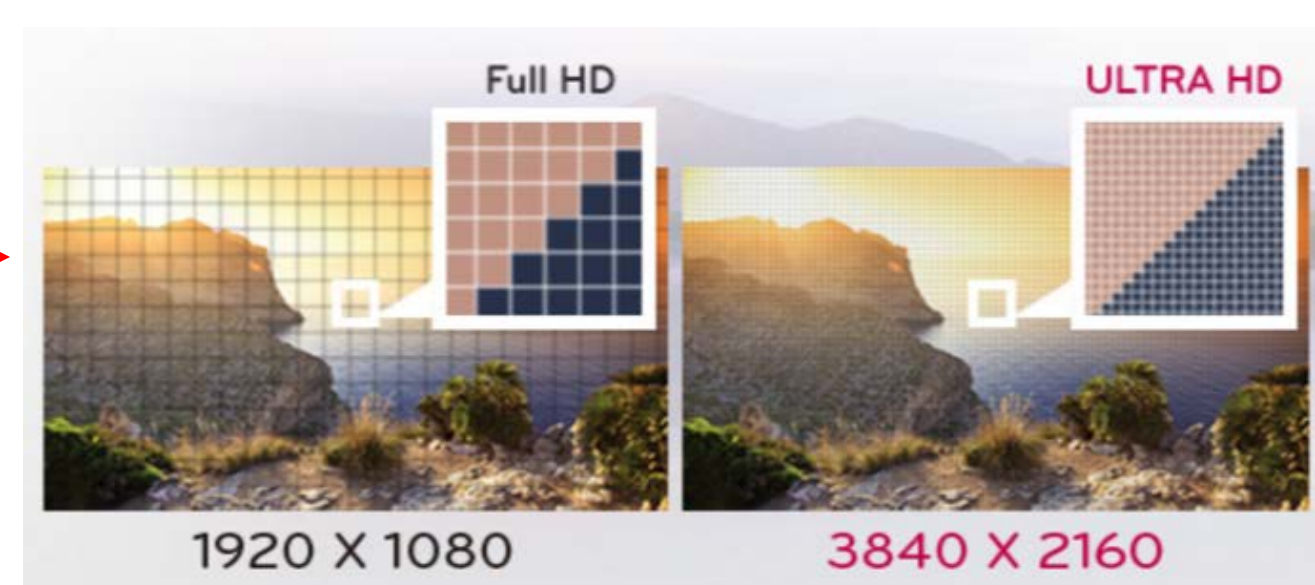


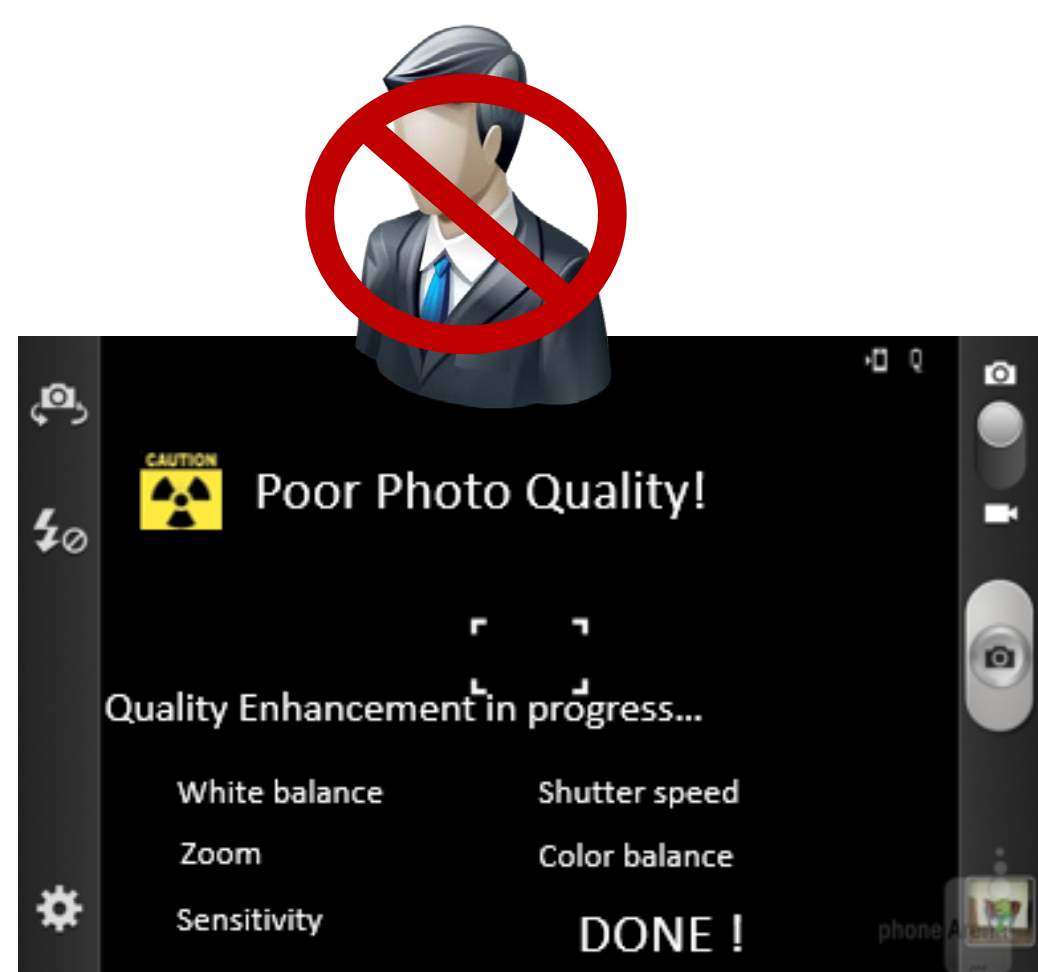
MOTIVATION

Application	Average daily shared photos
	390 Million
	700 Million
	70 Million
	760 Million



Billions of images are shared every day. Supported *resolution*: not very *high*.

Supported *resolution* by *display* systems: up to *ultra HD*.



Smart Capture



Remote Assistance



Related Applications

Mike Krieger (@mikeyk) says: "We're rolling out 1080x1080 uploads (and higher-quality viewing) for IG on iOS and Android. Let me know if feed looks a bit sharper today :)"

Applications started to *catch up* with *high resolution*.

Kylie Wilson (@_kyliejane) says: "So time to never look at Instagram when travelling or roaming data."

