



**UNDERGRADUATE THESIS**

**EVALUATION THE GRU MODEL FOR  
PREDICTING INDOONESIAN COMPOSITE INDEX  
IN VARIOUS DATA CONFIGURATION AND  
HYPERPARAMETERS**

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FACULTY OF COMPUTER SCIENCE  
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2026**

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HYPERPARAMETERS**

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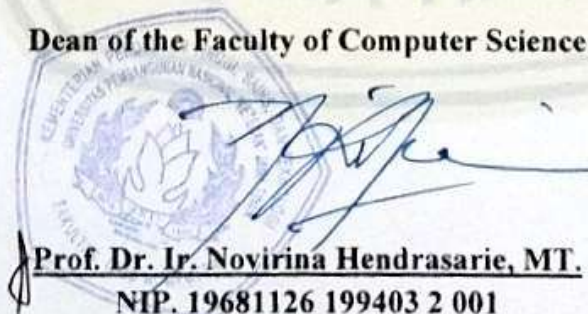
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Hereby declares that this undergraduate thesis contains no part of any other scientific work that has been submitted to obtain an academic degree at any higher education institution. Furthermore, it does not contain any work or opinions previously written or published by others, except for those which are explicitly cited in this thesis and listed completely in references.

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## ABSTRACT

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The IHSG is a key indicator that reflects the condition of the Indonesian capital market, making predictions of its movements very important for investors and market participants. This study aims to implement a model for predicting the value of the IHSG using the Gated Recurrent Unit (GRU) algorithm by adding the IDR/USD exchange rate and DJIA index as features. The GRU model was chosen because it is capable of modeling time series data patterns, capturing both short-term and long-term dependencies through gating mechanisms, and is more computationally efficient than other, more complex recurrent architectures. These characteristics make the GRU suitable for predicting movements in the IHSG, which exhibits dynamic patterns and is influenced by historical data. Testing was conducted through fifteen test scenarios with variations in features, data split ratio, number of layers and model units, learning rate, and dropout rate. The model was evaluated using MSE, RMSE, and MAPE metrics. The results of the study explain that the use of the DJIA index as a feature, along with an 80:10:10 data split ratio and a two-layer architecture with 32 and 64 units, yields the best performance with MSE values of 3226.2419, RMSE of 56.8, and MAPE of 0.6186%. Increasing the number of layers and modifying hyperparameters does not always improve model accuracy. The best GRU model will be implemented in a real-time prediction website by automatically retrieving data through the Yahoo Finance website. The results of the study show that the GRU model can be effectively used to predict short-term movements in the IHSG value.

**Keywords:** IHSG, Gated Recurrent Unit (GRU), DJIA, IDR/USD, Yahoo Finance

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The author admits that this thesis is far from ideal and still contains flaws. As a result, the author genuinely hopes for helpful critiques and recommendations to enhance subsequent work. I hope this undergraduate thesis advances knowledge, especially in the area of deep learning-based historical data prediction.

Surabaya, May 11, 2026

RIZKI BAEHTIAR AFANDI

## TABLE OF CONTENTS

<b>APPROVAL SHEET .....</b>	<b>iii</b>
<b>APPROVAL SHEET .....</b>	<b>v</b>
<b>STATEMENT OF ORIGINALITY .....</b>	<b>vii</b>
<b>ABSTRACT .....</b>	<b>ix</b>
<b>ACKNOWLEDGEMENTS.....</b>	<b>xi</b>
<b>TABLE OF CONTENTS .....</b>	<b>xiv</b>
<b>LIST OF FIGURES .....</b>	<b>xviii</b>
<b>LIST OF TABLES.....</b>	<b>xxi</b>
<b>CHAPTER I INTRODUCTION.....</b>	<b>1</b>
1.1 Background .....	1
1.2 Problem Statement .....	3
1.3 Research Objectives .....	3
1.4 Benefits of Research .....	3
1.5 Problem Scope .....	4
<b>CHAPTER II LITERATURE REVIEW .....</b>	<b>6</b>
2.1 Previous Research .....	6
2.2 Stocks .....	9
2.3 Indonesian Composite Index (IHSG).....	10
2.4 Dow Jones Industrial Average.....	11
2.5 Rupiah Exchange Rate .....	11
2.6 Web Scrapping .....	12
2.7 Yahoo Finance .....	12
2.8 Forecasting .....	13
2.9 Time Series Data .....	14
2.10 Artificial Intelligence (AI) .....	16
2.11 Machine Learning (ML).....	17
2.12 Deep Learning.....	18
2.13 Recurrent Neural Network (RNN).....	19
2.14 Gated Recurrent Unit (GRU) .....	20
2.15 GRU Hyperparameter .....	23
2.16 Activation Function.....	24
2.17 Variable Correlation Analysis .....	26

