PREDICTION OF SKINCARE SALES TURNOVER USING THE SUPPORT VECTOR METHOD AT THE WIDYA MSGLOW SIDOARJO COMPANY

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ABSTRACT

Every entrepreneur will certainly follow technological developments in the business world. MsGlow is one of the skincare businesses. The skincare business is one of the businesses that must compete with rapid and complex changes, and this very competitive makes business people have to think of strategies for business continuity in order to compete and also survive. One way that can be done is to utilize existing sales data. The importance of fast and precise operational data processing, information system facilities can be an alternative to solving problems in data processing, minimizing errors and accelerating the data processing process. As the number of sales transactions increases, there will be a buildup of data that has not been processed optimally. With the above problems, a forecasting system was created that can forecast skincare sales turnover using the Support Vector Machine (SVM) method. So far the SVM method has never been used to estimate sales turnover, especially skincare turnover. In this study, turnover in several areas will be forecasted. The kernel function variations used in Support Vector Machine (SVM) are RBF, Linear, and, Polynomial Degree 2. The results obtained from this research trial show that the overall forecasting model is good. The accuracy of the three areas obtained with the RBF kernel has a relatively good MAPE. In the accuracy test to predict skincare sales turnover, the three areas got a fairly good accuracy value of 94.46%. In the Sidoarjo area, it is predicted that there will be a lot of decrease in turnover in 2023-2024. These data prove that the way given in the research could solve the problem.

Keywords: Prediction, Turnover, Skincare, Support Vector Machine, MAPE.

1. INTRODUCTION

Currently, skincare is a basic need for women, both teenagers and adults. Of the various types of skincare available, there is one skincare that is quite well known, namely MsGlow. MsGlow has distributors spread throughout Indonesia. Widya MsGlow Sidoarjo is one of the official distributors of MsGlow which was founded in 2016 and is located at The Taman Dhika Housing Block 07 No.1 Sidoarjo. Currently, Widya MsGlow Sidoarjo's sales data processing still uses a manual data recording system written in books. There are always lots of sales every day. Each sale must be recorded one by one so that you can know the income earned within a certain period of time. With so many distributors popping up, there is competition, which forces owners to make the right decisions in determining their sales strategy. To be able to do this, companies need sufficient sources of information to be able to analyze further in the future. One way that can be done is by utilizing existing sales data. The importance of fast and precise operational data processing means that information system facilities can be an alternative for solving...
problems in data processing, reducing errors and speeding up the data processing process. As the number of sales transactions increases, data will accumulate that has not been processed optimally.

One method that can be used is a relatively new artificial intelligence method in prediction, namely the Support Vector Machine method. The Support Vector Machine (SVM) method is one of the many methods that can be used to solve various types of problems, including forecasting. In solving a problem, Support Vector Machine (SVM) is able to handle non-linear problems with the kernel function which makes this method can be used for time series forecasting [11]. There are several researches talking about the use of SVM method in area of prediction, such as the prediction of stroke with influential attributes [1], analysis of sales prediction [2], predicting visitor satisfaction [3], predicting rainfall and water discharge [4], predicting the number of Tuberculosis sufferers [6], the forecasting of foreign tourists coming to Indonesia [7], predicting client interest in deposit products [8], predicting crime rates based on news articles [9], predicting share price movements [10], and the diabetes prediction [12].

These studies inspired us to apply the SVM method to the problem of increasing sales turnover of skincare products at the MsGlow company. The aim of this research is to help improve the marketing of MsGlow skincare products by predicting future sales results based on previous sales data.

2. RESEARCH METHODOLOGY

2.1 Research flow

Our research flow is shown in Figure 1. We use Waterfall method to describe the process conducted in every step of the research.

2.2 System Flowchart

In Figure 2, we show the flowchart of the process to compute the skincare sales turnover. To start the process, we must enter input data for modeling training. After that, the system will initialize the C parameters to get the optimal C parameter values. The next step is to test the Support Vector Machine (SVM) model using testing data. Based on this test process, an analysis of the results of the calculation, namely in the form of the Mean Absolute Percentage Error (MAPE) value, will be obtained. The MAPE value used to evaluate which parameter value is good to use.

