LaTeX：算法模板

作者：凯鲁嘎吉 - 博客园 <http://www.cnblogs.com/kailugaji/>

参考一

```latex
\documentclass{article}
\usepackage{algorithm}
\usepackage{algorithmic}
\renewcommand{\algorithmicrequire}{ \textbf{Input:}} %Use Input in the format of Algorithm
\renewcommand{\algorithmicensure}{ \textbf{Output:}} %UseOutput in the format of Algorithm
% 参考：https://blog.csdn.net/jzwong/article/details/52399112
\begin{document}
% 例1
\begin{algorithm}[htb]
\caption{ Framework of ensemble learning for our system.}
\label{alg:Framwork}
\begin{algorithmic}[1] %这个1 表示每一行都显示数字
\REQUIRE ~~\\ %算法的输入参数：Input
        The set of positive samples for current batch, $P_n$;\\
        The set of unlabelled samples for current batch, $U_n$;\\
        Ensemble of classifiers on former batches, $E_{n-1}$;
\ENSURE ~~\\ %算法的输出：Output
        Ensemble of classifiers on the current batch, $E_n$;
        \STATE Extracting the set of reliable negative and/or positive samples $T_n$ from $U_n$ with help of $P_n$;
        \STATE Training ensemble of classifiers $E$ on $T_n \cup P_n$, with help of data in former batches;
        \STATE $E_n=E_{n-1}\cup E$;
        \STATE Classifying samples in $U_n-T_n$ by $E_n$;
        \STATE Deleting some weak classifiers in $E_n$ so as to keep the capacity of $E_n$;
\RETURN $E_n$; %算法的返回值
\end{algorithmic}
\end{algorithm}

% 例2
\begin{algorithm}
        \caption{An example}
        \label{alg:2}
        \begin{algorithmic}
                \STATE {set $r(t)=x(t)$}
                \REPEAT
                \STATE set $h(t)=r(t)$
                \REPEAT
                \STATE set $h(t)=r(t)$
                \UNTIL{B}
                \UNTIL{B}
        \end{algorithmic}
```

```latex
\end{algorithm}
% 例3
\begin{algorithm}
        \caption{Calculate $y = x^n$}
        \label{alg:3}
        \begin{algorithmic}
                \REQUIRE $n \geq 0 \vee x \neq 0$
                \ENSURE $y = x^n$
                \STATE $y \Leftarrow 1$
        \IF{$n < 0$}
                \STATE $X \Leftarrow 1 / x$
                \STATE $N \Leftarrow -n$
        \ELSE
                \STATE $X \Leftarrow x$
                \STATE $N \Leftarrow n$
        \ENDIF
        \WHILE{$N \neq 0$}
                \IF{$N$ is even}
                        \STATE $X \Leftarrow X \times X$
                        \STATE $N \Leftarrow N / 2$
                \ELSE[$N$ is odd]
                        \STATE $y \Leftarrow y \times X$
                        \STATE $N \Leftarrow N - 1$
                \ENDIF
        \ENDWHILE
        \end{algorithmic}
\end{algorithm}
% 例4
\begin{algorithm}[h]
        \caption{An example for format For \& While Loop in Algorithm}
        \label{alg:4}
        \begin{algorithmic}[1]
                \FOR{each $i \in [1,9]$}
                        \STATE initialize a tree $T_{i}$ with only a leaf (the root);\
                        \STATE $T=T \cup T_{i};$\
                \ENDFOR
                \FORALL {$c$ such that $c \in RecentMBatch(E_{n-1})$}
                        \STATE $T=T \cup PosSample(c)$;
                \ENDFOR
                \FOR{$i=1$; $i<n$; $i++$ }
                        \STATE $//$ Your source here;
                \ENDFOR
                \FOR{$i=1$ to $n$}
                        \STATE $//$ Your source here;
                \ENDFOR
                        \STATE $//$ Reusing recent base classifiers.
                \WHILE {$(|E_n| \leq L_1 )and( D \neq \phi)$}
                        \STATE Selecting the most recent classifier $c_i$ from $D$;
                        \STATE $D=D-c_i$;
                        \STATE $E_n=E_n+c_i$;
                \ENDWHILE
```

结果:

Algorithm 1 Framework of ensemble learning for our system.

Input:

The set of positive samples for current batch, P_n;

The set of unlabelled samples for current batch, U_n;

Ensemble of classifiers on former batches, E_{n-1};

Output:

Ensemble of classifiers on the current batch, E_n;

1: Extracting the set of reliable negative and/or positive samples T_n from U_n with help of P_n;

2: Training ensemble of classifiers E on $T_n \cup P_n$, with help of data in former batches;

3: $E_n = E_{n-1} \cup E$;

4: Classifying samples in $U_n - T_n$ by E_n;

5: Deleting some weak classifiers in E_n so as to keep the capacity of E_n;

6: **return** E_n;

Algorithm 2 An example

> set $r(t) = x(t)$
> **repeat**
>> set $h(t) = r(t)$
>> **repeat**
>>> set $h(t) = r(t)$
>> **until** B
> **until** B

