

# Title page

THESIS TITLE

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Note: When reviewer/examiner decides that the report is close to be finished, contact coordinator for a report number and instructions to produce a title and abstract page.

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## Abstract

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## List of Acronyms

<b>NER</b> Named-entity recognition . . . . .	1
<b>SMHI</b> Swedish Meteorological and Hydrological Institute . . . . .	1
<b>LiU</b> Linköping University . . . . .	1



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# 1 Introduction

In early twenties, floods around Lake Vänern and Arvika have costed Sweden an estimate of 11.1 billions Swedish Krona for damages and repairs [7]. Counties of Dalarna and Gävleborg has suffered from flash floods in 2021 disturbing the daily life of their citizens and damaging public and private properties [3]. Flooding is a devastating natural disaster that threatens the lively hood of people and the infrastructure of communities around the world [5].

To facilitate the process of emergency management during these hazardous events, early warning systems analyse their risk, monitor and warn the public while ensuring their readiness [2]. Traditionally, meteorologists forecast the weather by relying on tools such as gauges, satellites, and radars for data extraction. The emergence of social media platforms such as twitter provide individuals a public space to share their experience, effectively creating another potential source of data.

Researchers started harnessing this new wealth of information to aid the disaster management procedure. Twitter’s stream API makes it possible to create a monitoring system for early event detection on a global [4] and local [1] scales. Another use for it would be identifying victims in real time, locate their physical location, and communicate the information to rescue teams [8]. After the threat subsides, emergency managers can use relevant tweets to assess the impact and plan the recovery phase [1]. To prepare for future floods, authoritative entities can make informed actions by analysing historical data and determine the locations suffering from recurrent calamity. This new acquired knowledge is able to augment weather warning systems’ pipelines improving their accuracy such as Swedish Meteorological and Hydrological Institute ([SMHI](#)), a Swedish expert authority with a global perspective and a vital task in predicting changes in weather, water and climate [9].

This thesis project is a part of a research project, AI for Climate Adaptation [6] at Linköping University ([LiU](#)) in collaboration with the [SMHI](#). It implements a pipeline that provides a visual representation of tweets related to flood events in Sweden. First, relevant tweets are pulled, processed, and classified from the twitter API using data mining techniques. Second, physical locations are extracted from tweets mentioning flood events employing Named-entity recognition ([NER](#)) and gazetteers. Finally, the identified locations with relevant information from tweets are presented on a spatio-temporal visualization. For verification purposes, the pipeline is applied on a week worth of tweets after past flood events.

[Link to tentative notes for report](#)

## References

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- [2] Wikipedia contributors. *Early Warning System*. In: *Wikipedia*. 1119015319th ed. Wikipedia, The Free Encyclopedia, 10/30/2022, 06:41:00 AM. URL: [https://en.wikipedia.org/w/index.php?title=Early\\_warning\\_system&oldid=1119015319](https://en.wikipedia.org/w/index.php?title=Early_warning_system&oldid=1119015319) (visited on 11/17/2022).
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- [8] Jyoti Prakash Singh et al. “Event Classification and Location Prediction from Tweets during Disasters”. In: *Annals of Operations Research* 283.1 (Dec. 1, 2019), pp. 737–757. ISSN: 1572-9338. DOI: [10.1007/s10479-017-2522-3](https://doi.org/10.1007/s10479-017-2522-3). URL: <https://doi.org/10.1007/s10479-017-2522-3> (visited on 09/07/2022).
- [9] *SMHI*. SMHI - Who we are. Apr. 30, 2021.

# Appendices

## A Dummy appendix

### A.1 Dummy appendix