2.3 Master Data

In this research, we used data obtained from Widya MSGlow Sidoarjo. The marketing area of the products are Sidoarjo, Surabaya, and Gresik. The data used is for a 3 year marketing period, shown in Table 1.
BEGIN

INPUT data_training

Initializing parameter C

Got a model with a selected C value

Form an SVM model

INPUT data_testing

Make predictions

DISPLAY prediction result and MAPE

END

Figure 2. System Flowchart of Skincare Sales Turnover at Widya MSGlow Sidoarjo Company

<table>
<thead>
<tr>
<th>No.</th>
<th>Month</th>
<th>Year</th>
<th>Turnover at Marketing Area (Rp)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sidoarjo</td>
</tr>
<tr>
<td>1</td>
<td>January</td>
<td>2020</td>
<td>109,500,000</td>
</tr>
<tr>
<td>2</td>
<td>February</td>
<td>2020</td>
<td>101,700,000</td>
</tr>
<tr>
<td>3</td>
<td>March</td>
<td>2020</td>
<td>96,000,000</td>
</tr>
<tr>
<td>4</td>
<td>April</td>
<td>2020</td>
<td>105,600,000</td>
</tr>
<tr>
<td>5</td>
<td>May</td>
<td>2020</td>
<td>118,800,000</td>
</tr>
<tr>
<td>6</td>
<td>June</td>
<td>2020</td>
<td>108,300,000</td>
</tr>
<tr>
<td>7</td>
<td>July</td>
<td>2020</td>
<td>106,200,000</td>
</tr>
<tr>
<td>8</td>
<td>August</td>
<td>2020</td>
<td>117,900,000</td>
</tr>
<tr>
<td>9</td>
<td>September</td>
<td>2020</td>
<td>123,600,000</td>
</tr>
<tr>
<td>10</td>
<td>October</td>
<td>2020</td>
<td>115,800,000</td>
</tr>
<tr>
<td>11</td>
<td>November</td>
<td>2020</td>
<td>107,400,000</td>
</tr>
<tr>
<td>12</td>
<td>December</td>
<td>2020</td>
<td>100,800,000</td>
</tr>
<tr>
<td>13</td>
<td>January</td>
<td>2021</td>
<td>113,400,000</td>
</tr>
<tr>
<td>14</td>
<td>February</td>
<td>2021</td>
<td>119,400,000</td>
</tr>
<tr>
<td>15</td>
<td>March</td>
<td>2021</td>
<td>118,500,000</td>
</tr>
<tr>
<td>16</td>
<td>April</td>
<td>2021</td>
<td>125,700,000</td>
</tr>
<tr>
<td>17</td>
<td>May</td>
<td>2021</td>
<td>114,300,000</td>
</tr>
<tr>
<td>18</td>
<td>June</td>
<td>2021</td>
<td>120,000,000</td>
</tr>
<tr>
<td>19</td>
<td>July</td>
<td>2021</td>
<td>116,700,000</td>
</tr>
</tbody>
</table>
3. RESULTS AND DISCUSSION

4.1 Pre-processing

At the data pre-processing stage, the data is changed from univariate form to multivariate form where the multivariate explains that the future turnover/target (Yt) is influenced by the turnover of the previous period. Table 2 shows the sample of the univariate data from the marketing area Sidoarjo on marketing period January until December 2022.

Based on the univariate data above, now we create a multivariate data, as shown in Table 3 below. This multivariate table uses data marketing period from July 2022 to December 2022.

4.2 Normalization

Normalization is a process of grouping data attributes to minimize data redundancy in a database so that it can work optimally. The formula used to compute normalization is shown below:

\[
\text{normalizeValue} = \frac{x\text{Value} - \text{minValue}}{\text{maxValue} - \text{minValue}}
\]

Table 2. Univariate Data of Marketing Area Sidoarjo on period January – December 2022

