Chapter 6
Determining the Best Machine Learning Model by Predicting the Participation Index of the Borsa Istanbul Stock Exchange With [illegible]

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Forcasting the future direction of stock indinces has been received signi cant attention by researchers and investors. Due to the complexcity of information, it is very di cult to predict future stock market price behavior. In this paper, we determine the best machine learning model by forecasting the Borsa Istanbul Stock Exchange participation index with Arti cial Intelligence (AI). Six di erent machine learning algorithms are used to predict the prices of a participation index such as Linear Regression, LSTM, KNN, Auto-ARIMA, Gradient Boosting and Random Forest. Models were built by using the closing rates of the Participation Index between November 2015 and June 2020, and the last 30 days' rate was forecasted. As a

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main nding, the best model was determined according to accuracy results based on the various models. It is seen that, of the six di erent machine learning models, the LSTM model provides the most accurate result. This is kind of rst study on the prediction of participation index by application of six di erent machine learning models of AI.

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Artificial Intelligence (AI) has been acquiring more space in our lives as time passes. It automates and accelerates many things and does many jobs for humans. It is more efficient at complex analytical problems than the human brain. Poole and Mackworth (2010) claim that AI is a field studying the synthesis and analysis of computational agents acting intelligently. It has appropriate actions, according to circumstances and defined goals, which are changeable. In today's world, one of the biggest challenges for industry is that prediction is being handled by trained machines. Especially in fields that provide more value to people, this usage of machines has increased dramatically. New algorithms and computers are being invented to improve current AI capabilities, which are widely used in industry, playing significant roles from personal devices to huge production factories.

The capability of AI dealt with in this study is predicting the stock market. As is known, the stock market is a valuable field for all society, since it has the potential to provide wealth. Thanks to its importance, people are keen to know about future movements that will take place in this market. Accurate stock market prediction is important because, basically, higher accuracy brings more profits for investors. Also, studies have shown that there is a strong relationship between the stock market and macroeconomy (Fama, 1981; Geske & Roll, 1983). Moreover, it has been seen that the future of economic growth can be forecasted better with the help of stock market fluctuations (Bahadur and Neupane, 2006). With the help of technology, machine learning algorithms are utilized to forecast stock prices.

Prediction is the trending phenomenon in the 21st century. New methods are being discovered as time passes and these are widely used in important areas, especially in fields with high financial returns. The results produced by prediction have become the motivation to create better algorithms. Our motivation behind this study is to utilize this trending method in order to improve foresight of the Participation Index's movement. Predicting stock market movement has been a great challenge and aim of financial and technological companies. Many technologies have been used to improve forecasting results. We can assert with no doubt that, thanks to stock markets' attractiveness, new techniques will be invented and applied. The questions