Universität Konstanz

Cross-Resolution Image Quality Assessment

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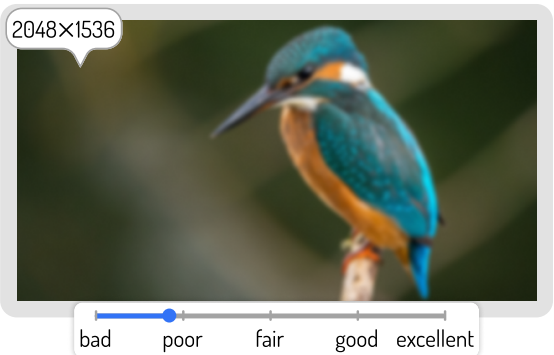
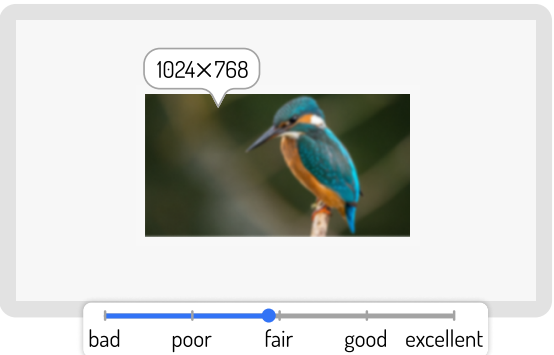
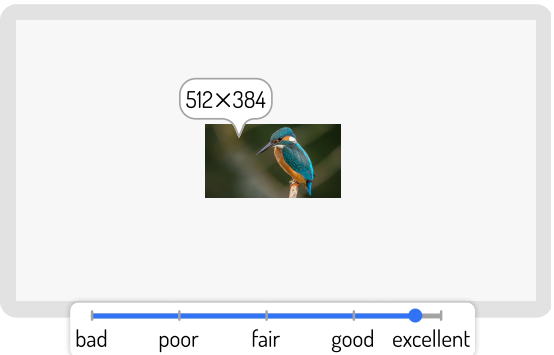
VQEG Meeting, 13.12.2022

Image Scale vs Human Perception



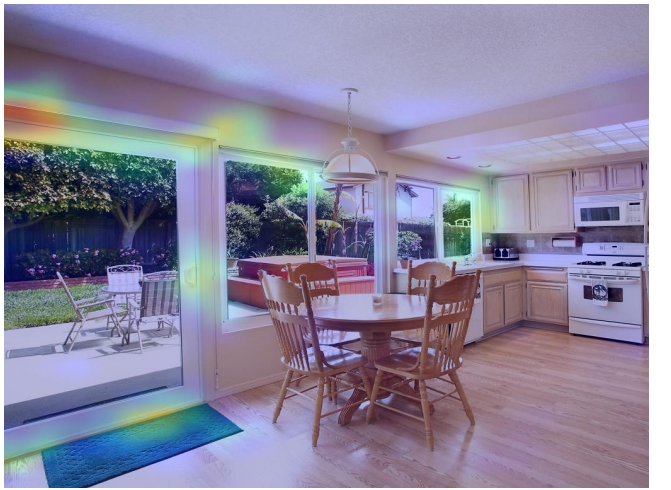




Scaling affects subjective perception.

