

APPLICATION UPGRADE METHOD AND APPARATUS, TERMINAL DEVICE AND COMPUTER READABLE STORAGE MEDIUM

This application claims priority to the Chinese Patent Application No. 201710674690.2, filed with the National Intellectual Property Administration, PRC on August 9, 2017, and entitled
5 "APPLICATION UPGRADE METHOD AND TERMINAL DEVICE", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

This application belongs to the field of computer technologies, and in particular, relates to an application upgrade method and apparatus, a terminal device and a computer readable storage
10 medium.

BACKGROUND

At present, a common upgrade mode of an application installed on a smart terminal is: after a user opens an APP, if the APP detects a new version that can be upgraded, the user is prompted to download the new version. If the user confirms the download of the new version, the new version of
15 the APP is downloaded and installed. In addition, the user can also directly achieve upgrade management of the application through an application market APP installed on the smart terminal, and the application market APP monitors a new version of the application installed on the smart terminal. When the user opens the application market APP, the application market APP prompts a list of upgradeable applications to the user. After the user selects an application that needs to be upgraded,
20 the application market APP downloads and installs a corresponding installation package according to the user's selection.

The foregoing application upgrade process requires interaction with the user, which is likely to cause frequent interruptions to the user, resulting in inefficient application upgrade. Although some smart terminals increase a function setting of automatically upgrading the application in the
25 background, the function is usually a uniform setting function for all applications on the smart terminal and does not distinguish different applications. Therefore, the existing application upgrade modes are relatively single and not flexible enough, and the level of intelligence of the upgrade operation is low, which affects the overall usability of the terminal.

TECHNICAL PROBLEMS

30 In view of the above, embodiments of this application provide an application upgrade method

and a terminal device, so as to solve the problems in the prior art of single upgrade mode, low upgrade efficiency and low level of upgrade intelligence.

A first aspect of the embodiments of this application provides an application upgrade method, including:

5 obtaining usage data of an application on a terminal in respect of a preset time period;

determining an upgrade mode of the application according to the usage data; and

if a new version of the application is detected, upgrading the application according to the upgrade mode.

A second aspect of the embodiments of this application provides a terminal device, including a memory, a processor, and a program of an application upgrade method stored in the memory and executable on the processor, where when the processor executes the program of an application upgrade method, the following steps are implemented:

obtaining usage data of an application on a terminal in respect of a preset time period;

determining an upgrade mode of the application according to the usage data; and

15 if a new version of the application is detected, upgrading the application according to the
 upgrade mode.

A third aspect of the embodiments of this application provides a computer readable storage medium storing a program of an application upgrade method, where when the program of an application upgrade method is executed by at least one processor, the following steps are implemented:

obtaining usage data of an application on a terminal in respect of a preset time period;

determining an upgrade mode of the application according to the usage data; and

if a new version of the application is detected, upgrading the application according to the upgrade mode.

25 **BENEFICIAL EFFECTS**

Compared with the prior art, the embodiments of this application have the beneficial effects: by obtaining usage data of an application on a terminal in respect of a preset time period and determining an upgrade mode of the application according to the usage data, the upgrade mode of the application is flexibly determined according to the application usage habits of a user, and the upgrade process is automatically completed according to the upgrade mode, so that the application upgrade efficiency

and the smart implementation of the upgrade operation are improved, the disturbance to the user is reduced, and the overall usability of the terminal is improved.

BRIEF DESCRIPTION OF DRAWINGS

In order to explain technical solutions in embodiments of this application more clearly, accompanying drawings required to be used in the description of the embodiments or the prior art will be briefly introduced below. Apparently, the accompanying drawings in the following description are only some embodiments of this application, and a person of ordinary skill in the art can further obtain other accompanying drawings according to these accompanying drawings without involving any inventive effort.

FIG. 1 is a flowchart of an implementation of an application upgrade method provided by an embodiment of this application;

FIG. 2 is a flowchart of a specific implementation of step S102 of an application upgrade method provided by an embodiment of this application;

FIG. 3 is a flowchart of a specific implementation of step S1022 of an application upgrade method provided by an embodiment of this application;

FIG. 4 is a flowchart of a specific implementation of step S103 of an application upgrade method provided by an embodiment of this application, when an upgrade mode is a first priority mode;

FIG. 5 is a schematic diagram of an application upgrade apparatus provided by an embodiment of this application; and

FIG. 6 is a schematic diagram of a terminal device according to an embodiment of this application.

