Evaluation of an automated tool to identify positive cases from unstructured, free-text pathology reports in a Swiss Cancer Registry

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Context

The Vaud Cancer Registry receives about 150’000 pathology reports per year which need to be reviewed manually by trained specialists according to whether they describe a pathology requiring registration in the database as "positive reports", or discarded as "negative reports".

Objectives

This study examines the performance of a text mining automated tool (AT) created to scan these free-text medical reports for terms relevant to cancer.

Methods

We developed a custom-made list of 155 keywords including all terms likely to report a positive case in a pathology report, based on existing medical classifications, similar lists, and on our working experience within the Vaud Cancer Registry.

In order to identify the presence of the keywords from the free-text of pathology reports in PDF format, we designed and launched an automated search script using Python Software (version 2.7). The performance of the AT was evaluated by computing its sensitivity, specificity, positive predictive value, and negative predictive value based on a sample of 2’302 pathology reports, and using the manual review performed by trained specialists as the gold standard.

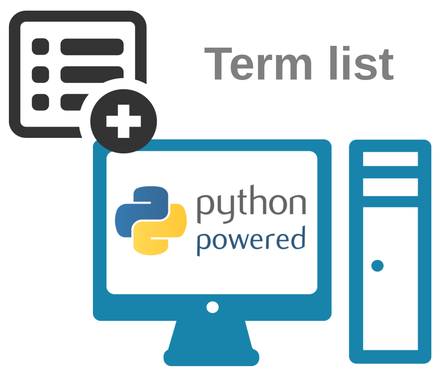
Results

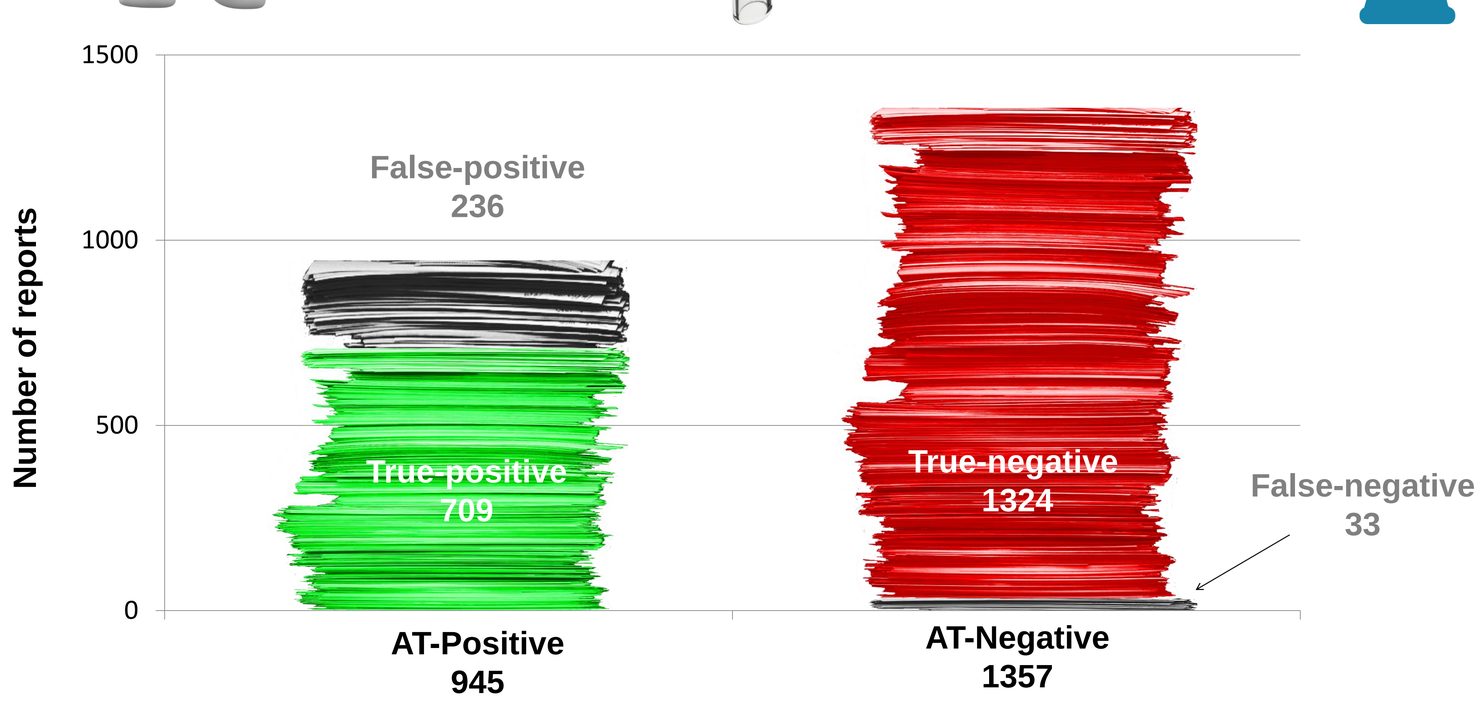
The trained specialists identified, among the 2’302 pathology reports:

- **742 positive reports**
- **1560 negative reports**

The AT generated:

- **236 false-positive**
- **33 false-negative** (1.4%)





Performance of the AT:

- **Sensitivity:** **95.6%**, 95%CI (93.8% to 96.9%)
- **Specificity:** **84.9%**, 95%CI (83.0% to 86.6%)

For an estimated prevalence of positive cases of 32%:

- **Positive Predictive Value :** **75.0%**, 95%CI (72.1% to 77.8%)
- **Negative Predictive Value :** **97.6%**, 95%CI (96.6% to 98.3%)

Conclusions

The AT is a promising tool that could greatly improve the efficiency of tumor registry human resources. Its sensitivity needs to be further improved by adding extra keywords, in order to avoid missing any positive case.

Source code

The AT code is available as open source project. Comments and collaboration are welcome : **https://github.com/pablogit/tdm**

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