Image Scale vs CNNs

256×192px



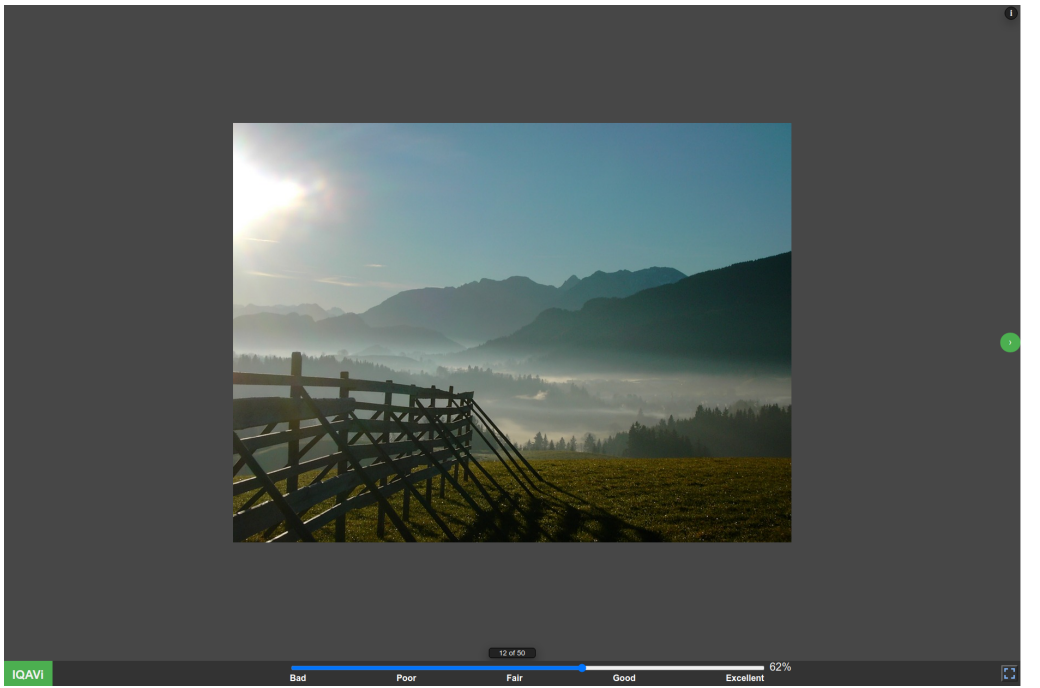
1024×768px

GradCAMs and predicted object classes change with scale.

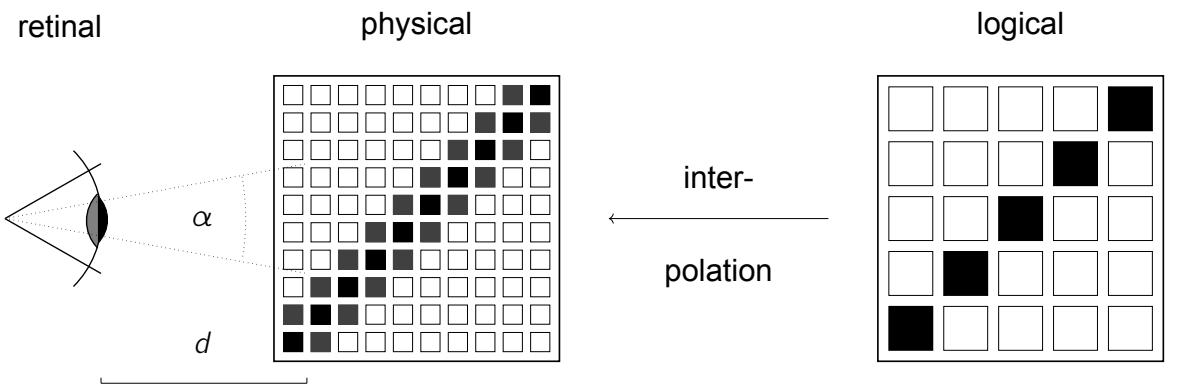
KonX: A Cross-Resolution IQA Benchmark

Sources	*Flickr* (KonIQ-10k) and *Pixabay*
#Images	210 from each source
Resolutions	2048×1535px, 1024×768px, 512×384px
Participants	19 in the full study
Annotations	2 per image at each resolution, 45360 in total

