Research on Relevance between Computer Algorithm and Techniques in Network Flow with Comprehensive Evaluation Method

Feichao Wang1, Huabei Nie2*, Xiaoping Li3

1. Network Management Center of Qilu Normal University, Jinan, Shandong, China
2. Department of Computer & Information Science, City College of Dongguan University of Technology, Dongguan, Guangdong, China
3. Department of Information Engineering, Jiangxi Vocational College of Finance and Economics, Jiujiang, Jiangxi, China

Abstract: Network flow is often accompanied by the best path and the maximum flow, and it now is an indispensable component of network flow. A subroutine of the maximum flow in the network flow theory can be used to solve a lot of practical problems, such as transportation engineering, network communications, relevance between computer algorithm and techniques. This paper mainly study the relevance between computer algorithm and techniques to prevent the bad nodes in the network flow. In the process of selecting and optimizing the nodes, the network optimization algorithm based on the comprehensive evaluation method can save two times of time comparing with the Ford-Fulkerson algorithm. This shows that the network optimization algorithm has good advantages in comprehensive evaluation method, reduces the selecting times of augmenting chain in the analysis, and improves the stability in the comparison process, to decrease the amount of time and accelerate the speed of calculation.

Keywords: CMOS technology; multifunction digital chip; layout design; MPW

1. Introduction

Along with the progress and development of human society, the comprehensive evaluation system has gradually developed scientifically, consciously and maturely, to be one of scientific evaluation methods. Due to its wide practical functions, it is used continuously in things closely related to human life, so that it gets extensive attention from related researchers.

As an indispensable part of graph theory, network flow theory is the main part of graph theory teaching. Network flow is often happened in real life and accompanied by the best path and the maximum flow, so it is now an indispensable component of network optimization. In real life, the maximum flow in the network flow optimization theory can be used to solve a lot of practical problems, such as transportation engineering, network communications, relevance between computer algorithm and techniques. New words related to flow, such as traffic flow, traffic flow, and information flow and so on, are emerging in the face of human beings. Thus maximum flow can not only provide effective ways to solve real life problems, but also applies strict mathematical formula to get the optimized mathematical model to enable the complex comprehensive evaluation, which also reflects the significance and application of the network flow optimization theory.

2. Comprehensive evaluation method

The evaluation subject of the comprehensive evaluation system is the result of the evaluated index calculation of the objective existence by evaluation model, and the form of the result can be a specific classification community, a rank order, or a numerical value of the corresponding value. The evaluation subject can also verify whether this model is reasonable according to the result and index calculated by comprehensive evaluation system.

The key elements of the evaluation system include module goals, evaluation criterion, evaluation system, evaluation mode, evaluation result, evaluation subject and evaluation objects. Their relation is shown in figure 1.

![Figure 1: Key elements of the evaluation system](image)

The process of comprehensive evaluation is the process of understanding objective things, in which the subject of comprehensive evaluation generalizes the objective existence. After years of development, this process is mainly composed by choosing evaluation criterion, ensuring module goals, establishing evaluation system, determining its weight value, choosing evaluation mode, calculating evaluation result and completing evaluation report. The first step is to ensure module goals. This is the cause of the comprehensive evaluation process, and the starting point and basis of the whole process. Its goodness or badness is directly related to ensuring the goals of the comprehensive
evaluation process, and choosing the evaluation model and evaluation index. The second step is to choose evaluation criterion. The criterion of the comprehensive evaluation system is mainly the standard of utility. According to the preference criterion of the subject, several evaluation criterion can be set. The third step is to establish evaluation system. The index of evaluation refers to the specific statistical indicators that can be operated under each specific evaluation system, so as to constitute a certain structure and choose those for quantitative analysis. The fourth step is to determine weight value of comprehensive evaluation. The index weight of evaluation system is determined by the difference of the amount of information among the indexes, the influence of the target, and the different evaluation model. The fifth step is to choose evaluation mode. The selection of evaluation model of comprehensive evaluation system is determined according to the purpose of evaluation and the evaluation of the evaluation model. The sixth step is to calculate evaluation result. The evaluation results of the comprehensive evaluation system are mainly based on the synthesis and calculation of the evaluation index by the evaluation model. The seventh step is to test the results. When testing whether the results of comprehensive evaluation is reasonable, the results should be feedback to the model selection of the comprehensive evaluation system, the index weight, the structure between each index, the corresponding value of the index and so on, until the reasonable scientific evaluation results appear. The eighth step is to complete evaluation report. This step mainly analyzes, releases and presents the results of the comprehensive evaluation system.