<table>
<thead>
<tr>
<th>No</th>
<th>Month</th>
<th>Turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>January</td>
<td>136,800,000</td>
</tr>
<tr>
<td>2.</td>
<td>February</td>
<td>129,900,000</td>
</tr>
<tr>
<td>3.</td>
<td>March</td>
<td>125,700,000</td>
</tr>
<tr>
<td>4.</td>
<td>April</td>
<td>129,000,000</td>
</tr>
<tr>
<td>5.</td>
<td>May</td>
<td>137,100,000</td>
</tr>
<tr>
<td>6.</td>
<td>June</td>
<td>143,700,000</td>
</tr>
<tr>
<td>7.</td>
<td>July</td>
<td>135,600,000</td>
</tr>
<tr>
<td>8.</td>
<td>August</td>
<td>142,800,000</td>
</tr>
<tr>
<td>9.</td>
<td>September</td>
<td>133,800,000</td>
</tr>
<tr>
<td>10.</td>
<td>October</td>
<td>125,700,000</td>
</tr>
<tr>
<td>11.</td>
<td>November</td>
<td>133,200,000</td>
</tr>
<tr>
<td>12.</td>
<td>December</td>
<td>128,100,000</td>
</tr>
</tbody>
</table>

Table 3. Multivariate Data of Marketing period July 2022 to December 2022

<table>
<thead>
<tr>
<th>Month</th>
<th>Yt</th>
<th>Yt-1</th>
<th>Yt-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>135,600,000</td>
<td>143,700,000</td>
<td>137,100,000</td>
</tr>
<tr>
<td>August</td>
<td>142,800,000</td>
<td>135,600,000</td>
<td>143,700,000</td>
</tr>
<tr>
<td>September</td>
<td>133,800,000</td>
<td>142,800,000</td>
<td>135,600,000</td>
</tr>
<tr>
<td>October</td>
<td>125,700,000</td>
<td>133,800,000</td>
<td>142,800,000</td>
</tr>
<tr>
<td>November</td>
<td>133,200,000</td>
<td>125,700,000</td>
<td>133,800,000</td>
</tr>
<tr>
<td>December</td>
<td>128,100,000</td>
<td>133,200,000</td>
<td>125,700,000</td>
</tr>
</tbody>
</table>
Table 4. Data Normalization

<table>
<thead>
<tr>
<th>Month</th>
<th>Yt</th>
<th>Yt-1</th>
<th>Yt-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>0.550</td>
<td>1.000</td>
<td>0.633</td>
</tr>
<tr>
<td>August</td>
<td>0.950</td>
<td>0.550</td>
<td>1.000</td>
</tr>
<tr>
<td>September</td>
<td>0.450</td>
<td>0.950</td>
<td>0.550</td>
</tr>
<tr>
<td>October</td>
<td>0.000</td>
<td>0.450</td>
<td>0.950</td>
</tr>
<tr>
<td>November</td>
<td>0.417</td>
<td>0.000</td>
<td>0.450</td>
</tr>
<tr>
<td>December</td>
<td>0.133</td>
<td>0.417</td>
<td>0.000</td>
</tr>
</tbody>
</table>

where:
- $x_{Value}$ = the value that will be normalized
- $min_{Value}$ = the lowest value of all variables
- $max_{Value}$ = the highest value of all variables

For example, now we will compute the turnover value of period data from January 2022 to June 2022. We use this 6 month data, January to June, to predict the data of July 2022, as shown on Table 2. Based on this data, we can determine:

$max_{Value} = 125,700,000 \Rightarrow$ the lowest turnover among January to June

$max_{Value} = 143,700,000 \Rightarrow$ the highest turnover among January to June

$x_{Value} = 135,600,000 \Rightarrow$ the turnover value on July

So the normalize value of July 2022 computed as follows:

$normalize_{Value} = \frac{135,600,000 - 125,700,000}{143,700,000 - 125,700,000} = 0.550$

By using the same way, we can compute data normalization of all multivariate data (Table 3). The result is shown in Table 4.

4.3 Training Process

4.3.1 Hessian Matrix

In the training process, a polynomial kernel of degree 1 will be used with the gamma parameter $C=0.1$. By using matrices multiplication of data normalization (Table 4), we compute Hessian matrix as follows:

$X_{11} = ((Yt_1 * Yt_1) + (Yt-1_1 * Yt-1_1) + (Yt-2_1 * Yt-2_1) + C^2)$

$X_{11} = ((0.550 * 0.550) + (1 * 1) + (0.633 * 0.633) + 0.1)^1$

$X_{11} = 1.804$

By using the same way, we can compute data for Hessian Matrix of all normalization data (Table 4). The result is shown in Table 5.

4.3.2 Class Matrix

Class matrix is used for determine whether there has been an increase or decrease in sales in previous month. If in the previous month there was an increase in sales then the matrix content is 1, whereas if there was a decrease in sales then the matrix content is -1, as presented in Table 6.