DESCRIPTION OF EMBODIMENTS

In the following description, specific details such as specific system structure and technology are provided for the purpose of illustration rather than limitation in order to gain a thorough understanding of the embodiments of this application. However, it will be apparent to a person of ordinary skill in the art that the present invention may also be implemented in other embodiments without these specific details. In other instances, detailed descriptions of well-known systems, apparatuses, circuits, and methods are omitted so as not to obscure the description of this application.

In the embodiments of this application, by obtaining usage data of an application on a terminal in respect of a preset time period and determining an upgrade mode of the application according to the

usage data, the upgrade mode of the application is flexibly determined according to the application usage habits of a user, and the upgrade process is automatically completed according to the upgrade mode, so that the application upgrade efficiency and the smart implementation of the upgrade operation are improved, the disturbance to the user is reduced, and the overall usability of the terminal is improved.

Referring to FIG. 1, illustrated is an implementation process of an application upgrade method provided by an embodiment of this application, which is described in detail as follows.

S101: Obtain usage data of an application on a terminal in respect of a preset time period.

In the embodiment of this application, the usage data of the application is used to reflect a user's usage habits for the application. The usage data of the application on the terminal can be obtained in a timed acquisition mode or in a real-time acquisition mode. If the timed acquisition mode is adopted, an acquisition time is preset. For example, the usage data can be obtained once every hour.

Further, the usage data of an application during a preset time period may include usage frequency of the application during the preset time period, network traffic consumed by the application during the preset time period, and power consumed by the application during the preset time period.

The usage frequency refers to the number of times the application is opened during the preset time period. For example, assuming that the preset time period is 24 h, if the application is opened 12 times within 24 h, the usage frequency of the application is $12/24 = 0.5$ time/h.

The consumed network traffic refers to the sum of network traffic consumed by the application in each usage process during the preset time period.

The consumed power refers to the sum of power consumed by the application in each usage process during the preset time period.

The preset time period can be set according to the needs of the actual application, and is not limited herein.

S102: Determine an upgrade mode of the application according to the usage data during the preset time period.

In the embodiment of this application, an update mode of the application is automatically determined according to the usage data of the application acquired in step S101. Different usage data reflects different application usage habits of the user, and different usage habits correspond to different upgrade modes. For example, an upgrade mode corresponding to an application commonly

used by the user may be upgrade as a priority or automatic upgrade, and an upgrade mode corresponding to an application rarely used by the user may be upgrade with a low priority or upgrade that needs to wait for user confirmation before being implemented.

An upgrade mode of an application and identification information of the application are correspondingly saved. When the application usage habits of the user change, for example, the number of times the user uses the application is significantly reduced, then the usage data of the application acquired through step S101 changes, and an upgrade mode determined according to the usage data in step S102 also changes accordingly, and thus the upgrade mode corresponding to the application that has been saved is updated according to a matching result.

S103: If a new version of the application is detected, upgrade the application according to the upgrade mode of the application.

In the embodiment of this application, when a new version of the application is detected, the application is upgraded according to the upgrade mode of the application determined in step S102.

For example, for an application commonly used by the user, the corresponding upgrade mode may be to automatically download an installation package of a new version and perform automatic upgrade the installation. When a new version of the application is detected, a terminal device automatically downloads an installation package of the new version and automatically completes upgrade the installation, without disturbing the user. For an application rarely used by the user, the corresponding upgrade mode may be to download an installation package of a new version after a message of user confirmation for installation is received and then perform upgrade and installation. When a new version of the application is detected, a terminal can query, in a message push mode, whether the user needs to install the new version, and only after a response message of user confirmation for installation is received, an installation package of the new version is downloaded and upgrade and installation are performed.

In the embodiment corresponding to FIG. 1, by obtaining usage data of an application on a terminal in respect of a preset time period and determining an upgrade mode of the application according to the usage data, the upgrade mode of the application is flexibly determined according to the application usage habits of a user, and the upgrade process is automatically completed according to the upgrade mode, so that the application upgrade efficiency and the smart implementation of the upgrade operation are improved, the disturbance to the user is reduced, and the overall usability of the terminal is improved.

On the basis of the embodiment corresponding to FIG. 1, a specific matching method for

determining an upgrade mode of the application according to the usage data of the application during the preset time period in step S102 is described in detail below through a specific embodiment.

In the embodiment of this application, the usage data of an application during a preset time period includes usage frequency of the application during the preset time period, network traffic consumed by the application during the preset time period, and power consumed by the application during the preset time period.