The above eight steps of the comprehensive evaluation system are not strictly distinguished but mutually influenced. The comprehensive evaluation can be learned as a complete system, because the evaluation itself will be determined by evaluation standard, and the dynamic process of the mutual influence of each step is shown in Figure 2.

### Figure 2 The process of the comprehensive evaluation system

#### 3. Network flow algorithm

Network flow theory now is an indispensable component of network optimization. A subroutine of the maximum flow in the network flow theory can be used to solve a lot of practical problems, such as transportation engineering, network communications, relevance between computer algorithm and techniques.

With the network flow algorithm, S1 randomly generates data \( d_1(k) \), \( k=1, 2 \ldots a \), and \( d_1(k) \) generated on the side must be transmitted through \( P_1 \) to \( t \) at the corresponding time. \( S_2 \) randomly generates a data \( d_2(j) \), and \( d_2(j) \) needs to be transmitted from \( S_2 \) to \( t \) through \( P_2 \) at the corresponding time.

However, \( P_1 \) and \( P_2 \) may use the same data repeatedly, when \( t(1) \) is not necessarily zero. If \( d_1 \) first arrives the node, then \( t_1 \) must be 0. In network flow model \( S_2 \) is before \( d_1 \), and B represents a network flow model data before \( d_1 \), so \( t(1) \) is obtained by the following formula:

\[
    tw_i(1) = \begin{cases} 
        0 & \text{if } ta_i(1) \geq t_i(w) \\
        t_i(w) - ta_i(1) & \text{other}
    \end{cases} 
\]  

(1)

Similarly, if \( d_2(1) \) is the first data node, then \( ttw(1) = 0 \); conversely \( w = 1, 2, \ldots \) a represent data before \( d_2 \) in the network flow algorithm, so \( tt(1) \) is as follows:

\[
    ttw(1) = \begin{cases} 
        0 & \text{if } ta_i(1) \geq t_i(w) \\
        t_i(w) - ta_i(1) & \text{other}
    \end{cases} 
\]
\[ t_{tw_1}(l) = \begin{cases} 0 & \text{if } \ tta_1(1) \geq tt_1(w) \\ \tt_1(w) - tta_1(1) & \text{other} \end{cases} \] (2)

\[ t_1(k) \text{ and } t_2(j) \] respectively means \( d_1 \) and the interval of \( d_2 \), and the two data generated are as follows:

\[ A(k) = A(k - 1) + T_1(k - 1), k = 2, 3, \ldots, \alpha \] (3)

\[ B(j) = A(j - 1) + T_2(j - 1), j = 2, 3, \ldots, \beta \] (4)

Let \( ts(k) \) represents departure time of \( d_1(k) \), \( tk \) represents the time point that \( d_1(k) \) outstrips node \( u \), and \( t(k) \) represents the time point that \( d_1(k) \) arrives \( t \), and the followings is formula related to a few time variables as \( d_1(k), k = 1, 2 \ldots \)

\[ ts(k) = A(k) + tw_0(k) + d_1(k) / x_1 \] (5)

\[ ta_1(k) = ts(k) + t_p_1 \] (6)

\[ t_1(k) = ta_1(k) + tw_1(k) + d_1(k) / x_2 \] (7)

\[ ta_2(k) = t_1(k) + t_p_2 \] (8)

\[ t_2(k) = ta_2(k) + tw_2(k) + d_1(k) / x_3 \] (9)

\[ ta(k) = t_2(k) + t_p_3 \] (10)