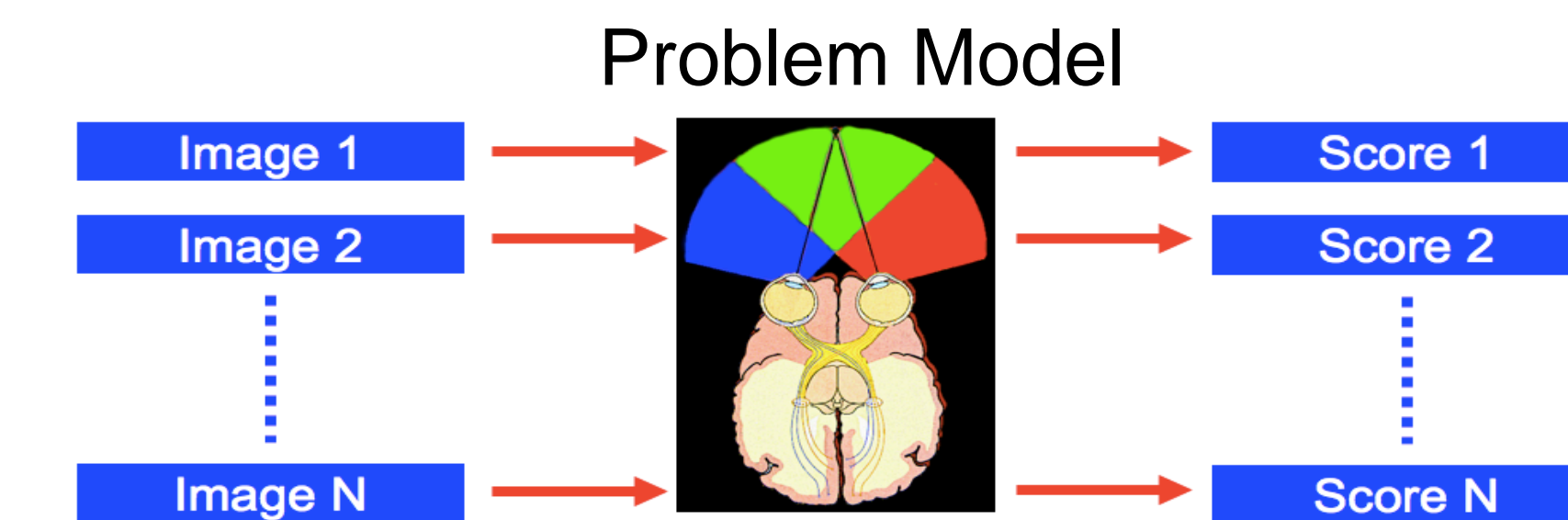
Sheepchase (@sheepchase) says: "@_kyliejane @mikeyk Oh! I hope you can turn it off!"

Adam Al-dbhany (@aDam_Nerd) says: "@mikeyk Unfortunately network usage is a concern. Is there a way to download lower res when on cellular data?"

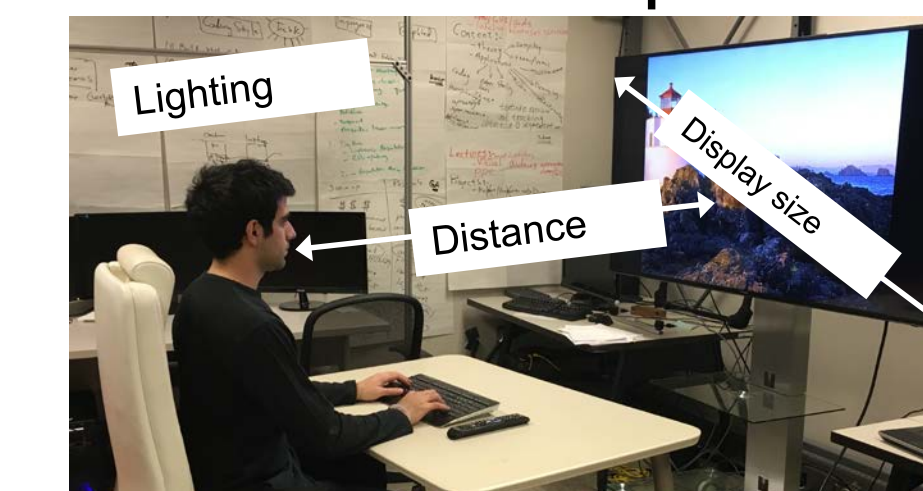
Users are *concerned* about *network usage*.

To balance *quality* and *network* usage, image *optimization* requires image *quality assessment*.

