Information Display SID 2010

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Eliminating Fingerprints on Displays

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Eliminating Fingerprints on Displays

One aspect of Display Week that doesn't get much press attention is the Poster session on Thursday from 4 to 8 PM. Posters are intended to provide a more interactive presentation of papers judged to be of high interest to a narrow audience or that would best be presented in a more interactive format. Around 200 posters were presented by their authors, six of which were about touch technologies.

One of the more interesting touch posters was P-182, "Theory, Design and Production of Fingerprint-Resistant Films for Touch-Enabled Displays" by five authors from Uni-Pixel Displays. Standard anti-fingerprint coatings work by controlling the contact angle of water or oil – hydrophilic or oleophilic (respectively) for low contact angle in an attempt to smooth out the fluids in the fingerprints; hydrophobic or oleophobic for high contact angle in an attempt to repel the fluids in the fingerprints. (The iPad screen uses an oleophobic coating; if you've ever seen an iPad being used, you know that it doesn't work very well.)

Fingerprints consist of a "liquid chemical soup" transferred from a finger to the flat display surface; the "soup" includes water, amino acids, cholesterol, fatty acids, small-molecule oils, DNA and ionic salts. The structural component of fingerprints is a 3D series of ridges about 3-5 microns high. Unfortunately, the ridges are generally unaffected by coatings that control the contact angle of the fluids in the "soup". The index of refraction of the chemicals in the "soup" is generally in the range of 1.33 to 1.55 (vs. glass at 1.51); this mismatch is the reason that fingerprints are so visible.

The poster authors described using a micro-structured, UV-embossed film to break up the fingerprint structure and wick the liquids away

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from the source, thus hiding the fingerprints. This solution is not solely dependent upon surface chemistry; some of the properties are achieved by physical phenomena. The micro-structure is raised about 4 microns above the surface. The carrier film can be a wide variety of materials, including polyester, PET, polyurethane, acrylics, PETGs and polycarbonates. The embossed area can be in the range of 15% to 25% of the total surface area.

The result is a robust, abrasion- and fingerprint-resistant surface with a silky surface feel. Before-and-after photos above illustrate this result. – Geoff Walker, NextWindow

Posted by Information Display at 6:01 PM

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