Let \( ts(j) \) indicates the time leaving \( S_2 \), then \( ttu(j) \) represents the time that \( d_1(k) \) leaves node \( u \), and \( ta(k) \) represents the time that \( d_1(k) \) reaches the intersection exit \( t \), so the following is formula related to some relevant time-variables like \( d_1(k), k = 1, 2 \ldots \alpha \):

\[ tts(j) = B(j) + tw_0(j) + d_2(j) / x_4 \] (11)

\[ tta_1(j) = tts(j) + t_p_4 \] (12)

\[ tt_1(j) = tta_1(j) + tw_1(j) + d_2(j) / x_2 \] (13)

\[ tta_2(j) = tt_1(j) + t_p_2 \] (14)

\[ tt_2(j) = tta_2(j) + tw_2(j) + d_2(j) / x_5 \] (15)

\[ tta_3(j) = tt_2(j) + t_p_5 \] (16)

\[ tt_3(j) = tta_3(j) + tw_3(j) + d_2(j) / x_6 \] (17)

\[ tta(j) = tt_3(j) + t_p_6 \] (18)

Based on the above analysis, network flow in circulation during the waiting time can be divided into two types. One is the same branch of network flow, and the other is a different branch of network flow. From \( tw_0(k) \), \( tw_2(k) \), \( tw_1(j) \) and \( ttwq(j) \) in which \( k = 2, 3 \ldots \alpha \), it can be found that \( j = 2, 3 \ldots \beta \), \( q = 2, 3 \), are the competition of network flow priority caused by the commonly used road of same branch. The result can be obtained from the following equation.

\[ tw_0(k) = \begin{cases} 0 & \text{if } A(k) \geq tt_1(k - 1) \\ tts(k - 1) - A(k) & \text{other} \end{cases} \] (19)
\[ t_{w_2}(k) = \begin{cases} 0 & \text{if } t_{a_2}(k) \geq t_{a_2}(k-1) \\ t_{a_2}(k-1) - t_{a_2}(k) & \text{other} \end{cases} \]  \hspace{1cm} (20)

\[ t_{tw_0}(j) = \begin{cases} 0 & \text{if } B(j) \geq t_{t_a}(j-1) \\ t_{ts}(j-1) - B(j) & \text{other} \end{cases} \]  \hspace{1cm} (21)

\[ t_{tw_q}(j) = \begin{cases} 0 & \text{if } t_{a_q}(j) \geq t_{a_q}(j-1) \\ t_{ts}(j-1) - t_{a_q}(j) & \text{other} \end{cases} \]  \hspace{1cm} (22)

From tw0 (k), tw2 (k), tw0 (J) and twq (J) in which k=2,3,..., \( \alpha \), and j=2,3,..., \( \beta \), q=2,3, are the right of priority because of competition of different data source in the common line.

Network flow algorithm to optimize the path can be divided into two types:

(1). In the network flow model, if d1 (k) is the distance between the before nodes, then d1 (k-1), based on tw1 (k), k=2, 3... \( \alpha \), can be introduced from the following formula:

\[ t_{w_1}(k) = \begin{cases} 0 & \text{if } t_{a_q}(j) \geq t_{a_q}(j-1) \\ t_{a_q}(j-1) - t_{a_q}(j) & \text{other} \end{cases} \]  \hspace{1cm} (23)

(2). In the network flow model, if d2 (k) is the data before the network node, then d2 (k-1), based on tw2 (k), k=2, 3..., \( \alpha \), can be introduced from the following formula.

\[ t_{w_1}(k) = \begin{cases} 0 & \text{if } t_{a_q}(j) \geq t_{a_q}(j-1) \\ t_{a_q}(j-1) - t_{a_q}(j) & \text{other} \end{cases} \]  \hspace{1cm} (24)

With the same approach, if d2 (j) is the data before the network node, then d2 (j-1), based on twl (J), j=2, 3..., \( \beta \), can be introduced from the following formula.

\[ t_{w_1}(j) = \begin{cases} 0 & \text{if } t_{a_q}(j) \geq t_{a_q}(j-1) \\ t_{a_q}(j-1) - t_{a_q}(j) & \text{other} \end{cases} \]  \hspace{1cm} (25)

In the network flow model, if d2 (j) is the front data, then d1 (vv), vv=2, 3..., \( \alpha \), based on tw1 (J), j=2, 3..., \( \beta \), can be introduced from the following formula.

\[ t_{w_1}(k) = \begin{cases} 0 & \text{if } t_{a_q}(j) \geq t_{a_q}(j-1) \\ t_{a_q}(j-1) - t_{a_q}(j) & \text{other} \end{cases} \]  \hspace{1cm} (26)

