Introduction

- Noise spikes generated after correlated double sampling (CDS) lead to potential touch mis-registration.
- Spatial low pass filtering based technique is employed to smooth noise spikes.

Results and Discussions

- Spatial Gaussian filters with various bandwidths:

\[ F_{\text{LPF}}(n, m, k) = \sum_{i=1}^{L-1} \sum_{j=0}^{W-1} C_{i,j} \times F_{\text{CDS}} \left( n + i - \frac{L-1}{2}, m + j - \frac{W-1}{2} \right) \]

- Signal and noise spikes attenuation:

\[ F_{\text{LPF}}(n, m) = \sum_{i=1}^{L-1} \sum_{j=0}^{W-1} C_{i,j} \times F_{\text{CDS}} \left( n + i - \frac{L-1}{2}, m + j - \frac{W-1}{2} \right) \]

Conclusion

- Noise spikes after CDS are smoothed. SNR is boosted by 15.6dB and noise spikes are attenuated by 19.25 dB.
- The spatial LPF based technique together with CDS based technique provide a fully packaged solution for noise reduction in touch screen panels.

Related Publication:  