2.18 Feature and Target Definition .....	26
2.19 Normalization.....	27
2.20 Denormalization.....	27
2.21 Evaluation Metrics .....	28
2.21.1 MSE .....	28
2.21.2 RMSE.....	28
2.21.3 MAPE.....	29
<b>CHAPTER III RESEARCH METHODOLOGY .....</b>	<b>31</b>
3.1 Research Stages.....	31
3.2 Literature Study.....	32
3.3 Data Collection.....	32
3.4 Data Preprocessing.....	34
3.4.1 Data Merging .....	35
3.4.2 Correlation Analysis Between Variables .....	36
3.4.3 Feature and Target Definition .....	38
3.4.4 Normalization.....	38
3.5 Data Structure.....	39
3.6 Model Design .....	39
3.6.1 Denormalization .....	44
3.6.2 Model Evaluation .....	45
3.7 Testing Scenarios.....	46
3.8 Website Implementation.....	48
<b>CHAPTER IV RESULTS AND DISCUSSION .....</b>	<b>50</b>
4.1 Data Collection.....	50
4.2 Data Preprocessing.....	52
4.2.1 Data Merging .....	52
4.2.2 Feature and Target Definition .....	54
4.2.3 Normalization.....	55
4.3 Data Structure.....	56
4.4 GRU Model Design .....	57
4.4.1 Denormalization .....	61
4.4.2 Model Evaluation .....	62
4.5 Testing Scenario .....	63

4.5.1 Test Scenario 1 .....	64
4.5.2 Test Scenario 2 .....	65
4.5.3 Test Scenario 3 .....	67
4.5.4 Test Scenario 4 .....	69
4.5.5 Test Scenario 5 .....	71
4.5.6 Test Scenario 6 .....	73
4.5.7 Test Scenario 7 .....	75
4.5.8 Test Scenario 8 .....	77
4.5.9 Test Scenario 9 .....	79
4.5.10 Test Scenario 10 .....	80
4.5.11 Test Scenario 11 .....	82
4.5.12 Test Scenario 12 .....	84
4.5.13 Test Scenario 13 .....	86
4.5.14 Test Scenario 14 .....	88
4.5.15 Test Scenario 15 .....	90
4.6 Website Implementation.....	94
<b>CHAPTER V CONCLUSION .....</b>	<b>97</b>
5.1 Conclusion .....	97
5.2 Recommendations .....	97
<b>BIBLIOGRAPHY .....</b>	<b>100</b>
<b>ATTACHMENT .....</b>	<b>107</b>

## LIST OF FIGURES

<b>Figure 2. 1</b> Trend Pattern.....	15
<b>Figure 2. 2</b> Seasonality Pattern.....	15
<b>Figure 2. 3</b> Cycle Pattern.....	16
<b>Figure 2. 4</b> Random Component Pattern.....	16
<b>Figure 2. 5</b> Deep Learning Architecture.....	18
<b>Figure 2. 6</b> Recurrent Neural Network (RNN) Structure.....	19
<b>Figure 2. 7</b> Gated Recurrent Unit Architecture.....	21
<b>Figure 2. 8</b> Sigmoid Function.....	24
<b>Figure 2. 9</b> Tanh Function.....	25
<b>Figure 2. 10</b> ReLU Function.....	25
<b>Figure 3. 1</b> Research Stages.....	31
<b>Figure 3. 2</b> IHSG Sample Data.....	33
<b>Figure 3. 3</b> DJIA Index Sample Data.....	34
<b>Figure 3. 4</b> IDR/USD Exchange Rate Sample Data.....	34
<b>Figure 3. 5</b> Stages of Data Preprocessing.....	35
<b>Figure 3. 6</b> Sample dataset after merging.....	36
<b>Figure 3. 7</b> Stages of GRU model development.....	40
<b>Figure 4. 1</b> IHSG Variable Data Scrapping Results.....	51
<b>Figure 4. 2</b> DJIA Index Variable Data Scrapping Results.....	51
<b>Figure 4. 3</b> IDR/USD Exchange Rate Variable Scrapping Results.....	52
<b>Figure 4. 4</b> Combined data.....	54
<b>Figure 4. 5</b> Data normalization results.....	56
<b>Figure 4. 6</b> Sample Model Summary.....	59
<b>Figure 4. 7</b> Sample model training using Early Stopping.....	60
<b>Figure 4. 8</b> Model training process visualization.....	61
<b>Figure 4. 9</b> Model evaluation scores.....	63
<b>Figure 4. 10</b> Comparison of actual and predicted scores.....	63
<b>Figure 4. 11</b> Train and Validation Loss Testing Scenario 1.....	64
<b>Figure 4. 12</b> Actual and Predicted IHSG Price Charts Test Scenario 1.....	65
<b>Figure 4. 13</b> Training and Validation Loss in Test Scenario 2.....	66
<b>Figure 4. 14</b> Actual and Predicted IHSG Price Graph Test Scenario 2.....	67
<b>Figure 4. 15</b> Train and Validation Loss Test Scenario 3.....	68