Considering the time constraints, it is also required that ta(k) and tta(j) should not surpass the limited time when the corresponding network flow passes the node. That is:

\[ t_{a}(k) \leq A(k) + T_{th_1}(k), k = 2,3, \ldots, \alpha \]  \hspace{1cm} (27)

\[ t_{ta}(j) \leq B(j) + T_{th_2}(j), j = 2,3, \ldots, \beta \]  \hspace{1cm} (28)

\( T_{th_1}(k) \) and \( T_{th_2}(j) \) are respectively related to the size of data \( d_1(k) \) and \( d_2(j) \). If \( T_{th_1}(k) \) and \( T_{th_2}(j) \) respectively have linear relationship with \( d_1(k) \) and \( d_2(j) \), the formula of \( T_{th_1}(k) \) and \( T_{th_2}(j) \) is as follows:

\[ T_{th_1}(k) = a \times d_1(k) + b_1 \]  \hspace{1cm} (29)

\[ T_{th_2}(j) = a \times d_2(j) + b_1 \]  \hspace{1cm} (30)

The above a, b, c, and d are the parameters proposed in the calculation process of the network flow model.
If data distribution belongs to discrete distribution, taking \( d_i(k), k = 1, 2, 3, \ldots, \alpha \) as an example, the size of data of \( d_i(k) \) can choose \( dd_i, i = 1, 2, \ldots, nu + 1 \) according to \((nu+1)\). Interval probability of corresponding data of each \( dd_i \) is \([Pr_0, Pr_i]\) or \([Pr_{i-1}, Pr_i]\), \( i = 2, 3, \ldots, nu + 1 \). in which \( Pr_0 = 0 \) and \( Pr_{nu+1} = 1 \). Then \( d_i(k) = 1, 2, \ldots, \alpha \) can be generated from the following algorithms.

1. **[Initialization]** \( k = 0 \).
2. Generate a values \( r_1, r_2, \ldots, r_u \) that follow \((0,1)\) and well distribute.
3. \( k = k + 1 \) and \( d_i(k) \) can be obtained from the following.

\[
d_i(k) = \begin{cases} 
    dd_i & \text{if } 0 = Pr_0 \leq r_k \leq Pr_1 \\
    dd_2 & \text{if } Pr_1 < r_k \leq Pr_2 \\
    M & \text{if } \sum_{1}^{nu} \text{if } Pr_{nu} < r_k \leq Pr_{nu+1} \\
    M & \text{if } Pr_{nu} < r_k \leq Pr_{nu+1} = 1 
\end{cases} 
\]

(31)

4. Calculate the next \( d_i(k) \).

Based on the above theory, the result of \( d_2(j), j = 1, 2, \ldots, \beta \) can be obtained. According to the characteristics of the network flow model, considering the transmission between two nodes, network flow data generated in the entrance can flow out respectively from the pointing nodes, and the flow capacity of the network cannot be negative.Let \((d_i(k), Tth_i(k), P_i) - X\) represents unit road network flow that is successfully transferred to \( d_i(k) \) through the \( P_i \), \( k = 1, 2, \ldots \), under \( Tth_i(k) \), and determine that each datum accords with the basic conditions of network flow.

4. **Relevance between computer algorithm and techniques**

In the process of searching for the relevance between computer network algorithm and technology, the network flow optimization algorithm based on comprehensive evaluation method is analyzed in this paper. In the network flow algorithm, \( V_C \) is the relevance of current nodes; \( V_G \) is the target nodes of initiator; \( V_S \) is the collection initiator use to attack the target system, the driving factor that attacking tree nodes continue to transfer.

The main idea of the convenient matching algorithm for relational nodes is to examine each correlated \( xV \) one by one. Whether the host of \( xV \) is connected to the host of \( CV \). Whether the precondition of using the relevance \( xV \) matches the attacking result of the current relevance \( CV \). If the condition of the attack is matched and connected to the host, then \( V_C \) is the father node, and the associated \( xV \) is added as wife’s node.

The specific operation of algorithm is as follows.

**Input:**

- \( V_C \): the current connected node
- \( V_G \): the target connected node (presupposed attacking target)
- \( V_S \): the collection of relevance in a network flow
- \( Path(V) \): connection path before node V
- \( V_{-host} \): the host of relevance of V
- \( a(V) \): the attack using relevance of V

**Output:**

- \( V_C \) added with post node

In order to prevent the bad node data appearing in the network flow, assume the monotonic use of relevance. According to the irreversible hypothesis of the attack, once the initiator get the effective information, it will not get again. Thus in the network flow algorithm with the comprehensive evaluation method, the third line specially determines whether the newly added node appears in the previous section, which is to avoid the same two relevance in a path.

