

# Very Low Cost Algorithms for Predicting the File Size of JPEG Images Subject to Changes of Quality Factor and Scaling \*

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## Abstract

This work presents two new algorithms to predict the file size of a JPEG image subject to transformations consisting of simultaneous changes in resolution (scaling) and in quality factor (QF). To be computationally efficient, the prediction is based solely on easily accessible image parameters such as the quality factor and the original file size. A large image corpus (100 000 images), gathered by a crawler, is divided into a training set used to optimize the predictors and into a test set used to validate the predictors. For both algorithms the prediction error is shown to be of a few percents when the output parameters are close to those of the original image while remaining reasonably attractive elsewhere. Both algorithms are simple to implement and require very little processing for the prediction itself; making them good choices for implementation in transcoding servers. Following is an example of a prediction matrix from the first algorithm for images with original quality factor ( $QF_{in}$ ) of 80 and for various scalings and output quality factors ( $QF_{out}$ ).

**Keywords:** Transcoding, image adaptation, resolution reduction, file size prediction, JPEG

$QF_{in} = 80$		Scaling									
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
$QF_{out}$	10	0.03	0.04	0.05	0.07	0.08	0.10	0.12	0.15	0.17	0.20
	20	0.03	0.05	0.07	0.09	0.12	0.15	0.19	0.22	0.26	0.32
	30	0.04	0.05	0.08	0.11	0.15	0.19	0.24	0.29	0.34	0.41
	40	0.04	0.06	0.09	0.13	0.17	0.22	0.28	0.34	0.40	0.50
	50	0.04	0.06	0.10	0.14	0.19	0.25	0.32	0.39	0.46	0.54
	60	0.04	0.07	0.11	0.16	0.22	0.28	0.36	0.44	0.53	0.71
	70	0.04	0.08	0.13	0.18	0.25	0.33	0.42	0.52	0.63	0.85
	80	0.05	0.09	0.15	0.22	0.31	0.41	0.52	0.65	0.78	0.95
	90	0.06	0.12	0.21	0.31	0.44	0.59	0.75	0.93	1.12	1.12
	100	0.10	0.24	0.47	0.75	1.05	1.46	1.89	2.34	2.86	2.22

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\*This work was supported by Vantrix Corporation and by NSERC CRD Grant 326637-05.