

Mental Health Markers in Language and Brain Data: Potential Diagnostic Use and Privacy Concerns

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Highlights

Functional near-infrared spectroscopy (fNIRS) brain imaging, and **stylometry**, which is the use of statistical analysis of written language, can be potentially used to support and enhance **mental health diagnosis**.

However, these technologies introduce the risk of **inadvertent leaking of private information**.

Goals and Impact

- Design and build a system that leverages fNIRS, stylometry, and machine learning techniques to help detect depression.
- Prevent mental health information from being inadvertently leaked and used by third parties putting subjects at a disadvantage
- Inform public debate and enable the consideration of regulations early, before widespread use of these technologies.



fNIRS: a lightweight, portable, non-invasive neuroimaging tool that uses light to capture hemodynamic responses in the brain

fNIRS

fNIRS has been found to **detect markers** for mental health disorders, such as **PTSD, schizophrenia, eating disorders, and depression**^{1,2,3}.

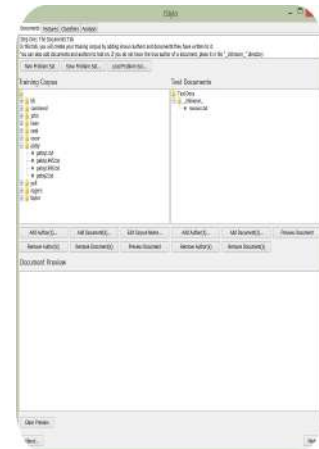
Brain data can pose **privacy threats** as well. fNIRS has been used as an **authentication metric**⁴. There is a potential for co-opting an EEG setup intended for one purpose, such as gaming, to **extract unrelated, potentially private information**⁵.



Stylometry

Researchers have shown that it is possible to detect **depression**⁶, **PTSD**⁷, **suicidal ideation**⁸ via text published on social media platforms.

Stylometry has been used for **authorship attribution**⁹ and **profiling authorial traits** such as gender, age, education, and personality¹⁰.



Jstylo: an authorship attribution tool, built using stylometry

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