In order to verify the effectiveness of the comprehensive evaluation method of network flow algorithm, compare it with the Ford-Fulkerson algorithm and simulate in the MATLAB software. Then compare the results of network flow algorithm under the comprehensive evaluation method and Ford-Fulkerson algorithm, and finish the network simulation flow after the nodes increase from 200 to 2000 nodes. Under the different simulation algorithms, surrounding of each node will have 100 nodes adjacent to it, and the probabilistic setting between any two points in the network flow is 0.0005. When running the program, run for 15 times. The experimental results are listed in the following table 1 and table 2.
According to the data in table 1 and table 2, with the comprehensive evaluation method, the comparison of the two algorithms is shown in figure 3.

### Table 1 Results of Ford-Fulkerson algorithm

<table>
<thead>
<tr>
<th>Times</th>
<th>200</th>
<th>400</th>
<th>600</th>
<th>800</th>
<th>1000</th>
<th>1200</th>
<th>1400</th>
<th>1600</th>
<th>1800</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.49</td>
<td>0.52</td>
<td>2.45</td>
<td>3.15</td>
<td>7.24</td>
<td>9.73</td>
<td>20.63</td>
<td>11.97</td>
<td>15.67</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.49</td>
<td>0.53</td>
<td>2.41</td>
<td>3.13</td>
<td>7.15</td>
<td>9.76</td>
<td>20.60</td>
<td>11.93</td>
<td>14.63</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.43</td>
<td>0.55</td>
<td>2.43</td>
<td>3.14</td>
<td>7.20</td>
<td>9.73</td>
<td>20.54</td>
<td>11.93</td>
<td>14.68</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.46</td>
<td>0.53</td>
<td>2.42</td>
<td>3.20</td>
<td>7.13</td>
<td>9.77</td>
<td>20.65</td>
<td>11.97</td>
<td>14.80</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0.45</td>
<td>0.53</td>
<td>2.41</td>
<td>3.21</td>
<td>7.30</td>
<td>9.62</td>
<td>20.63</td>
<td>12.20</td>
<td>14.72</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0.46</td>
<td>0.55</td>
<td>2.36</td>
<td>3.14</td>
<td>7.26</td>
<td>9.80</td>
<td>20.82</td>
<td>12.10</td>
<td>14.73</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0.46</td>
<td>0.58</td>
<td>2.41</td>
<td>3.24</td>
<td>7.22</td>
<td>9.82</td>
<td>20.63</td>
<td>11.93</td>
<td>14.93</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0.46</td>
<td>0.56</td>
<td>2.41</td>
<td>3.24</td>
<td>7.36</td>
<td>9.71</td>
<td>20.85</td>
<td>11.99</td>
<td>14.60</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0.45</td>
<td>0.55</td>
<td>2.40</td>
<td>3.22</td>
<td>7.29</td>
<td>9.69</td>
<td>20.59</td>
<td>11.91</td>
<td>14.51</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.47</td>
<td>0.54</td>
<td>2.44</td>
<td>3.22</td>
<td>7.22</td>
<td>9.66</td>
<td>20.71</td>
<td>11.95</td>
<td>14.69</td>
<td></td>
</tr>
</tbody>
</table>

