THE TECHNICAL UNIVERSITY OF DENMARK

02456 DEEP LEARNING PROJECT SYNOPSIS

Text-based anomaly detection with *Corti*

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Motivation

Anomaly detection is an important field within machine learning. With the vast amount of data that is becoming available deep learning is starting to be a viable approach to this problem. An example where anomaly detection is used is within emergency call-centres to assist the call-takers in taking rapid life-changing decisions. It is especially in this field that Corti is working.

For this project we will use the Twitter data set to investigate methods for anomaly detection, where we will focus on tweets regarding Covid-19. The tweet with association to Covid-19 have been made publicly available by Banda et al., 2020.

Hopefully the findings can help Corti further improve their networks to save people's lives.

Background

Variational Lossy Autoencoder (VLAE) has been shown to provide significant performance improvement for image analysis in Chen et al., 2016. The VLAE is a variation of the Variational Autoencoder (VAE) that attempts to solve systemic issues that arise when using the VAE with auto regressive models. *Corti* wants to implement the state off the art VLAE with neural auto regressive model such as an RRN or LTSM. Moreover *out-of-distribution detection* will be investigated as mentioned in Nalisnick et al., 2018. This can in our case be done by e.g. feeding tweets from another subject than Covid-19.

Milestones

Week	Dates	Description
Week 9	02/11-08/11	• Create the synopsis • Get in contact with Corti • Read the available material
Week 10	09/11-15/11	• Meeting with Corti at the premises in Copenhagen • Get the data • Start building the VLAE (Variational Lossy Autoencoder)
Week 11	16/11-22/11	• Work with VLAE Model
Week 12	23/11-29/11	• Meeting with Corti to discuss progress • Work with VLAE Model • Start work on the report and poster
Week 13	30/11-06/12	• Finish modelling • Finish poster
Week 14	07/12-13/12	• Poster presentation • Finalize report

References

Banda, J. M., Tekumalla, R., Wang, G., Yu, J., Liu, T., Ding, Y., Artemova, K., Tutubalina, E., & Chowell, G. (2020). *A large-scale COVID-19 Twitter chatter dataset for open scientific research - an international collaboration* (Version 34.0) [This dataset will be updated bi-weekly at least with additional tweets, look at the github repo for these updates. Release: We have standardized the name of the resource to match our pre-print manuscript and to not have to update it every week.]. Zenodo. https://doi.org/10.5281/zenodo.3723939

Chen, X., Kingma, D. P., Salimans, T., Duan, Y., Dhariwal, P., Schulman, J., Sutskever, I., & Abbeel, P. (2016). Variational lossy autoencoder.

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Nalisnick, E., Matsukawa, A., Teh, Y. W., Gorur, D., & Lakshminarayanan, B. (2018). Do deep generative models know what they don't know?

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