PROBLEM DESCRIPTION



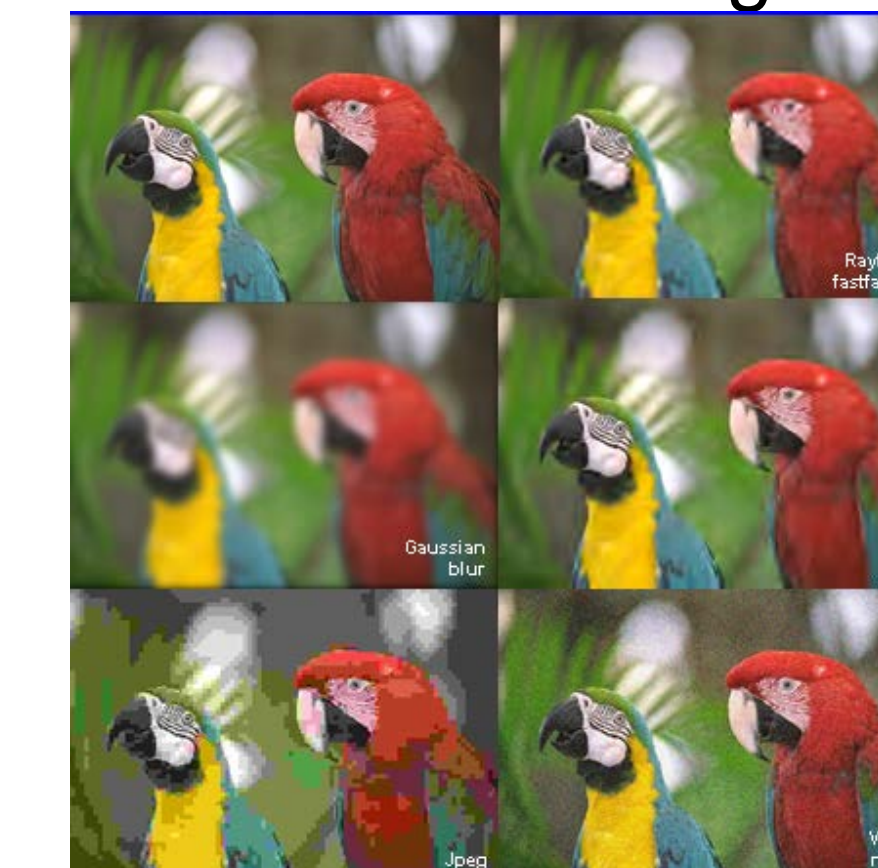
Test setup



Stimuli



Reference images



Distorted images

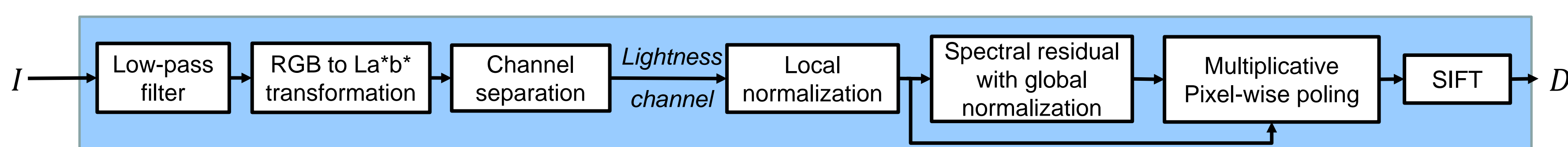
Subjective Scores

- 1 —> Bad *very annoying*
- 2 —> Poor *annoying*
- 3 —> Fair *slightly annoying*
- 4 —> Good *distortion but not annoying*
- 5 —> Very Good *no perceived distortion*