**Average time(s)**: 0.46, 0.54, 2.41, 1.73, 3.18, 7.42, 9.73, 20.67, 11.99, 14.69

**Maximum flow**: 3190, 2753, 2141, 2973, 2578, 2605, 3807, 3543, 3819, 4925

### Table 2 Results of network flow algorithm

<table>
<thead>
<tr>
<th>Times</th>
<th>200</th>
<th>400</th>
<th>600</th>
<th>800</th>
<th>1000</th>
<th>1200</th>
<th>1400</th>
<th>1600</th>
<th>1800</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.11</td>
<td>0.41</td>
<td>0.76</td>
<td>1.23</td>
<td>1.56</td>
<td>3.01</td>
<td>5.02</td>
<td>8.30</td>
<td>8.62</td>
<td>12.3</td>
</tr>
<tr>
<td>2</td>
<td>0.11</td>
<td>0.42</td>
<td>0.77</td>
<td>1.26</td>
<td>1.54</td>
<td>3.02</td>
<td>5.01</td>
<td>8.31</td>
<td>8.67</td>
<td>13.3</td>
</tr>
<tr>
<td>3</td>
<td>0.11</td>
<td>0.41</td>
<td>0.77</td>
<td>1.24</td>
<td>1.53</td>
<td>3.03</td>
<td>5.02</td>
<td>8.34</td>
<td>8.63</td>
<td>13.33</td>
</tr>
<tr>
<td>4</td>
<td>0.11</td>
<td>0.40</td>
<td>0.77</td>
<td>1.22</td>
<td>1.54</td>
<td>3.02</td>
<td>4.99</td>
<td>8.28</td>
<td>8.64</td>
<td>13.39</td>
</tr>
<tr>
<td>5</td>
<td>0.11</td>
<td>0.41</td>
<td>0.75</td>
<td>1.24</td>
<td>1.54</td>
<td>3.01</td>
<td>5.04</td>
<td>8.31</td>
<td>8.64</td>
<td>13.31</td>
</tr>
<tr>
<td>6</td>
<td>0.11</td>
<td>0.41</td>
<td>0.78</td>
<td>1.25</td>
<td>1.55</td>
<td>2.99</td>
<td>4.99</td>
<td>8.35</td>
<td>8.63</td>
<td>13.32</td>
</tr>
<tr>
<td>7</td>
<td>0.11</td>
<td>0.39</td>
<td>0.77</td>
<td>1.25</td>
<td>1.55</td>
<td>3.01</td>
<td>4.99</td>
<td>8.31</td>
<td>8.68</td>
<td>13.30</td>
</tr>
<tr>
<td>8</td>
<td>0.11</td>
<td>0.39</td>
<td>0.77</td>
<td>1.23</td>
<td>1.55</td>
<td>3.01</td>
<td>4.96</td>
<td>8.44</td>
<td>8.61</td>
<td>13.29</td>
</tr>
<tr>
<td>9</td>
<td>0.11</td>
<td>0.42</td>
<td>0.76</td>
<td>1.24</td>
<td>1.54</td>
<td>2.97</td>
<td>4.98</td>
<td>8.30</td>
<td>8.59</td>
<td>13.33</td>
</tr>
<tr>
<td>10</td>
<td>0.11</td>
<td>0.42</td>
<td>0.77</td>
<td>1.23</td>
<td>1.54</td>
<td>3.00</td>
<td>4.96</td>
<td>8.37</td>
<td>8.60</td>
<td>13.27</td>
</tr>
</tbody>
</table>

**Average time(s)**: 0.11, 0.41, 0.77, 1.24, 1.54, 3.01, 4.99, 8.35, 8.63, 13.32

**Maximum flow**: 3190, 2753, 2141, 2973, 2578, 2605, 3807, 3543, 3819, 4925

### Figure 3 Comparison of the two algorithms
According to the table 1, table 2 and figure 3, it can be clearly seen that when the number of nodes is between 1200 and 1800, the network algorithm is better than Ford-Fulkerson. When the number of nodes is 1600, network flow algorithm can save more than half of the time of the Ford-Fulkerson algorithm. And the time of Ford-Fulkerson algorithm is more than two times of the network optimization algorithm. This shows that the network algorithm has good advantages under comprehensive evaluation method, and it can well reduce the selecting times of augmenting chain, to improve the stability during the sub-process, and reduce the calculation time and accelerate the speed.

5. Conclusions

Comprehensive evaluation method is a kind of effective evaluation criterion, comparing with single evaluation method which refers to evaluation of one-sided understanding to evaluate single information or determined indicators of a certain objective. To have an accurate understanding of relatively objective things, the evaluation should be done from more than one aspect or several dimensions, in order to truly understand the objective things. As an indispensable part of graph theory, network flow theory is the main part of graph theory teaching. Network flow is often happened in real life and accompanied by the best path and the maximum flow, so it is now an indispensable component of network optimization. In real life, the maximum flow in the network flow optimization theory can be used to solve a lot of practical problems, such as transportation engineering, network communications, relevance between computer algorithm and techniques.

Reference