



DIPARTIMENTO DI ELETTRONICA INFORMATICA E SISTEMISTICA
Direzione e amministrazione: Viale Risorgimento 2 – 40136 Bologna (I)
Tel. 051 2093001 - Fax 051 2093073 - C.F. 80007010376 - P.IVA 01131710376

Prot. n. 667 del 21/07/2010

Bologna, July 21, 2010

To whom it may concern

Subject: assessment of the Doctoral Thesis “*Tree-based Indexing Methods for Similarity Search in Metric and Nonmetric Spaces*” by Jakub Lokoč

The thesis presents results derived from an implementation of techniques for improving and extending the capabilities of M-tree, a well-known indexing structure for efficient searching in metric spaces.

In details, the contribution of the thesis is threefold:

1. New algorithms for M-tree construction, in order to improve performance of the index during the search phase (at the cost of a slightly increased cost during the insertion phase).
2. A new technique for batch loading (i.e., for insertion of several objects at the same time) that efficiently exploits the presence of parallel hardware (like multi-thread processors or computer clusters).
3. An extension of M-tree (named NM-tree) which is able to process exact and approximate searches in non-metric spaces (i.e., spaces where some of the metric postulates do not hold).

The motivations of the Thesis are clearly given and are agreeable: the subject of the work is of relevance to researchers in the area of similarity search. All the presented techniques have been implemented and included experimental results show very significant performance improvements.

Viale Risorgimento, 2
40136 Bologna
Tel. 051 2093001

Via Venezia, 52
47023 Cesena
Tel. 0547 339211

Villa Griffone
40044 Pontecchio Marconi
Tel. 051 846433



DIPARTIMENTO DI ELETTRONICA INFORMATICA E SISTEMISTICA
Direzione e amministrazione: Viale Risorgimento 2 - 40136 Bologna (I)
Tel. 051 2093001 - Fax 051 2093073 - C.F. 80007010376 - P.IVA 01131710376

The outline and the general presentation of the contents are very well prepared; the Thesis is very well written, both non-redundant and explicative. Many insights on the M-tree index are provided: this makes this work highly recommendable to any researcher willing to investigate the (many) facets of metric tree indexing (like routing of new objects, split policies, and so on), besides the original M-tree papers/TRs/Thesis.

In conclusion, the Thesis reports outstanding scientific work: this is also demonstrated by the publications (co-)authored by the candidate, which include 3 papers published in international conferences/workshops, 1 article published in the Journal of Discrete Algorithms and another article submitted for journal publication. I particularly appreciated the balanced mix of experimental and theoretical results (although the latter can be achieved only for topics contained in the second part of the Thesis).

In any case, I feel the candidate has prepared a strong Thesis which satisfies any requirement for moving towards his defense and I, as one of the original designers of M-tree, am ready to champion for the candidate in this: I highly recommend that Jakub Lokoč is awarded the PhD degree.

Finally, as pointed out in the conclusions of the Thesis, a lot of issues still remain open as possible research topics: I would suggest the candidate to continue working in this direction and to pursue a career in the area of research; he has proven his ability to work scientifically by his own and clearly seems to possess all the required characteristics for becoming an excellent researcher.

Best regards,

Prof. Marco Patella

Viale Risorgimento, 2
40136 Bologna
Tel. 051 2093001

Via Venezia, 52
47023 Cesena
Tel. 0547 339211

Villa Griffone
40044 Pontecchio Marconi
Tel. 051 846433