Referring to FIG. 2, illustrated is a specific implementation process of S102 provided by an embodiment of this application, which is described in detail as follows.

S1021: Perform a weighted calculation on the usage frequency of the application, the consumed network traffic, and the consumed power to obtain an upgrade evaluation value of the application.

In the embodiment of the present invention, the usage data of the application may include usage frequency of the application, network traffic consumed by the application, and power consumed by the application. Weights are set for the usage frequency, the consumed network traffic and the consumed power acquired in step S101 respectively, and a weighted calculation is performed, and a weighted calculation result is used as an upgrade evaluation value of the application.

Further, a specific implementation method for calculating the upgrade evaluation value of the application is as follows.

The upgrade evaluation value of the application is calculated according to formula (1):

$$P = fx + \frac{t_0}{t}y + \frac{q_0}{q}z \quad \text{formula (1)}$$

where p is the upgrade evaluation value, f is the usage frequency of the application during the preset time period, x is a preset frequency weight corresponding to the usage frequency, t_0 is network traffic consumed by the application during the preset time period, t is total network traffic consumed by the terminal during the preset time period, y is a preset traffic weight corresponding to the network traffic consumed by the application, q_0 is power consumed by the application during the preset time period, q is total power consumed by the terminal during the preset time period, z is a preset power weight corresponding to the power consumed by the application, and $x + y + z = 1$.

The preset frequency weight x , the preset flow weight y , and the preset power weight z represent weights of the usage frequency, the consumed network traffic, and the consumed power in the upgrade evaluation value respectively. Specific values of x , y and z can be set according to the needs of the actual application and are not limited herein, but conditions $x + y + z = 1$ need to be met.

S1022: According to a preset threshold interval where the upgrade evaluation value of the application is located, determine an upgrade mode corresponding to the threshold interval as an upgrade mode of the application, where upgrade modes corresponding to different threshold intervals have different priorities.

5 In the embodiment of this application, a preset number of threshold intervals are preset, each threshold interval corresponds to an upgrade mode, upgrade modes corresponding to different threshold intervals are different, and the priority of each upgrade mode is also different.

According to the upgrade evaluation value obtained by calculation in step S1021, a threshold interval where the upgrade evaluation value is located is determined, and an upgrade mode
10 corresponding to the threshold interval is determined as an upgrade mode of the application.

In the embodiment corresponding to FIG. 2, a weighted calculation is performed on the application frequency of the application, the consumed network traffic, and the consumed power, the upgrade evaluation value of the application is calculated according to the formula (1), the corresponding upgrade mode is determined according to the threshold interval where the upgrade
15 evaluation value is located, so that the upgrade mode of the application is determined in a mode of quantification of the upgrade evaluation value, and the accuracy in determining the upgrade mode is effectively improved. Moreover, by setting the weight values of the usage frequency, the consumed network traffic, and the consumed power, the proportion of different parameters in the upgrade evaluation value can be flexibly adjusted, so that flexible configuration can be performed according
20 to the situation of actual application when the upgrade mode is determined according to the upgrade evaluation value, and the level of intelligence of the upgrade and the overall usability of the terminal are further improved.

On the basis of the embodiment corresponding to FIG. 2, a specific implementation method for determining an upgrade mode of the application according to the upgrade evaluation value of the
25 application in step S1022 is described in detail below through a specific embodiment.

In the embodiment of this application, the upgrade mode of the application includes a first priority mode, a second priority mode, and a third priority mode, where the first priority mode is to automatically download an installation package of a new version and perform automatic upgrade and installation; the second priority upgrade mode is to automatically download the installation package
30 of the new version; and perform upgrade and installation after a message of user confirmation for installation is received, and the third priority upgrade mode is to download the installation package after the message of user confirmation for installation is received of the new version and perform

upgrade and installation. Moreover, the priority of the first priority mode is higher than that of the second priority mode, and the priority of the second priority mode is higher than that of the third priority mode.

Referring to FIG. 3, illustrated is a specific implementation process of S1022 provided by an embodiment of this application. The details are as follows. S10221: If the upgrade evaluation value of the application is greater than a preset first threshold, determine the upgrade mode of the application as the first priority mode.

