

UNIVERSITY OF THESSALY



NEURO-FUZZY COMPUTING

ECE447

Coding Project

Alexandra Gianni Nikos Stylianou

ID: 3382

ID: 2917

March 1, 2024

Contents

Introduction	2
--------------	---

Introduction

In the realm of machine learning and artificial intelligence, the ability to accurately classify text into predefined categories represents a cornerstone of many practical applications, from sentiment analysis to automated customer support and beyond. This project, conceived as a practical assignment for our Neuro-fuzzy class, aims to design, implement, and evaluate a multiclass text classifier. The core objective of this classifier is to process inputs provided in a CSV file format, each entry containing snippets of text, and to assign them to one of several predefined classes based on their content.

To achieve this, we embark on a journey through the intricacies of neurofuzzy systems, which blend the robustness and learning capabilities of neural networks with the interpretability and reasoning of fuzzy logic. This hybrid approach enables the handling of uncertainty and imprecision in natural language, offering a promising pathway to enhancing classification performance.

Our project report is structured to walk the reader through the entire lifecycle of the classifier's development. Starting with a comprehensive literature review, we lay the groundwork by exploring existing theories and methodologies that underpin our approach. This is followed by a detailed account of the system design, where we elaborate on the architecture, choice of algorithms, and the rationale behind these decisions. We then proceed to describe the implementation phase, documenting the practical steps taken to bring our design to fruition, including data preprocessing, feature extraction, and model training.

A significant portion of the report is dedicated to the evaluation of our classifier. Here, we employ a variety of metrics to assess its performance, discussing both its strengths and areas for improvement. Through this analysis, we aim to not only validate our approach but also contribute valuable insights to the field of text classification.

Finally, the report concludes with a reflection on the lessons learned throughout the project, potential applications of our classifier, and avenues for future research. By providing a comprehensive overview of our journey from conception to evaluation, this report aims to offer a valuable resource for fellow researchers and practitioners in the domain of text classification.