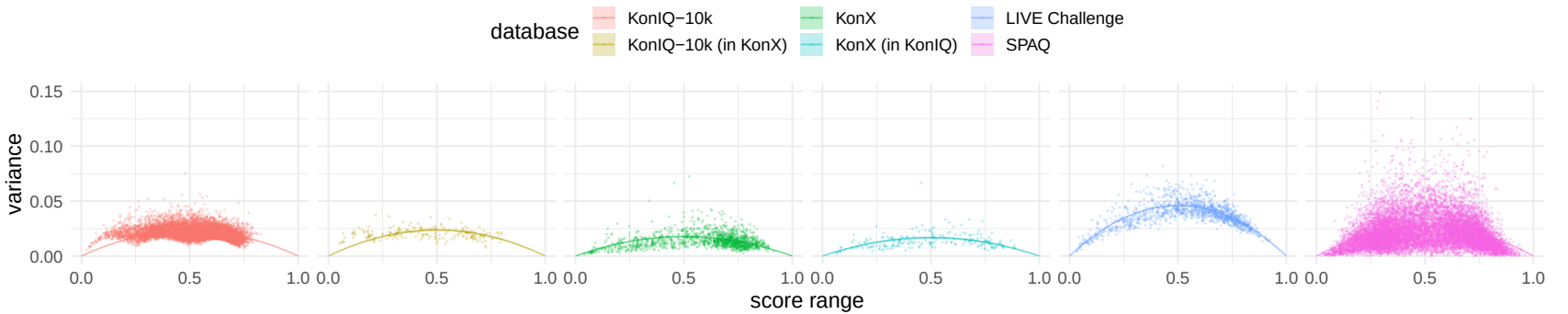
The IQAVi Interface



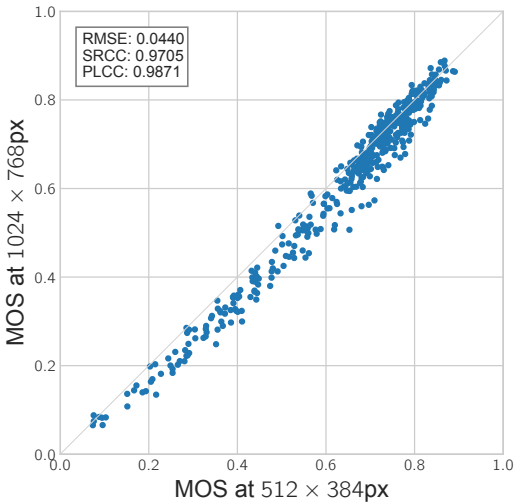
Careful with Resolution

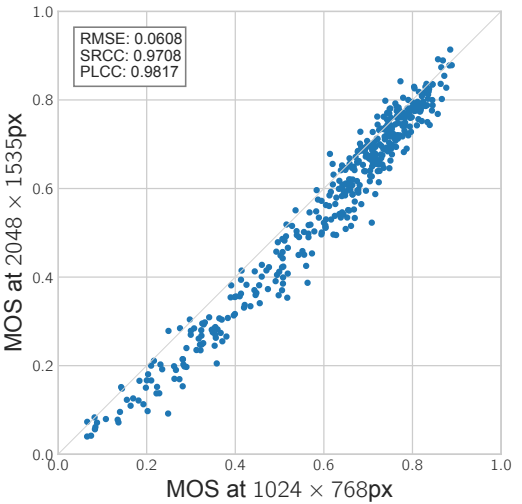


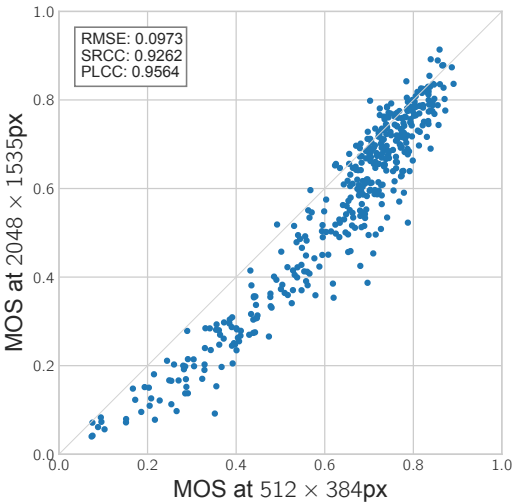
SOS Plots for Authentically Distorted DBs



