Photorealistic Stylised Image Quality Assessment Database (PSIQAD) Building and Modelling

Student: Low Qing Ru   **Supervisor:** Prof Lin Weisi

Background

Image Quality Assessment (IQA) tasks have increasing importance with the ubiquitous use of imaging devices and image-editing applications. The emergence of Partially Artificial Images (PAIs), whose contents are partially or completely generated by image generation applications, brings more challenges to the applicability of conventional IQA methods as they often only focus on either degradations or enhancements which both exist in PAIs.
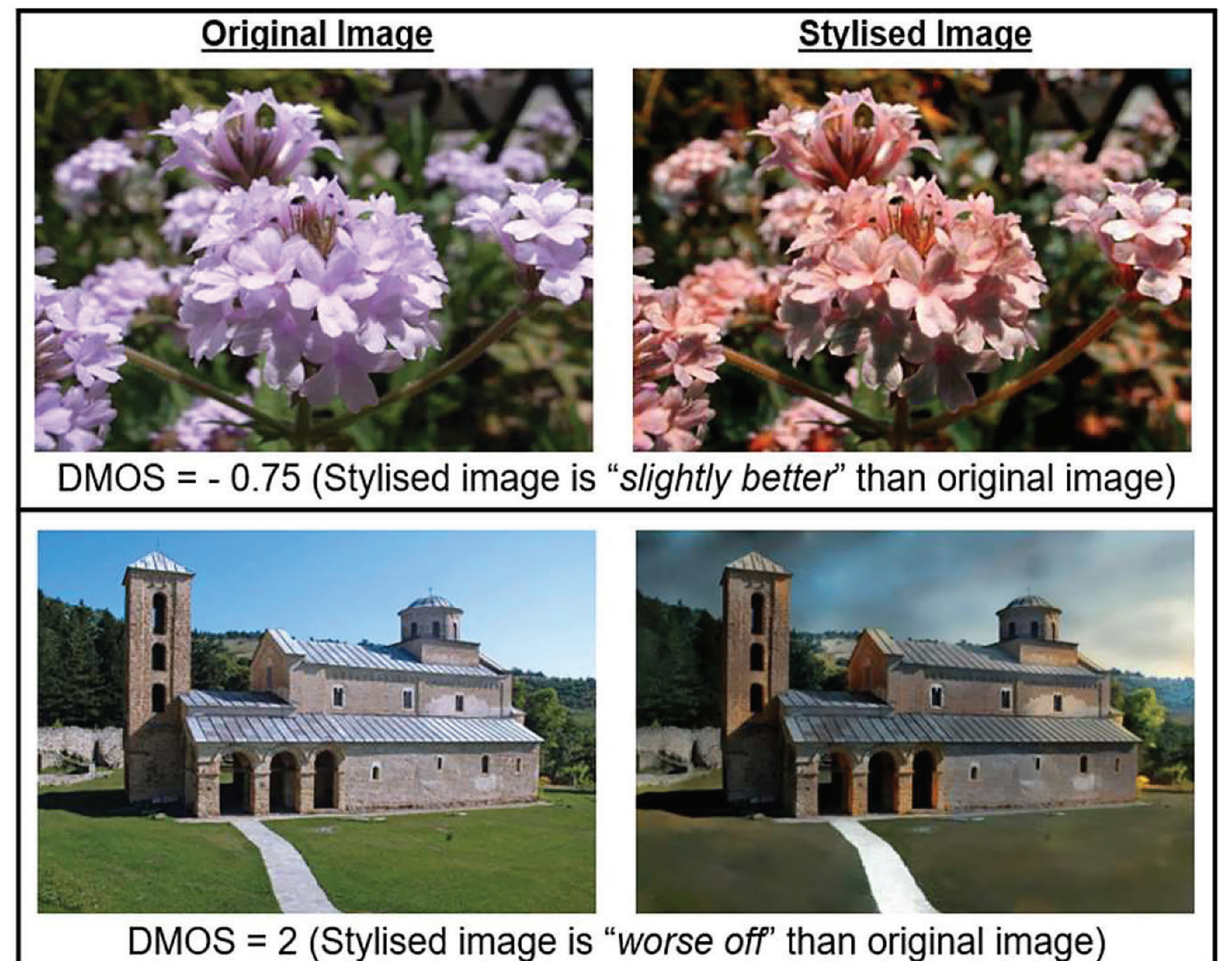
Modelling Results:

Full-Reference IQA	SROCC	KROCC	PLCC
VIF	0.6534	0.4826	0.5211
SSIM	0.6225	0.4461	0.5696
MAD	0.6273	0.4498	0.5876
GSM	0.4568	0.3239	0.3856
PSNR	0.6899	0.4993	0.6620
FSIM	0.5556	0.3966	0.4899
FSIMc	0.6285	0.4535	0.5510
SR-SIM	0.3909	0.2747	0.3415
CNN-based FR-IQA model	0.6106	0.4353	0.5811
FR-SIQA model (ours)	**0.9016**	**0.7319**	**0.9308**

Table 1: Correlation comparison between existing Full-Reference IQA methods and the proposed Full-Reference Stylised IQA model.

No-Reference IQA	SROCC	KROCC	PLCC
PIQE	0.0325	0.0258	0.0331
NIQE	0.1722	0.1055	0.1500
BRISQUE	0.2049	0.1422	0.2090
BLIINDS-II	0.0209	0.0244	0.0367
NIMA Technical model	0.5202	0.3661	0.4959
NIMA Aesthetic model	0.1120	0.0769	0.0892
NR-SIQA model (ours)	**0.8846**	**0.7090**	**0.9174**

Table 2: Correlation comparison between existing No-Reference IQA methods and the proposed No-Reference Stylised IQA model.

Example of Images in PSIQAD:

DMOS = - 0.75 (Stylised image is "*slightly better*" than original image)

DMOS = 2 (Stylised image is "*worse off*" than original image)

All Differential Mean Opinion Score (DMOS) are processed human ratings obtained from subjective tests conducted.

This project aims to study humans' preference for photorealistic stylised images, a form of PAIs, through the creation of a novel database, PSIQAD. This project also discusses the shortcoming of conventional IQA methods on PAIs and objective stylised IQA models were created to demonstrate how PSIQAD can be leveraged. At the end of the project, it was concluded that **humans are unable to distinguish between technical and aesthetic** quality in the context of PAIs which thus hopes to introduce a potential research area to study human visual system in both dimensions.