<b>Figure 4. 16</b> Actual and Predicted IHSG Price Graph Test Scenario 3 .....	69
<b>Figure 4. 17</b> Training and Validation Loss Test Scenario 4.....	70
<b>Figure 4. 18</b> Actual and Predicted IHSG Price Graphs for Test Scenario 4.....	71
<b>Figure 4. 19</b> Training and Validation Loss in Test Scenario 5.....	72
<b>Figure 4. 20</b> Actual and Predicted IHSG Price Graphs for Test Scenario 5.....	73
<b>Figure 4. 21</b> Training and Validation Loss in Test Scenario 6.....	74
<b>Figure 4. 22</b> Actual and Predicted IHSG Price Graphs for Test Scenario 6.....	75
<b>Figure 4. 23</b> Training and Validation Loss in Test Scenario 7.....	76
<b>Figure 4. 24</b> Actual and Predicted IHSG Price Graphs for Test Scenario 7.....	76
<b>Figure 4. 25</b> Training and Validation Loss in Test Scenario 8.....	77
<b>Figure 4. 26</b> Actual and Predicted IHSG Price Graphs for Test Scenario 8.....	78
<b>Figure 4. 27</b> Training and Validation Loss in Test Scenario 9.....	79
<b>Figure 4. 28</b> Actual and Predicted IHSG Price Graphs for Test Scenario 9.....	80
<b>Figure 4. 29</b> Training and Validation Loss in Test Scenario 10.....	81
<b>Figure 4. 30</b> Actual and Predicted IHSG Price Graphs for Test Scenario 10.....	82
<b>Figure 4. 31</b> Training and Validation Loss in Test Scenario 11 .....	83
<b>Figure 4. 32</b> Actual and Predicted IHSG Price Graphs for Test Scenario 11 .....	84
<b>Figure 4. 33</b> Training and Validation Loss in Test Scenario 12.....	85
<b>Figure 4. 34</b> Actual and Predicted IHSG Price Graphs for Test Scenario 12.....	86
<b>Figure 4. 35</b> Training and Validation Loss in Test Scenario 13.....	87
<b>Figure 4. 36</b> Actual and Predicted IHSG Price Graphs for Test Scenario 13.....	88
<b>Figure 4. 37</b> Training and Validation Loss in Test Scenario 14 .....	89
<b>Figure 4. 38</b> Actual and Predicted IHSG Price Graphs for Test Scenario 14.....	90
<b>Figure 4. 39</b> Training and Validation Loss in Test Scenario 15.....	91
<b>Figure 4. 40</b> Actual and Predicted IHSG Price Graphs for Test Scenario 15.....	92
<b>Figure 4. 41</b> Website Implementation Results I .....	94
<b>Figure 4. 42</b> Website Implementation Results II.....	94
<b>Figure 4. 43</b> Website Implementation Results III.....	95

## LIST OF TABLES

<b>Table 2. 2</b> Previous Research.....	6
<b>Table 2. 3</b> Sample feature and target data.....	26
<b>Table 3. 1</b> Sample dataset of IHSG and DJIA for correlation analysis .....	36
<b>Table 3. 2</b> Manual data calculations for Correlation Analysis.....	37
<b>Table 3. 3</b> Data Normalization Application .....	38
<b>Table 3. 4</b> The application of data denormalization .....	44
<b>Table 3. 5</b> Sample actual data and predictions.....	45
<b>Table 3. 6</b> Testing Scenarios .....	47
<b>Table 4. 1</b> Model Evaluation Test Scenario 1 .....	65
<b>Table 4. 2</b> Model Evaluation Test Scenario 2 .....	67
<b>Table 4. 3</b> Model Evaluation Test Scenario 3 .....	68
<b>Table 4. 4</b> Model Evaluation Test Scenario 4 .....	70
<b>Table 4. 5</b> Model Evaluation Test Scenario 5 .....	73
<b>Table 4. 6</b> Model Evaluation Test Scenario 6 .....	74
<b>Table 4. 7</b> Model Evaluation Test Scenario 7 .....	76
<b>Table 4. 8</b> Model Evaluation Test Scenario 8 .....	78
<b>Table 4. 9</b> Model Evaluation Test Scenario 9 .....	80
<b>Table 4. 10</b> Model Evaluation Test Scenario 10 .....	81
<b>Table 4. 11</b> Model Evaluation Test Scenario 11 .....	83
<b>Table 4. 12</b> Model Evaluation Test Scenario 12 .....	85
<b>Table 4. 13</b> Model Evaluation Test Scenario 13 .....	87
<b>Table 4. 14</b> Model Evaluation Test Scenario 14.....	89
<b>Table 4. 15</b> Model Evaluation Test Scenario 15 .....	91
<b>Table 4. 16</b> Evaluation Results for All Testing Scenarios .....	92