Algorithm 3 Calculate $y = x^n$

Input: $n \geq 0 \vee x \neq 0$

Output: $y = x^n$

  $y \Leftarrow 1$

  if $n < 0$ **then**

    $X \Leftarrow 1/x$

    $N \Leftarrow -n$

  else

    $X \Leftarrow x$

    $N \Leftarrow n$

  end if

  while $N \neq 0$ **do**

    if N is even **then**

      $X \Leftarrow X \times X$

      $N \Leftarrow N/2$

    else {N is odd}

      $y \Leftarrow y \times X$

      $N \Leftarrow N - 1$

    end if

  end while

Algorithm 4 An example for format For & While Loop in Algorithm

1: **for** each $i \in [1, 9]$ **do**
2:     initialize a tree T_i with only a leaf (the root);
3:     $T = T \cup T_i$;
4: **end for**
5: **for all** c such that $c \in RecentMBatch(E_{n-1})$ **do**
6:     $T = T \cup PosSample(c)$;
7: **end for**
8: **for** $i = 1$; $i < n$; $i++$ **do**
9:     // Your source here;
10: **end for**
11: **for** $i = 1$ to n **do**
12:     // Your source here;
13: **end for**
14: // Reusing recent base classifiers.
15: **while** $(|E_n| \leq L_1) and (D \neq \phi)$ **do**
16:     Selecting the most recent classifier c_i from D;
17:     $D = D - c_i$;
18:     $E_n = E_n + c_i$;
19: **end while**

参考二

```
\documentclass{article}
 \usepackage[ruled]{algorithm2e}                %算法排版样式1
%\usepackage[ruled,vlined]{algorithm2e}         %算法排版样式2
%\usepackage[linesnumbered,boxed]{algorithm2e}    %算法排版样式3
% 参考：https://www.cnblogs.com/tsingke/p/5833221.html
\begin{document}
% 例1
\begin{algorithm}[H]
% \SetAlgoNoLine   %去掉之前的竖线
        \caption{How to write algorithms}
        \KwIn{this text}
        \KwOut{how to write algorithm with \LaTeX2e }

        initialization; \\
        \While{not at end of this document}{
            read current; \\
            \eIf{understand}
            {
                    go to next section; \\
                    current section becomes this one; \\
            }
            {
                go back to the beginning of current section; \\
            }
        }
\end{algorithm}

% 例2
\begin{algorithm}
 \SetAlgoNoLine   %去掉之前的竖线
 \caption{identifyRowContext}
  \KwIn{$r_i$, $Backgrd(T_i)$=${T_1,T_2,\ldots ,T_n}$ and similarity threshold $\theta_r$}
  \KwOut{$con(r_i)$}
    $con(r_i)= \Phi$; \\
    \For{$j=1;j \le n;j \ne i$}
    {
        float $maxSim=0$; \\
        $r^{maxSim}=null$; \\
        \While{not end of $T_j$}
        {
            compute Jaro($r_i,r_m$)($r_m\in T_j$); \\
            \If{$(Jaro(r_i,r_m) \ge \theta_r)\wedge (Jaro(r_i,r_m)\ge r^{maxSim})$}
            {
                replace $r^{maxSim}$ with $r_m$; \\
            }
        }
        $con(r_i)=con(r_i)\cup {r^{maxSim}}$; \\
```

```
    }
    return $con(r_i)$; \\
\end{algorithm}

\end{document}
```

结果:

Algorithm 1: How to write algorithms

Input: this text

Output: how to write algorithm with LATEX2e

initialization;

while *not at end of this document* **do**

    read current;

    if *understand* **then**

        go to next section;

        current section becomes this one;

    else

        go back to the beginning of current section;

    end

end

Algorithm 2: identifyRowContext

Input: r_i, $Backgrd(T_i)=T_1,T_2,\ldots,T_n$ and similarity threshold θ_r

Output: $con(r_i)$

$con(r_i) = \Phi$;

for $j = 1; j \leq n; j \neq i$ **do**

    float $maxSim = 0$;

    $r^{maxSim} = null$;

    while *not end of* T_j **do**

        compute $\text{Jaro}(r_i, r_m)(r_m \in T_j)$;

        if $(Jaro(r_i,r_m) \geq \theta_r) \wedge (Jaro(r_i,r_m) \geq r^{maxSim})$ **then**

            replace r^{maxSim} with r_m;

        end

    end

    $con(r_i) = con(r_i) \cup r^{maxSim}$;

end

return $con(r_i)$;

补充：常用到的分条目

```
\begin{itemize}
\item[1. ] xxx
\item[2. ] xxx
\end{itemize}
```

参考文献

[1] [latex算法流程图_开飞机的小毛驴儿-CSDN博客_latex 算法流程图](#)

[2] [LaTeX 算法代码排版 --latex2e范例总结](#) - Tsingke - 博客园

[3] 更多LaTeX知识，参考：[LaTeX常用链接与资料](#)