Notice of the Final Oral Examination
for the Degree of Master of Applied Science

of

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BSc (Macau University of Science and Technology, 2011)

“A Novel Progressive Lossy-to-Lossless Coding Method for Mesh Models of Images”

Department of Electrical and Computer Engineering

Thursday, July 9, 2015
1:00 P.M.
Engineering Office Wing
Room 230

Supervisory Committee:
Dr. Michael David Adams, Department of Electrical and Computer Engineering, University of Victoria (Supervisor)
Dr. Alexandra Branzan Albu, Department of Electrical and Computer Engineering, UVic (Member)

External Examiner:
Dr. Gary MacGillivray, Department of Mathematics and Statistics, UVic

Chair of Oral Examination:
Dr. Annalee Lepp, Department of Women’s Studies, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

A novel progressive lossy-to-lossless coding method is proposed for mesh models of images whose underlying triangulations have arbitrary connectivity. For a triangulation $T$ of a set $P$ of points, our proposed method represents the connectivity of $T$ as a sequence of edge flips that maps a uniquely-determined Delaunay triangulation of $P$ to $T$. The coding efficiency of our method is highest when the underlying triangulation connectivity is close to Delaunay, and slowly degrades as connectivity moves away from being Delaunay. Through experimental results, we show that our proposed coding method is able to significantly outperform a simple baseline coding scheme. Furthermore, our proposed method can outperform traditional connectivity coding methods for meshes that do not deviate too far from Delaunay connectivity. This result is of practical significance since, in many applications, mesh connectivity is often not so far from being Delaunay, due to the good approximation properties of Delaunay triangulations.