

Machine learning algorithms in application to COVID-19 severity prediction in patients

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Introduction

Overload of hospitals;
Shortage of doctors;
Lack of resources like
MRI/CT scanning devices,
PCR testing facilities, etc.

Methods

Data Analysis

Statistical tests:

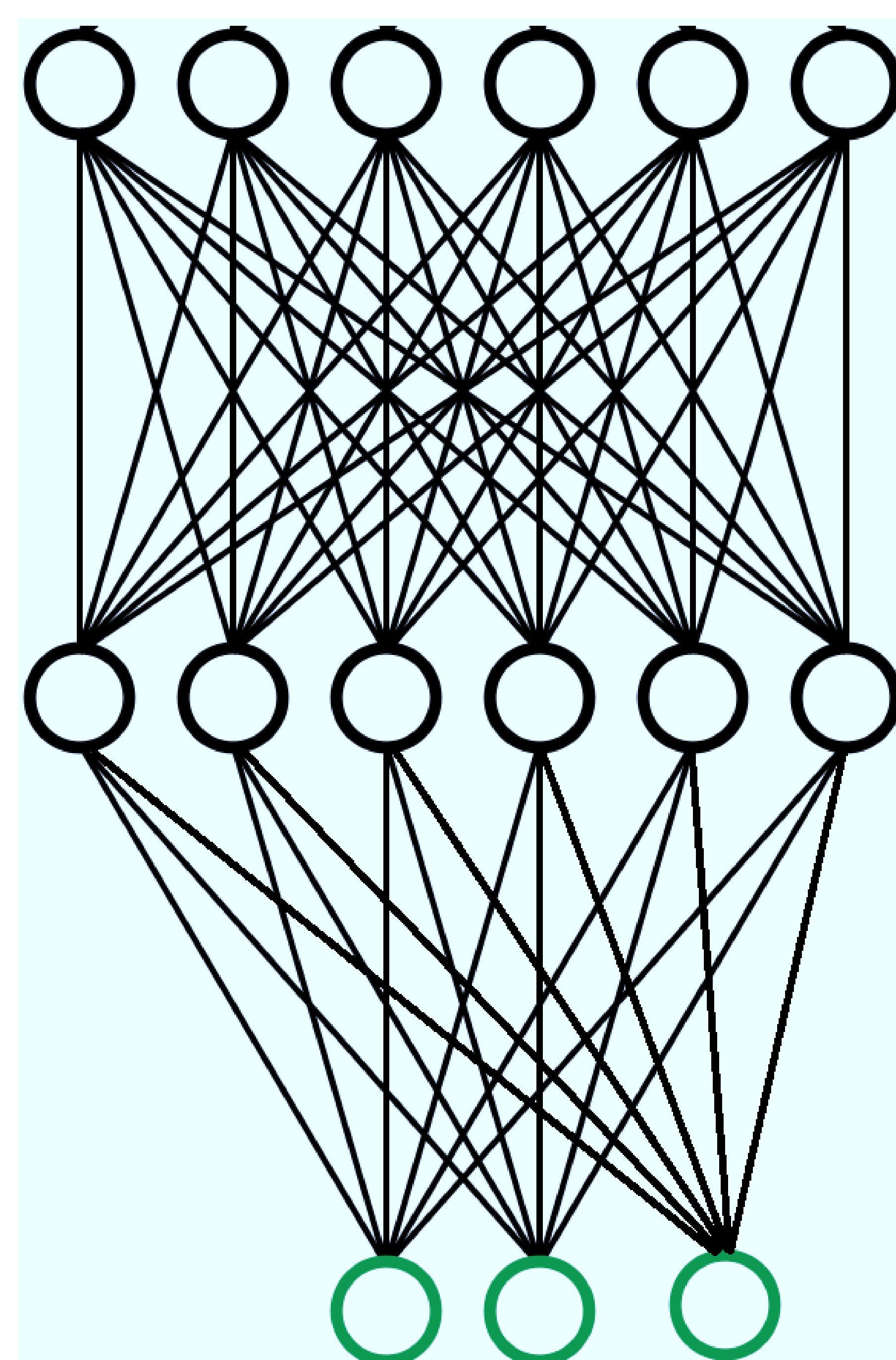
- Kolmogorov-Smirnov,
- Z-test,
- Kruskal-Wallis H test
- Mann-Whitney U test.

Machine Learning Algorithms

- Random Forest
- Extra Trees
- Logistic Regression
- Support Vector Machines
- k Nearest Neighbors
- **Multilayer Perceptrons**

Results

Algorithm	ROC AUC	
	25 features	22 features
Support Vector Machine	0.765	0.772
Random Forest	0.835	0.830
Extra Trees	0.858	0.853
k Nearest Neighbors	0.755	0.755
Logistic Regression	0.835	0.843
MLP	0.824	0.869



Conclusions

Neural networks outperformed other Machine Learning algorithms with **ROC AUC 0.869**. The features used in the model are extracted from anamnesis morbi and anamnesis vitae of the patients during the admission.

The resulting software is used on sites to decide on the admission of patients to primary care centers or the specialized hospitals with large reanimation divisions.

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