Class Matrix is formed by using this formula:

Table 5. Value of Hessian Matrix

<table>
<thead>
<tr>
<th>Data</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.804</td>
<td>1.806</td>
<td>1.646</td>
<td>1.152</td>
<td>0.614</td>
<td>0.590</td>
</tr>
<tr>
<td>2</td>
<td>1.806</td>
<td>2.305</td>
<td>1.600</td>
<td>1.298</td>
<td>0.946</td>
<td>0.456</td>
</tr>
<tr>
<td>3</td>
<td>1.646</td>
<td>1.600</td>
<td>1.508</td>
<td>1.050</td>
<td>0.535</td>
<td>0.556</td>
</tr>
<tr>
<td>4</td>
<td>1.152</td>
<td>1.298</td>
<td>1.050</td>
<td>1.205</td>
<td>0.528</td>
<td>0.288</td>
</tr>
<tr>
<td>5</td>
<td>0.614</td>
<td>0.946</td>
<td>0.535</td>
<td>0.528</td>
<td>0.476</td>
<td>0.156</td>
</tr>
<tr>
<td>6</td>
<td>0.590</td>
<td>0.456</td>
<td>0.556</td>
<td>0.288</td>
<td>0.156</td>
<td>0.291</td>
</tr>
</tbody>
</table>

Table 6. Value of Class Matrix

<table>
<thead>
<tr>
<th>Z</th>
<th>-1</th>
<th>-1</th>
<th>-1</th>
<th>-1</th>
<th>-1</th>
<th>-1</th>
<th>-1</th>
<th>-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>1</td>
<td>1</td>
</tr>
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<td>-1</td>
<td>1</td>
<td>-1</td>
<td>-1</td>
<td>1</td>
<td>1</td>
<td>-1</td>
<td>1</td>
<td>-1</td>
</tr>
<tr>
<td>-1</td>
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<td>-1</td>
<td>-1</td>
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<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>-1</td>
<td>1</td>
<td>-1</td>
<td>1</td>
<td>1</td>
<td>-1</td>
<td>1</td>
<td>-1</td>
<td>1</td>
</tr>
</tbody>
</table>

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Table 7. The result of Hessian Matrix * ClassMatrix

<table>
<thead>
<tr>
<th>Data</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.804</td>
<td>-1.806</td>
<td>1.646</td>
<td>1.152</td>
<td>-0.614</td>
<td>0.590</td>
</tr>
<tr>
<td>2</td>
<td>-1.806</td>
<td>2.305</td>
<td>-1.600</td>
<td>-1.298</td>
<td>0.946</td>
<td>-0.456</td>
</tr>
<tr>
<td>3</td>
<td>1.646</td>
<td>-1.600</td>
<td>1.508</td>
<td>1.050</td>
<td>-0.535</td>
<td>0.556</td>
</tr>
<tr>
<td>4</td>
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<td>-1.298</td>
<td>1.050</td>
<td>1.205</td>
<td>-0.528</td>
<td>0.288</td>
</tr>
<tr>
<td>5</td>
<td>-0.614</td>
<td>0.946</td>
<td>-0.535</td>
<td>-0.528</td>
<td>0.476</td>
<td>-0.156</td>
</tr>
<tr>
<td>6</td>
<td>0.590</td>
<td>-0.456</td>
<td>0.556</td>
<td>0.288</td>
<td>-0.156</td>
<td>0.291</td>
</tr>
</tbody>
</table>

\[ Y = \begin{bmatrix} -1 & 1 & -1 & 1 & 1 & -1 \end{bmatrix} \] ................................................................. (2)

where:

\[ Z = Y \ast Y \]

Then the Hessian matrix is multiplied by the Class matrix to form a class matrix as presented in Table 7.