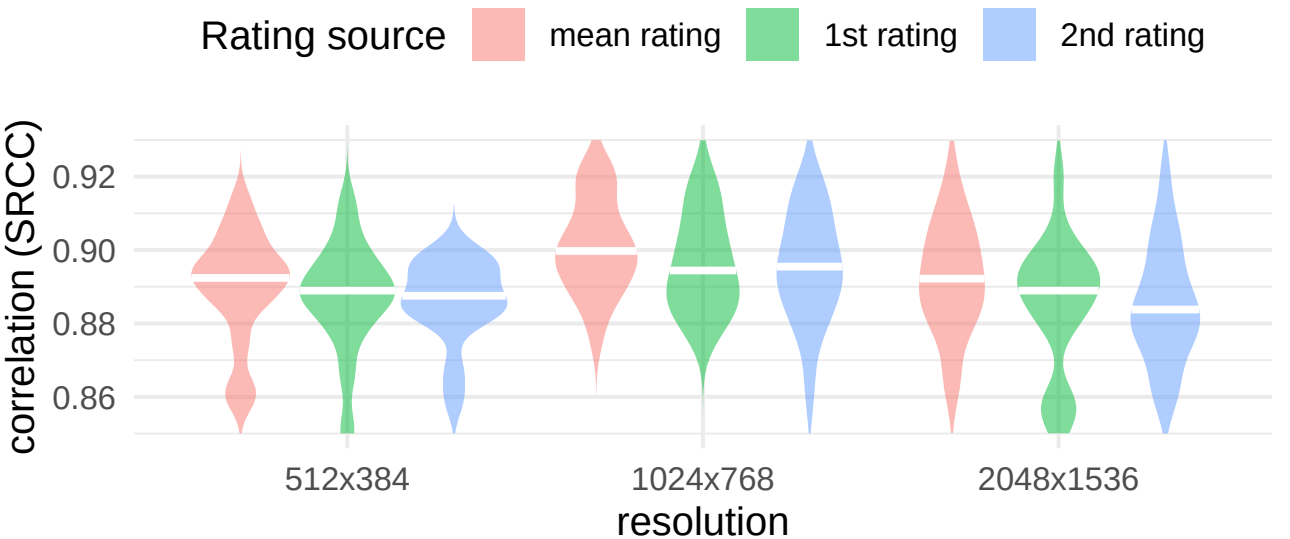
KonX MOS Scatterplots



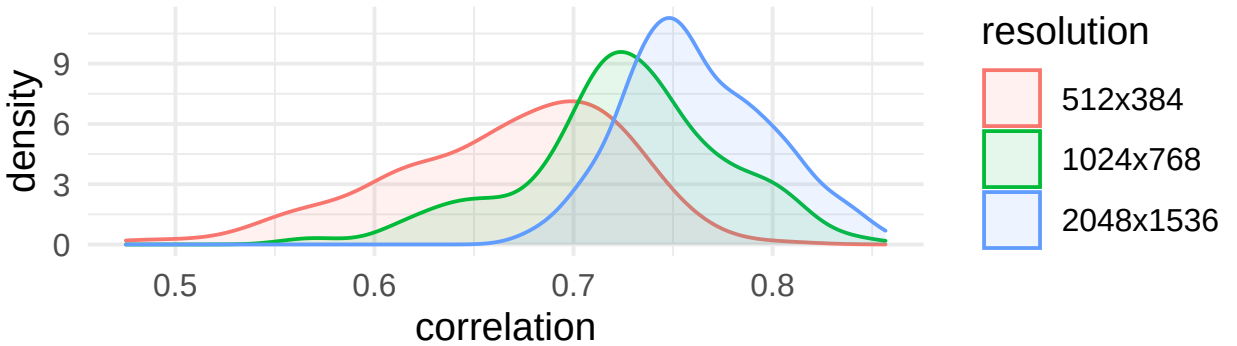




Correlations between KonX and KonIQ-10k

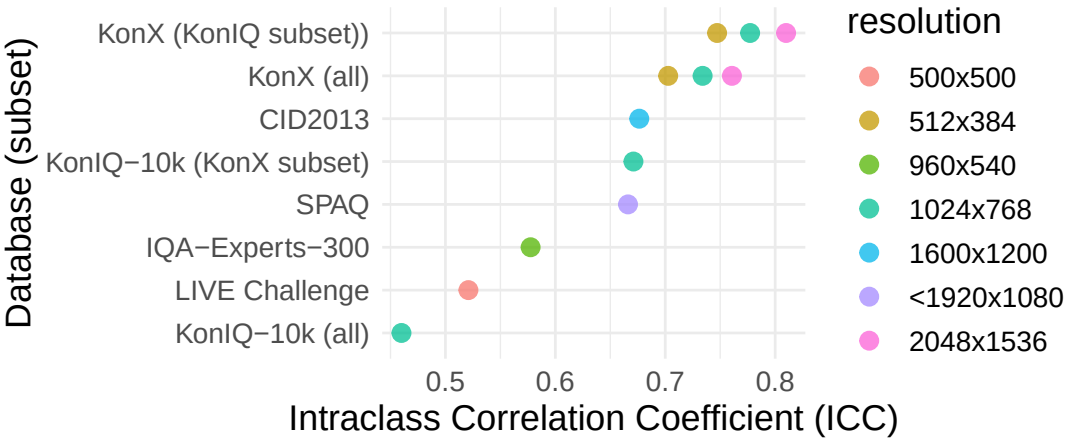


SRCCs Between KonX Participants by Resolution



