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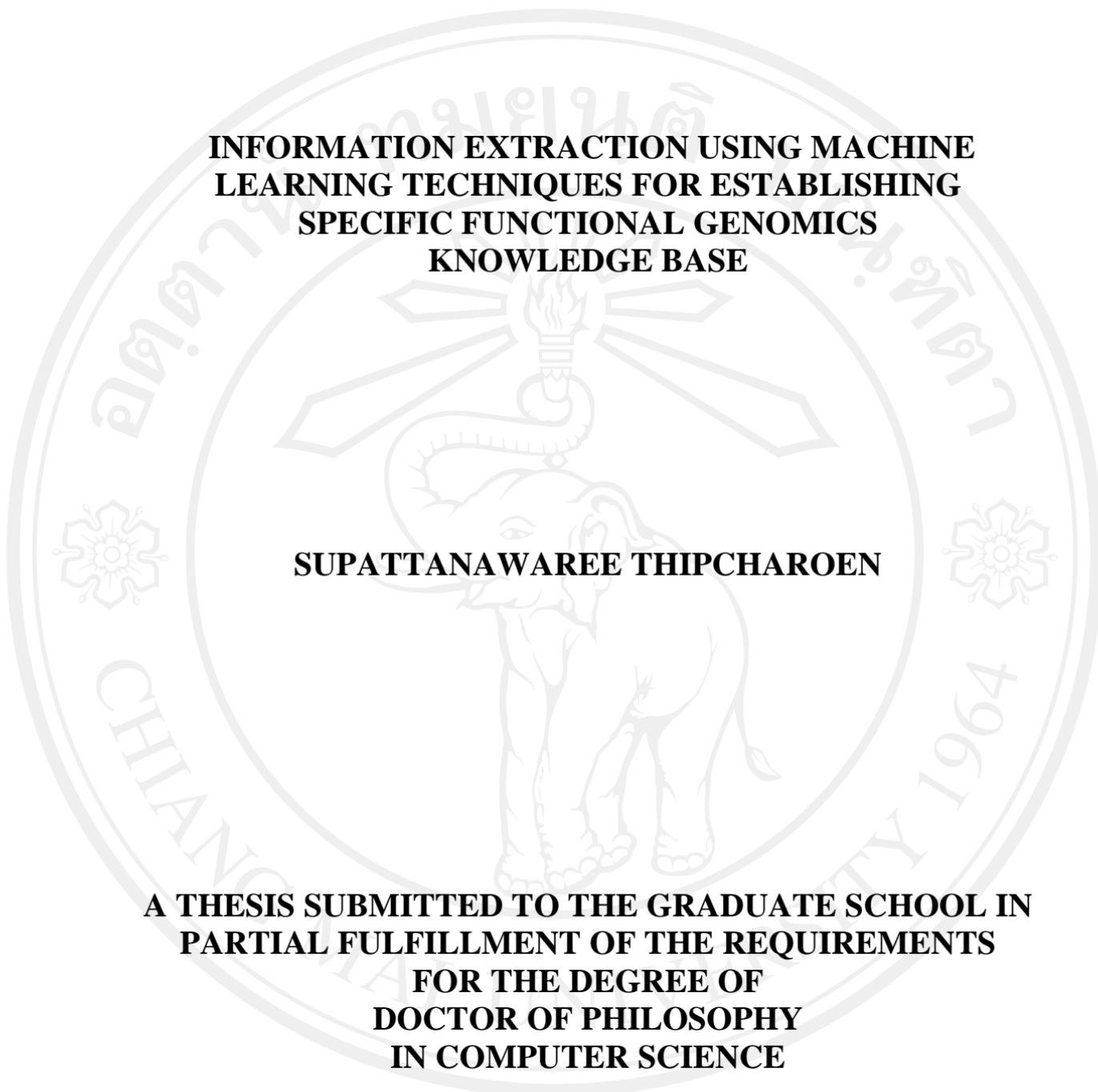
SUPATTANAWAREE THIPCHAROEN

DOCTOR OF PHILOSOPHY IN COMPUTER SCIENCE

THE GRADUATE SCHOOL CHIANG MAI UNIVERSITY JUNE 2013

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SUPATTANAWAREE THIPCHAROEN

A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN COMPUTER SCIENCE

**THE GRADUATE SCHOOL
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THIS THESIS HAS BEEN APPROVED

TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

IN COMPUTER SCIENCE

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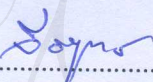
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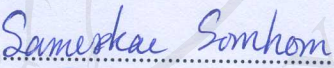
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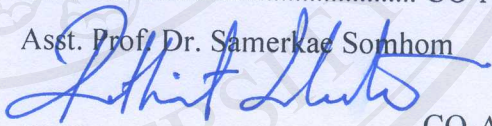
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Supattanawaree Thipcharoen