be integrated in the OS, at the application level, or in embedded systems. It takes font outline or stroke descriptions as input, converts them to an internal ADF representation and renders them in real time. Because Saffron rendering is computationally simple and does not use TrueType or Type 1 hinting required by competing technologies, fonts do not need to be special cased; consequently, Saffron can be accelerated using standard graphics processing units (GPUs) or even implemented in hardware.

- **Quality:** Type rendered by Saffron is a more faithful representation of the type designer's intent and is superior to competing technologies[2]. Detail and legibility are preserved even at small point sizes without the need for labor-intensive manual hinting. This is particularly valuable with CJK and non-Latin character sets. Saffron type looks better, automatically.
- **Adaptability:** Saffron's patently distinct rendering approach based on "distance fields" adapts easily to a variety of output devices, requiring at most a single sample per pixel component to achieve its superior quality. Saffron offers unparalleled flexibility for optimal rendering on new and up-and-coming display technologies.
- **Viewing Preference Adjustment**: Saffron's CSM allows for continuously variable and interactive adjustment of both stroke weight and edge sharpness. This provides a convenient tool for manufacturers and application vendors to optimize rendering settings for their displays and gives the user unprecedented control of how type is displayed.
- **Performance:** Saffron's computational overhead is much lower than existing type systems since the rendering of ADFs can be done using a simple distance

reconstruction procedure. Coverage or image-based systems, when combined with the conditional overhead of hinting, involve significantly more complex computations. Mitsubishi Electric is also developing FPGA and custom ASIC implementations of Saffron.

[1]Saffron is not limited in any way to rendering type for displays; similar benefits can be expected for other output devices such as printers.
[2]Larry Oppenberg, Dennis Pasternak – Galapagos Designs.

About MERL:

Mitsubishi Electric Research Laboratories, Inc. (MERL) is the North American arm of Corporate R&D for Mitsubishi Electric. Located in Cambridge MA, MERL conducts fundamental research and advanced development in computer vision, digital communications, graphics, speech interface, and other computing/communications technologies. MERL generates technology and intellectual property that makes its way to Mitsubishi's products, and also licenses technologies to third-party companies.

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