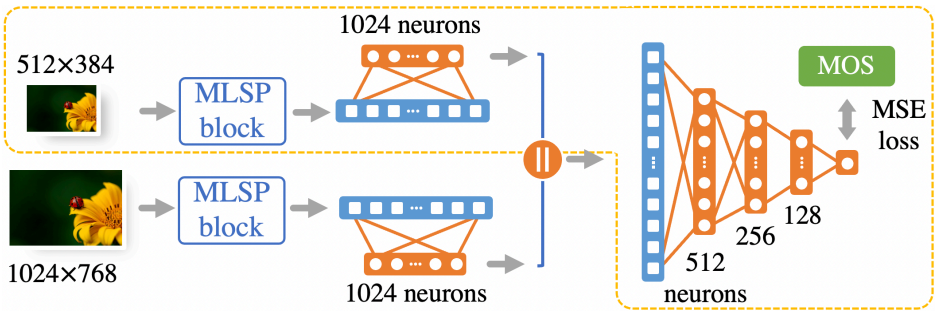
Larer images might be easier to assess.

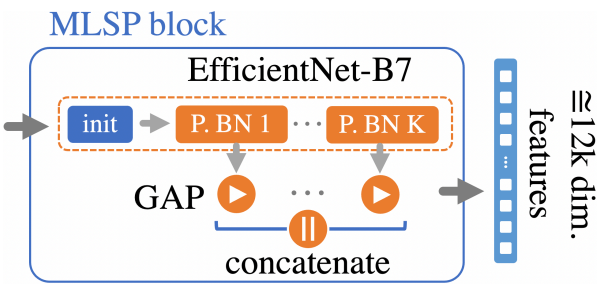
Intraclass Correlation Coefficients



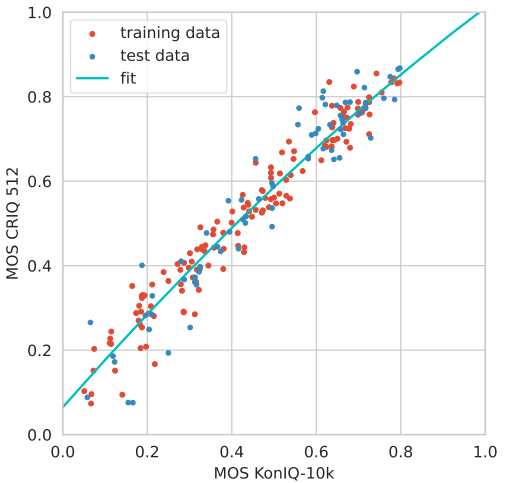
Agreement of individual scores per images is high in KonX.