Add up the values of each column and get the following results:

- Column 1: 1.804 + (−1.806) + 1.646 + 1.152 + (−0.614) + 0.590 = 2.771
- Column 2: (−1.806) + 2.305 + (−1.600) + (−1.298) + 0.946 + (−0.456) = 1.890
- Column 3: 1.646 + (−1.600) + 1.508 + 1.050 + (−0.535) + 0.556 = -2.599
- Column 4: 1.152 + (−1.298) + 1.050 + 1.205 + (−0.528) + 0.288 = 1.869
- Column 5: (−0.614) + 0.946 + (−0.535) + (−0.528) + 0.476 + (−0.156) = -0.41
- Column 6: 0.590 + (−0.456) + 0.556 + 0.288 + (−0.156) + 0.291 = 1.113

Total Matrix Kernel = 6.059

Alpha = 6 / 6.059 = 0.99

Perform a Weight Search:

\[ W_1 = \text{Alpha} \ast \text{Column 1} \ast Y_1 \]
\[ W_1 = 0.99 \ast -2.771 \ast 1 \]
\[ W_1 = -2.774 \]

Then do a search for the bias value by taking each example class for the class Label 1 August and Label 1 July:

Calculation:

\[ b = -\frac{1}{2} (W \ast X_{k1} + W \ast X_k - 1) \]
\[ b = -\frac{1}{2} \ast (-2.744\ast1.806) + (-1.889\ast2.305) + \ldots + (-1.102\ast0.59) \]
\[ b = -\frac{1}{2} \ast 1.057 \]
\[ b = 0.528 \]

After obtaining the bias value, you can then calculate the modeling pattern from the previous 6 months to get the predicted value for the next month. To calculate K (Xjanuary, Xt1) as follows:

\[ \alpha_1 y_1 K(x_{juli},x_{t1}) = 1.0000 \ast -1 \ast (0.55\ast1\ast0.633) = 0.344 \]
\[ \alpha_1 y_1 K(x_{agui},x_{t1}) = 1.0000 \ast 1 \ast (0.95\ast0.55\ast1) = 0.5172 \]
\[ \alpha_1 y_1 K(x_{sep},x_{t1}) = 1.0000 \ast -1 \ast (0.45\ast0.95\ast0.55) = 0.232 \]
\[ \alpha_1 y_1 K(x_{okt},x_{t1}) = 1.0000 \ast 1 \ast (0\ast0.45\ast0.95) = 0 \]
\[ \alpha_1 y_1 K(x_{nov},x_{t1}) = 1.0000 \ast -1 \ast (0.417\ast0\ast0.45) = 0 \]
\[ \alpha_1 y_1 K(x_{des},x_{t1}) = 1.0000 \ast -1 \ast (0.133\ast0\ast0.417) = 0 \]

After calculating all the \( \alpha_i y_i K(x_1,x_i) \) values against the first testing data values, the next step is to look for the modeling results. The modeling results are the sum of the data results that have been entered into the SVM model.

\[ \sum \alpha_i y_i K(x_1,x_i) = (-0.344) + 0.5172 + (-0.232) + 0 + 0 + 0 \]
\[ = (-0.06) \]

And,

\[ \text{Sign}(\sum \alpha_i y_i K(x_1,x_i) + b = -0.06 + 0.528 = 0.468 \]
These results are then denormalized to find out the forecasting results from July.

Denormalization value = (0.468 * 18,000,000) + 125,700,000
Denormalization value = 134,124,400

From the denormalization process a function will be produced \( f(\Phi(X_t)) \) obtained from the value \( \text{sign}(f(\Phi(X_t))) \).

\[
\begin{align*}
\text{Denormalization value} & = 134,124,400 - 128,100,000 \\
\text{Denormalization value} & = 6,024,000
\end{align*}
\]

Class prediction results are obtained from the results of the classification function. If the result is more than 0 then you enter class 1 and if the result is less than 0 then you enter class -1. The calculation results above show a Sign value of 6,024,000. This value is more than 0 so this result is in category 1. Therefore, this testing data is in the increasing category. Based on these results, the turnover value for January 2023 is predicted to increase with forecast results of 134,124,400.

### 4.4 Implementation

The process of predicting skincare sales turnover is carried out by optimizing parameters with different values in each test. The data processed comes from 3 (three) sales areas, namely Sidoarjo, Gresik, and Surabaya in the sales period 2020 to 2022. Prediction results are displayed in table form.

Table 8 shows that the smallest MAPE is obtained at the value of Gamma 0.860, Lambda value 0.7, and maximum iteration of 10. There are 4 (four) rows of data that contain the smallest MAPE values, where the epsilon value is different for each row of data.

