

Recognition of Inscriptions in Ancient Sri Lanka



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Faculty of Information Technology

University of Moratuwa

September 2010

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Dissertation submitted to the Faculty of Information Technology, University of Moratuwa, Sri Lanka for the partial fulfilment of the requirements of the Degree of MSc in Artificial Intelligence

September 2010

Declaration

I declare that this dissertation does not incorporate, without acknowledgment, any material previously submitted for a Degree or a Diploma in any University and to the best of my knowledge and belief, it does not contain any material previously published or written by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and summary to be made available to outside organization.

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Supervised by

Prof. Asoka S. Karunananda

Name of Supervisor(s)

Signature of Supervisor(s)

Date

Dedication

*This Thesis is Dedicated to
My Parents,
My Husband Ramesh and
Prof. Asoka S. Karunananda.*



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Acknowledgements

It is a great pleasure for us to acknowledge the assistance and contributions of a large number of individuals to this effort.

I am heartily thankful to my supervisor, Prof. Asoka S. Karunananda, whose encouragement, supervision and support from the preliminary to the concluding level enable me to develop an understanding of the project. And also many thanks for conducting various fruitful discussions and guiding us to improve our research skills.

A special word of thanks goes to the staff of Department of Archaeology, Sri Lanka for giving me a great support during period of study.

I would like to thank the developers of the GIMP and NeuroSolutions for providing great tools and also for the publishing well made simple tutorials.

I express my heartfelt thanks to my parents, brother and husband and all friends for the affectionate guidance and encouragement for the successfulness of this project.

I also acknowledge the numerous references made to text books and websites which are too many to mention individually.

Finally I wish to thanks all those not mentioned individually who have contributed directly or indirectly to make this project successful.

Abstract

Recognizing the content in the ancient inscriptions unlocks many gateways to the undiscovered historical events since inscriptions were used as a major communication mechanism in ancient Sri Lanka. Currently these inscriptions are read through naked human eye with a great effort. This manual process is not only time consuming but also can generate uncertain outputs sometimes due to the noise that is available in the inscriptions.

We hypothesize that the noise removal of a textual document can be resolved through communication among lexical, structure analyst and semantic agents of a multi agent solution. This is inspired by the real world scenario where noisy outputs can be resolved by experts through their knowledge in morphology, sentence structure and semantics of a particular context.

This thesis is an attempt to recognize the Brahmi characters in ancient Sri Lankan inscriptions. The overall solution comprises of several agents namely: artificial neural network agent, lexical agent, structure analyst agent and semantic agent. The input for the proposed system is an ancient Sri Lankan inscription, this particular inscription image is pre processed using different image processing techniques and segmented into isolated characters. The artificial neural network agent analyzes the pixel intensity of the isolated characters, extract the features and recognize the relevant Brahmi character using the trained neural network. The recognized character string could contain Brahmi characters which have identified erroneously due to the high noise availability. The lexical, structure analyst agent and semantic agents play a major role to correct the mistakenly identified characters by communicating with each other. The output of the system consists of relevant Sinhala Unicode characters for the recognized Brahmi character string.

Experiments were carried out to evaluate the recognition rate of the system by using 12 inscriptions that were found in archaeological sites – Wessagiriya , Handagala Vihara etc. 84% of inscriptions were completely recognized and among the rest 8% of inscriptions were partially identified.

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