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Predicting alcohol withdrawal in intensive care units

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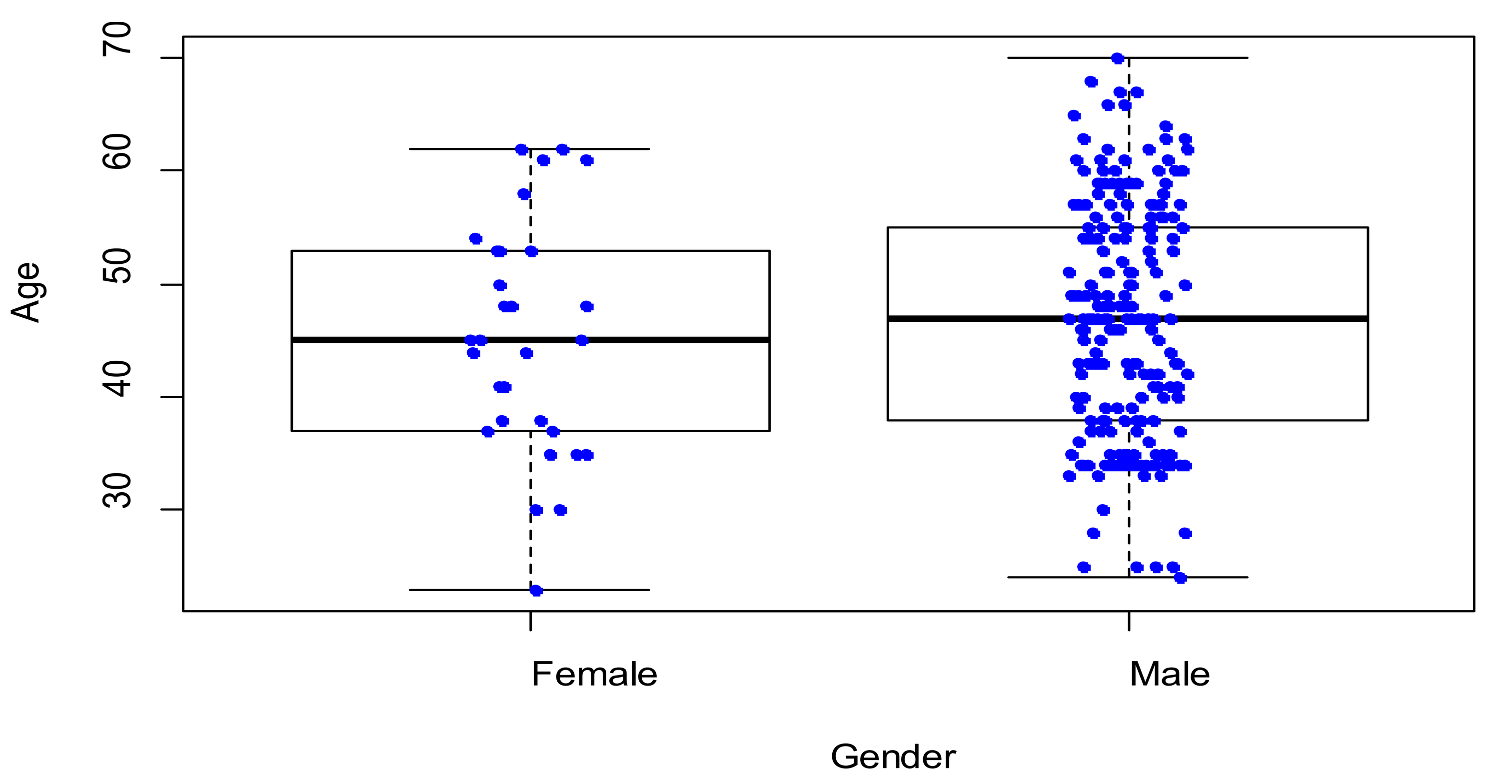
RATIONAL

- Alcohol use disorder is a common health issue in older adults who are facing depression caused by retirement, loss of a spouse, and sleep problems.
- The prolonged, heavy alcohol ingestion will lead to high alcohol dependency such that cessation or reduction of using alcohol causes alcohol withdrawal syndrome (AWS) in roughly 4 to 72 hours after the last drink.
- There is an essential need to predict and treat AWS in the initial stages otherwise the patients will suffer from hallucinations, fever, seizures, and agitation.
- Using physiological signals and machine learning techniques, we examined the predictability of AWS over the records of patients who stayed in critical care units in Medical Information Mart for intensive care III (MIMIC-III).

METHOD

MIMIC-III contains the records of 243 patients who were admitted in ICUs with the primary issue of AWS. To have a fair comparison, an equal number of records of patients without AWS are considered as the control group. We extracted nine descriptive statistical features from physiological signals and medical history of patients: average heart rate, average amount of magnesium in the blood, average body temperature, average systolic blood pressure, maximum systolic blood pressure, minimum systolic blood pressure, age, gender and length of stay in intensive care units. The computed features were fed into 11 supervised machine learning classifiers to identify AWS conditions.



The age and gender distributions of patients who admitted with primary issue of AWS

ALCOHOL WITHDRAWAL PREDICTION

	Naïve Bayes	Gradient Boosting	Adaptive Boosting	Support Vector Machine	Random Forest	Multi Layer Perceptron	Bagged Decision Tree	k-Nearest Neighbors	Decision Tree	Linear discriminant Analysis	Logistic regression
Accuracy	**0.85**	**0.85**	0.84	0.84	0.84	0.84	0.81	0.80	0.80	0.77	0.76
Precision	0.80	**0.82**	**0.82**	**0.82**	**0.82**	**0.82**	0.80	0.76	0.57	0.74	0.75
Recall	**0.92**	0.90	0.88	0.88	0.87	0.86	0.82	0.89	0.91	0.80	0.77

10-fold cross-validation strategy

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