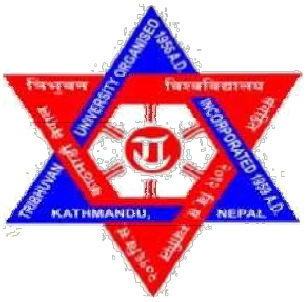

Tribhuvan University
Institute of Science and Technology

A Comparative Study of Naive Bayes and Support Vector Machine Classifier for Nepali News Classification

Dissertation
Submitted To

Central Department of Computer Science & Information Technology
Kirtipur, Kathmandu,Nepal

In partial fulfillment of the requirements
for the Degree of Master of Science in Computer Science & Information Technology

Submitted By
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Date: 28 Dec, 2015

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Student's Declaration

I hereby declare that I am the only author of this work and that no sources other than the listed here have been used in this work.

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Supervisor's Recommendation

I hereby recommend that the dissertation prepared under my supervision by **Mr. Ganesh Bahadur Ayer** entitled "**A Comparative Study of Naive Bayes and Support Vector Machine Classifier for Nepali News Classification**" be accepted as in fulfilling partial requirement for the completion of Master's Degree of Science in Computer Science & Information Technology. In my best knowledge this is an original work in computer science.

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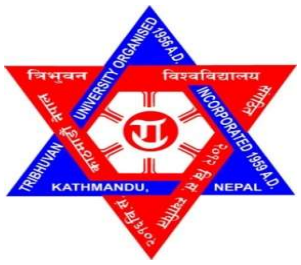

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LETTER OF APPROVAL

We certify that we have read this dissertation work and in our opinion it is appreciable for the scope and quality as a dissertation in the partial fulfillment of the requirements of Master's Degree of Science in Computer Science & Information Technology.

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As we know that, there won't be 100% accuracy and efficiency in any work done by both machine any human, so there may be some errors in my project. But, I have done my best to complete this dissertation, so any suggestion regarding the mistakes of this work will be always welcomed.

Ganesh Bahadur Ayer

ABSTRACT

Automated document classification is the task of assigning the given document into some class of interest. Text classification is the subset of document classification as document can be text, image, music, etc. Document classification has many applications in library science, information science, computer science and others. It can be used for intellectual categorization of documents, indexing of documents, filtering of spams, routing of emails, identification of language, classification of genre, etc.

The problem of automated document classification can be solved in supervised, unsupervised or semi-supervised way. Most of the learning and classification algorithms use document attributes and human inference to learn and classify given documents. In this dissertation work, many Natural Language Processing (NLP) techniques are used for document processing and attribute selection. And, two learning based classification techniques are used namely, Support vector machine (SVM) and Naive Bayes Classifier.

For the evaluation of the system, we have created Nepali text datasets for five classes of documents: Business, Crime, Education, Health and Sports. There are two separate datasets for training and testing of the system. SVM classification system has the average system accuracy rate of 86.34%, precision rate of 84% recall rate of 94.4%. Similarly, Naive Bayes classification system has the average system accuracy rate of 88.8%, precision rate of 92.23% and recall rate of 88.87%.

Keywords:

Automated Document Categorization, Text Classification, Natural language processing, Nepali language, Preprocessing, Feature extraction, Artificial Neural Networks, Support vector machine, Naive Bayes Classifier

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LIST OF ABBREVIATIONS

AI Artificial Intelligence

ANN Artificial Neural Network

API Application Programming Interface

BPN Back Propagation Network

CDT C/C++ Development Components

IDE Integrated Development Environment

KNN K-Nearest Neighbor

MT Machine Translation

MAP Maximum A Posteriori

NB Naive Bayes

NN Neural Network

NLP Natural Language Processing

PCA Principal Component Analysis

SVM Support Vector Machine

SDK Software Development Kit

TC Text Classification

TF-IDF Term Frequency - Inverse Document Frequency