POLYPUBLIE

Improved Alzheimer disease diagnosis with a machine learning approach and neuroimaging: Case study development. Supplément

Lilia Lazli

Document en libre accès dans PolyPublie
Open Access document in PolyPublie

Date	2025
Type	Article de revue/Article
Version	Matériel supplémentaire / Supplementary material
URL de PolyPublie PolyPublie URL	https://publications.polymtl.ca/64723/
Évaluation par les pairs Peer reviewed	Révisé par les pairs / Refereed
Conditions d'utilisation Terms of use	Creative Commons Attribution 4.0 International (CC BY)
Référence Citation	Lazli, L. (2025). Improved Alzheimer disease diagnosis with a machine learning approach and neuroimaging: Case study development. JMIRx Med, 6, e60866 (13 pages). https://doi.org/10.2196/60866

Publication officielle
Official publication

Titre de la revue Journal title	JMIRx Med (vol. 6)
Maison d'édition Publisher	JMIR Publications Inc.
URL officielle Official URL	https://doi.org/10.2196/60866
Mention légale Legal notice	This is an open-access article distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIRx Med, is properly cited. The complete bibliographic information, a link to the original publication on https://med.jmirx.org/, as well as this copyright and license information must be included.

Ce fichier a été téléchargé à partir de PolyPublie, le dépôt institutionnel de Polytechnique Montréal
This file has been downloaded from PolyPublie, the institutional repository of Polytechnique Montréal
https://publications.polymtl.ca

Multimedia Appendix 2: SVM

The SVM computation process with mathematical formulas is explained as follows.

SVMs try to maximize the margin between classes (here using the simple linear feature space $x_i.x_j$), by finding the optimal α_i values in the following quadratic programming problem (represented in dual Lagrangian form where *C* is a constant that bounds the misclassification error):

$$max \sum_{i=1}^{N} \alpha_i - \frac{1}{2} \sum_{i=1}^{N} \sum_{j=1}^{N} \alpha_i \alpha_j y_i y_j (x_i.x_j) \tag{2.1}$$

subject to: $0 \leq \alpha_i \leq C$ and $\sum_{i=1}^{N} \alpha_i y_i = 0$

Unlabelled instances are classified using the learned parameters α_i and bias b, by taking the sign of the following decision function:

$$f(x) = \sum_{i=1}^{N} \alpha_i y_i (x.x_i) + b \tag{2.2}$$