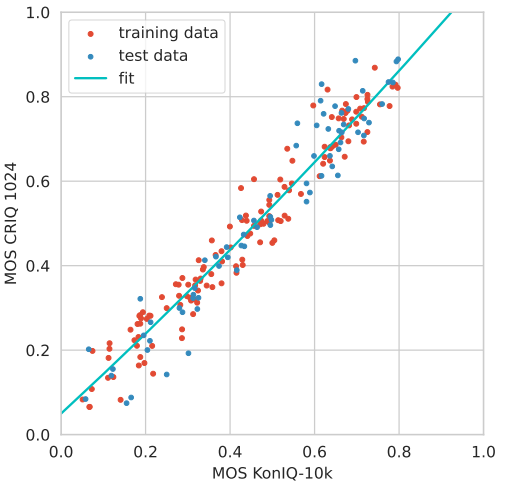
Effnet-2C-MLSP

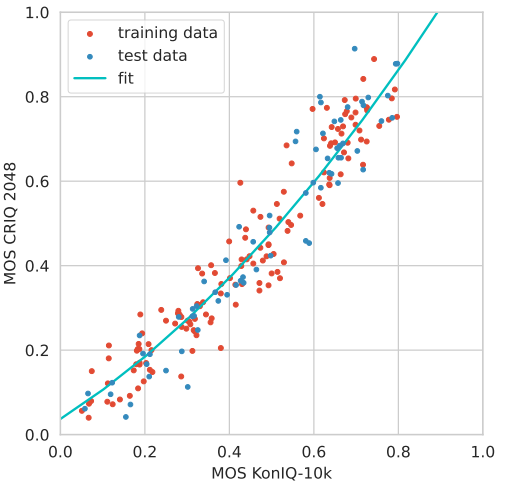




Training on Remapped KonIQ-10k





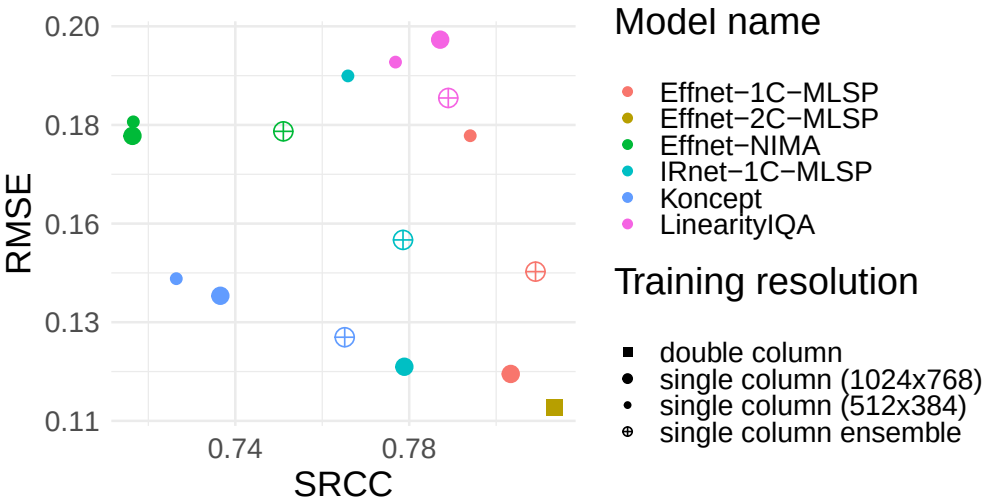


Reduces MAE by 12.8%.

Cross-Database Model Performance

Models	KonIQ-10k		Live Challenge		SPAQ	
	SRCC	PLCC	SRCC	PLCC	SRCC	PLCC
LinearityIQA	0.9299	0.9415	0.8114	0.8404	0.8442	0.8422
Effnet-NIMA	0.7635	0.7788	0.6886	0.7269	0.7896	0.7936
IRN-1C-MLSP	0.8601	0.8932	0.8005	0.8310	0.8523	0.8553
Effnet-2C-MLSP	**0.9490**	**0.9596**	**0.8327**	**0.8595**	**0.8641**	**0.8641**

Results on CRIQ Splits

Model	Training Resolution	SRCC						PLCC					
		512 × 384px		1024 × 768		2048 × 1536		512 × 384px		1024 × 768		2048 × 1536	
		KonIQ	Pixabay	KonIQ	Pixabay	Koniq	Pixabay	Koniq	Pixabay	Koniq	Pixabay	Koniq	Pixabay
KonCept	512	0.8807	0.3047	0.8264	0.2703	0.6821	0.3112	0.8535	0.3049	0.7522	0.2670	0.6016	0.2690
	1024	0.8251	0.2658	0.8888	0.4175	0.8165	0.4518	0.6968	0.2658	0.8845	0.4201	0.8420	0.4926
Effnet-NIMA	512	0.8506	0.3101	0.7648	0.3739	0.5505	0.4010	0.8357	0.3682	0.7664	0.4118	0.5928	0.3972
	1024	0.8568	0.2506	0.8840	0.3184	0.8185	0.3925	0.8449	0.3105	0.8849	0.3895	0.8423	0.4503
LinearityIQA	512	**0.9436**	0.3818	0.9111	0.3994	0.7611	0.4485	**0.9416**	0.4681	0.9068	0.4670	0.7933	0.4859
	1024	0.9141	0.3849	**0.9452**	0.4519	0.9023	0.4935	0.9087	0.4311	0.9435	0.4813	0.9115	0.5291
IRN-1C-MLSP	512	0.9279	0.3197	0.9093	0.3490	0.8072	0.4501	0.9274	0.4155	0.9046	0.4355	0.8326	0.4967
	1024	0.8949	0.3117	0.9320	0.4190	0.9076	0.5037	0.8992	0.4003	0.9313	0.4876	0.9160	**0.5596**
Effnet-2C-MLSP	512	0.9273	0.3955	0.9056	0.4457	0.7900	0.5149	0.9248	0.4689	0.9035	0.5063	0.8252	0.5391
	1024	0.8918	0.3762	0.9358	0.4844	0.9105	**0.5415**	0.8957	0.4443	0.9361	**0.5422**	0.9228	0.5857
	both	0.9234	**0.4058**	0.9426	**0.4715**	**0.9276**	0.5132	0.9251	**0.4783**	**0.9437**	0.5220	**0.9325**	**0.5596**

RMSE vs SROCC on KonX