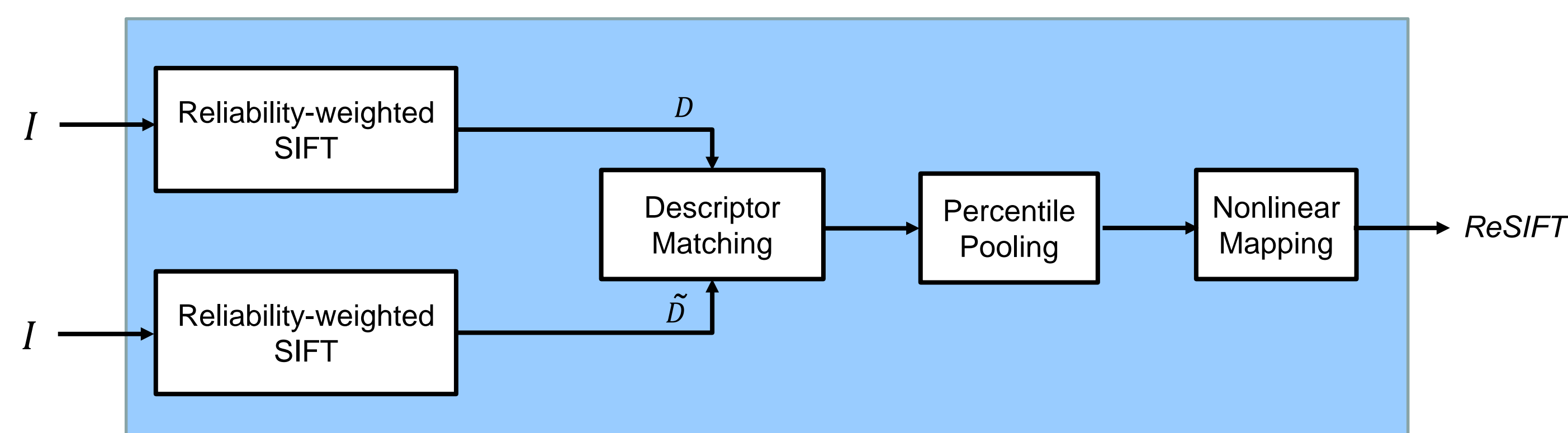
LITERATURE

Year	Study	Method Type	Method Details
2012	Decombas et al.	Post-SIFT	SSIM on windows around the SIFT points and the standard deviation of the matching distance between the SIFT points
2013	Chen and Coulombe	Post-SIFT	Affine transformation parameters are obtained through SIFT descriptor matching and images are compared after affine transformation using existing methods including PSNR, SSIM, and VIF
2014	Wen et al.	Post-SIFT	Number of matched SIFT features
2014	Sun et al.	Pre-SIFT and Post-SIFT	Number of SIFT features in a unit region on the first octave of a Difference of Gaussian map
2016	Temel and AlRegib	Pre-SIFT and Post-SIFT	Reliability-weighted SIFT descriptor matching

ReSIFT PIPELINE



Reliability-weighted descriptor generation block diagram



ReSIFT block diagram

VALIDATION

	LIVE	MULTI	Total
Compression	460	180	640
Noise	174	180	354
Communication	174	-	174
Blur	174	315	489

Distortion Types	Databases	Pearson Correlation				Spearman Correlation				
		PSNR-HMA	SR-SIM	PerSIM	ReSIFT	IW-SSIM	FSIM	FSIMc	SR-SIM	ReSIFT
Compression	JP2K [LIVE]	0.982	0.957	0.976	0.972	0.979	0.981	0.982	0.972	0.971
	JPEG [LIVE]	0.972	0.950	0.959	0.964	0.960	0.962	0.962	0.954	0.955
Noise	Blur-JPEG [MULTI]	0.838	0.904	0.864	0.921	0.869	0.854	0.855	0.862	0.886
	Wn [LIVE]	0.985	0.974	0.968	0.986	0.982	0.980	0.979	0.983	0.984
Communication	Blur-Noise [MULTI]	0.803	0.871	0.839	0.897	0.893	0.864	0.869	0.863	0.882
	FF [LIVE]	0.954	0.943	0.946	0.949	0.967	0.970	0.971	0.966	0.959
Blur	Gblur [LIVE]	0.950	0.949	0.967	0.971	0.983	0.983	0.983	0.978	0.979
	Blur-JPEG [MULTI]	0.838	0.904	0.864	0.921	0.869	0.854	0.855	0.862	0.886
	Blur-Noise [MULTI]	0.803	0.871	0.839	0.897	0.893	0.864	0.869	0.863	0.882

