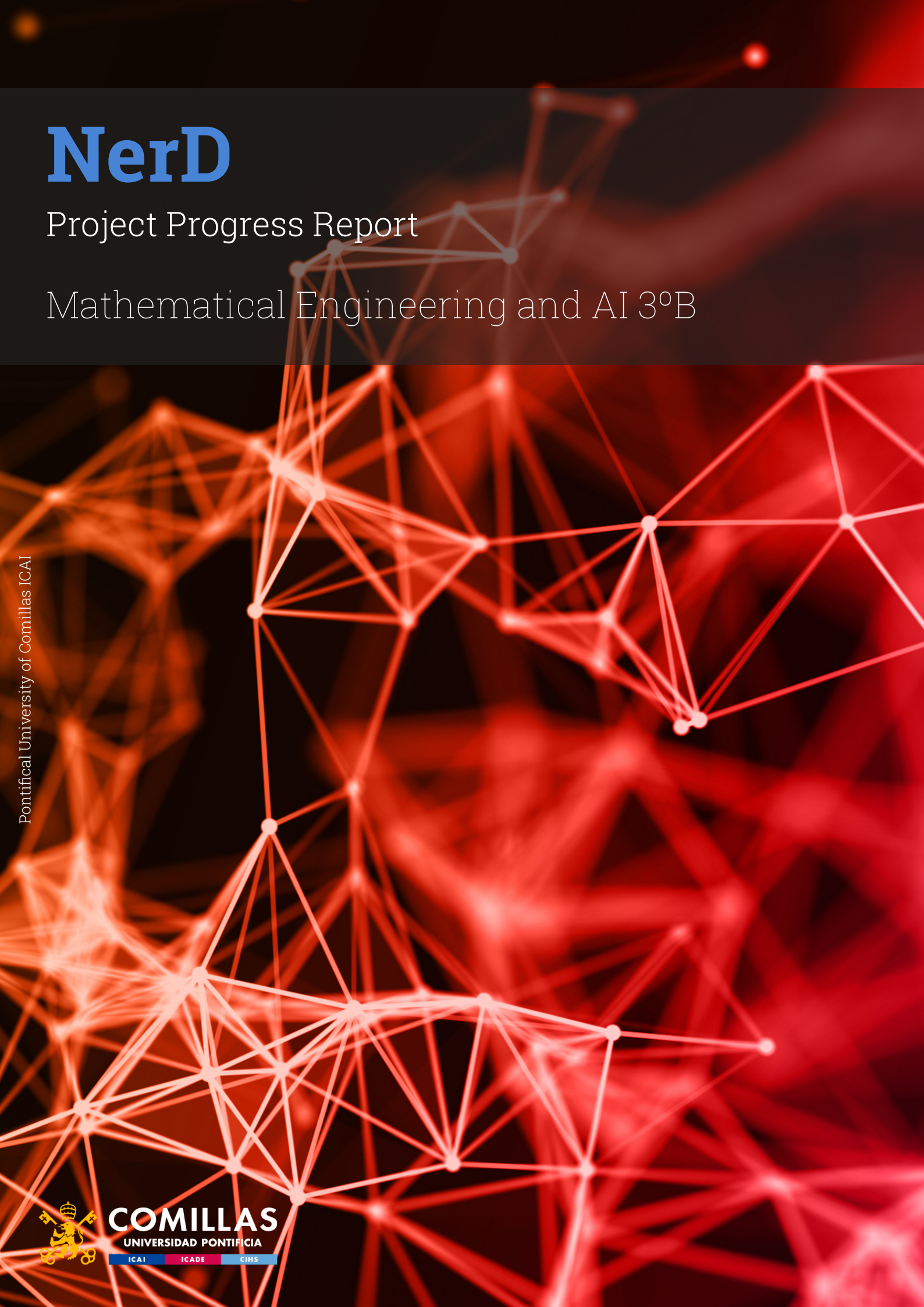
NerD

Project Progress Report

Mathematical Engineering and AI 3ºB



Pontifical University of Comillas ICAI

COMILLAS
UNIVERSIDAD PONTIFICIA
ICAI ICADE CIHS

NerD

Project Progress Report

Mathematical Engineering and AI 3ºB

carried out by

Jorge Kindelán Navarro

Eugenio Ribón Novoa

Beltrán Sánchez Careaga

Ignacio Queipo de Llano Pérez-Gascón

Professors:	Jaime Pizarroso Gonzalo
	Andrés Occhipinti Liberman
Project Duration:	March 2025 - April 2025
Faculty:	Pontifical University of Comillas

COMILLAS

UNIVERSIDAD PONTIFICIA

ICAI

Contents

1

Introduction

This document presents the current progress on our project, which aims to develop an automatic alert generation system using Named Entity Recognition (NER), Sentiment Analysis (SA), and Image Captioning. The objective is to identify reputational or geopolitical risks from multimedia content, such as news articles and images.

The project is hosted at: NerD Repository

2

Progress Overview

2.1. Multitask NER + SA Model

We have developed a custom multitask learning model 'BiLSTMTagger' which performs both NER and SA tasks simultaneously. The model architecture includes:

- A shared BiLSTM encoder
- A token-level classifier for NER
- A sentence-level classifier for binary SA

Training is optimized via a combination of CrossEntropyLoss (for NER) and BCELoss (for SA), with the model checkpointed based on validation loss.

2.2. Image Captioning Component

We have integrated an image captioning module using a pretrained model from Hugging Face. This component converts input images into natural language captions, which will later be incorporated into the pipeline to enrich the NER + SA input.

2.3. Dataset Enhancement and Preprocessing

The datasets required substantial preprocessing:

- We reformatted the MultiNERD dataset to align with our token-tag-sentiment format.
- A sentiment column was generated using a high-accuracy pretrained model.
- The final datasets were filtered and balanced to have:
  - 40,000 training samples
  - 10,000 testing samples
  - Equal number of positive and negative sentences

2.4. Preliminary Results

- NER performance is strong, particularly for entity types like PERSON, ORG, and LOC.
- SA achieves a validation accuracy of 84
- The alert generation logic is defined but not yet implemented.

3

Next Steps

- Finalize neural alert generation system.
- Integrate image captions into the input pipeline for the joint model.
- Perform extensive hyperparameter tuning and final evaluations.
- Develop a simple web-based interface to make our system accessible and user-friendly. The goal of this interface is to allow users to input a news article or social media post along with an associated image.