Table 9 shows that the smallest MAPE is obtained at the value of Gamma 0.590, Lambda value 0.4, and maximum iteration of 10. There are 3 (three) rows of data that contain the smallest MAPE values, where the epsilon value is different for each row of data.

Table 10 shows that the smallest MAPE is obtained at the value of Gamma 0.270, Lambda value 0.7, and maximum iteration of 10. There are 4 (four) rows of data that contain the smallest MAPE values, where the epsilon value is different for each row of data.

**Table 8. Sidoarjo Area Test Results**

<table>
<thead>
<tr>
<th>No</th>
<th>Training Data</th>
<th>Testing Data</th>
<th>Gamma</th>
<th>Lambda</th>
<th>Epsilon</th>
<th>Max. Iteration</th>
<th>MAPE (%)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>24</td>
<td>12</td>
<td>0.070</td>
<td>0.2</td>
<td>0.00010</td>
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<td>3.27264</td>
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<tr>
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<td>0.7</td>
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<td>10</td>
<td>3.27131</td>
</tr>
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**Table 9. Gresik Area Test Results**

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<th>Lambda</th>
<th>Epsilon</th>
<th>Max. Iteration</th>
<th>MAPE (%)</th>
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<tr>
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<td>0.00010</td>
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</tr>
<tr>
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<td>0.3</td>
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<tr>
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<td>12</td>
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<td>2.36128</td>
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</tbody>
</table>
Table 10. Surabaya Area Test Results

<table>
<thead>
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<th>Testing Data</th>
<th>Gamma</th>
<th>Lambda</th>
<th>Epsilon</th>
<th>Max. Iteration</th>
<th>MAPE (%)</th>
</tr>
</thead>
<tbody>
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<td>0.01000</td>
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<td>0.7</td>
<td>0.10000</td>
<td>10</td>
<td>1.76451</td>
</tr>
</tbody>
</table>

Figure 3. Front Design of the System

The testing phase done uses the Black Box method. Black box testing is a test that does not look at the coding structure of a program. This testing usually covers program performance and functional testing is testing based on case studies that will be given to a component, module or feature that will be tested. Functional testing is carried out by providing input to components, modules or features and then checking the output results. If the resulting output matches expectations or is correct, if it is not appropriate then the part contains an error.

In this Figure 3 and Figure 4, testing will be carried out in the three areas by entering data into the system which will be processed using the Support Vector Machine (SVM) algorithm to determine the results of the values that have been entered.

The results of testing for each area will show the lowest MAPE value, which means the parameters used are the best for the process of predicting skincare sales turnover using the Support Vector Machine (SVM) method. In terms of system testing results, 12 test data experiments will be carried out in 2022. This test is carried out to ensure the feasibility of the system and compare the output values of the system and the original results.

Figure 4. Forecasting Result
The table explains that the highest accuracy value in each area was in the third experiment. After obtaining the average accuracy value, the system was able to predict skincare sales turnover using the Support Vector Machine (SVM) method quite well.

4.5 Presentation of Forecasting Result

To see the comparison results of skincare sales predictions in the Sidoarjo, Gresik and Surabaya areas, you can see the results of the following line graph Figure 5.

The comparison results of Skincare Sales Turnover Predictions in 2023 can be seen in the line graph of the predicted turnover results for the three regions. The Sidoarjo region is shown in blue, the Gresik region is a green line, and the Surabaya region is purple. In the comparison graph, it can be seen that the Sidoarjo region will experience quite a large increase in turnover in 2023. Meanwhile, the Gresik region will experience a decrease in turnover in 2024.

The results of the comparison of skincare sales turnover predictions in 2024 can be seen in the line graph of the predicted turnover results for the three regions, as presented in Figure 6. The Sidoarjo region is shown in blue, the Gresik region is a green line, and the Surabaya region is purple. In the comparison graph, it can be seen that the Sidoarjo region will experience quite a large increase in turnover in 2024. Meanwhile, the Gresik region will experience a decrease in turnover in 2024.

4. CONCLUSION

Based on the research that has been carried out, we can conclude that the using of the Support Vector Machine (SVM) method could solve the problem of skincare sales turnover prediction. This method helps the owner of the skincare company to predict their future profit based on previous data.

Based on the results of the research we conducted, it is hoped that future research will add more training data, both in terms of sales periods and additional marketing areas.
REFERENCES


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