Dopavision: A Novel Supervised Machine Learning Model for Predicting Post-Cocaine Phasic Mesolimbic Dopamine Activity in Male C57BL/6J Mice

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Dysregulated dopamine in the mesolimbic system is linked to disorders like schizophrenia, depression, and addiction. Low phasic dopamine release correlates with reduced drug reward sensitivity and reduced motivation, but no reliable method exists to predict phasic dopamine levels. This study developed a prototype machine learning model, Dopavision, to predict percent changes in phasic dopamine release following common behavioral testing in mice. Using social and locomotor data, the multiple linear regression explained 60.18% of dopamine variability, while the random forest classifier algorithm achieved 83.33% accuracy. Future research can refine the model for both sexes, potentially enabling human DA prediction and early disorder prevention.

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