This investigation encoded and checked four dissimilar models using the Python programming language. The data set used to create the inputs for this model was the Spanish Exchange Index, referred to as IBEX 35. The entire data set used in this exploration holds 2454 observations, comprising the closing prices and volume values from XXX 1, 20XX to December 31, 20XX, covering more than ten years of daily prices in which various tendencies happened that could reflect a typical market cycle. The Anderson-Darling test was completed on the sample data and denied the null supposition; thus, the hypothesis of normal distribution in the data sample cannot be accepted.

Since the price values of the data-set did not follow a normal distribution, the closing prices and the volume values were rescaled between ($−1 < x < 1$) to be used with the hyperbolic tangent functions.

To assess the accuracy of the various models utilized in this research, the mean square error (MSE), mean absolute error (MAE), mean squared log error (MLE) metrics, and the determination coefficient ($R\_{2}$) were utilized as performance metrics.

The common input layer for the ANN architectures use in this study is presented in Eq. \ref{equation:input}:

\begin{equation}

\begin{split}

X\_{input}(t) = f[v(t-4),v(t-3),v(t-2),v(t-1),\\

c(t-4),c(t-3),c(t-2),c(t-1)]\\

\end{split}

\label{equation:input}

\end{equation}

Where $c(t)$ is the function for closing price and $v(t)$ for volume value at a given time $t

In this research, we defined three variables to predict: the closing price is $t$ and then the closing price of the next day, quoted as $t+1$, and then two days after the closing price $t+2$.