In the embodiment of this application, the first threshold and the second threshold are preset, and three threshold intervals are obtained according to the first threshold and the second threshold, i.e., a threshold interval greater than the first threshold, a threshold interval less than or equal to the first threshold and greater than the second threshold, and a threshold interval less than or equal to the second threshold, respectively. Each threshold interval corresponds to an upgrade mode, the upgrade mode corresponding to the threshold interval that is greater than the first threshold is the first priority mode, the upgrade mode corresponding to the threshold interval that is less than or equal to the first threshold and greater than the second threshold is the second priority mode, and the upgrade mode corresponding to the threshold interval less than or equal to the second threshold is the third priority mode.

When the upgrade evaluation value of the application calculated according to step S1021 is greater than the first threshold, the threshold interval where the upgrade evaluation value is located is the threshold interval that is greater than the first threshold, and the upgrade mode corresponding to the threshold interval is the first priority mode, so the upgrade mode of the application is the first priority mode.

When a new version of the application is detected, the terminal device automatically downloads an installation package of the new version according to the upgrade mode of the application and performs automatic upgrade and installation without any interruption to the user.

It can be understood that, in the embodiment of this application, when the upgrade evaluation value is greater than the first threshold, the upgrade mode of the application is the first priority mode. In other invention embodiments, it may also be that the upgrade mode of the application is the first priority mode when the upgrade evaluation value is at least the first threshold.

S10222: If the upgrade evaluation value of the application is less than or equal to the first threshold and greater than a preset second threshold, determine the upgrade mode of the application as the second priority mode, where the first threshold is greater than the second threshold.

When the upgrade evaluation value of the application calculated according to step S1021 is less than or equal to the first threshold and greater than the second threshold, the threshold interval where the upgrade evaluation value is located is the threshold interval that is less than or equal to the first threshold and greater than the second threshold, and the upgrade mode corresponding to the threshold interval is the second priority mode, so the upgrade mode of the application is the second priority mode.

When a new version of the application is detected, the terminal device automatically downloads an installation package of the new version according to the upgrade mode of the application, but does not install the installation package immediately. The terminal device sends a confirmation request to the user through message push or the like. For example, through a dialog box, the terminal device informs the user that the new version of the application is available for upgrade, and the installation package of the new version has been downloaded, and the user is required to confirm whether to install the installation package. The terminal device performs upgrade and installation after receiving a message of user confirmation for installation.

It can be understood that, in the embodiment of this application, when the upgrade evaluation value is less than or equal to the first threshold and greater than the second threshold, the upgrade mode of the application is the second priority mode. In other invention embodiments, it may also be that when the upgrade evaluation value is less than the first threshold and greater than the second threshold, the upgrade mode of the application is the second priority mode.

It may also be that when the upgrade evaluation value is less than the first threshold and equal to or greater than a preset second threshold, the upgrade mode of the application is the second priority mode, or it may be that when the upgrade evaluation value is less than or equal to the first threshold and equal to or greater than the second threshold, the upgrade mode of the application is the second priority mode.

S10223: If the upgrade evaluation value of the application is less than or equal to the second threshold, determine the upgrade mode of the application as the third priority mode.

When the upgrade evaluation value of the application calculated according to step S1021 is less than or equal to the second threshold, the threshold interval where the upgrade evaluation value is located is the threshold interval that is less than or equal to the second threshold, and the upgrade mode corresponding to the threshold interval is the third priority mode, so the upgrade mode of the application is the third priority mode.

When a new version of the application is detected, the terminal device does not download an

installation package of the new version according to the upgrade mode of the application, but sends a confirmation request to the user through message push, or the like. For example, through a dialog box, the terminal device informs the user that the new version of the application is available for upgrade, and the user is asked to confirm whether it is necessary to download and install the installation package, and after receiving a message of user confirmation for installation, the terminal device
5 downloads the installation package of the new version and performs upgrade and installation.

It can be understood that, in the embodiment of this application, when the upgrade evaluation value is less than or equal to the second threshold, the upgrade mode of the application is the third priority mode. In other invention embodiments, it may also be that the upgrade mode of the application is the third priority mode when the upgrade evaluation value is less than the second
10 threshold.

In the embodiment corresponding to FIG. 3, the first threshold and the second threshold are preset, three threshold intervals are obtained according to the first threshold and the second threshold, and each threshold interval corresponds to one upgrade mode. The upgrade mode of the application is set as a first priority mode, a second priority mode, and a third priority mode, and specific upgrade
15 operation steps are set for each upgrade mode, so that an upgrade mode of the application is determined according to the threshold interval where the upgrade evaluation value of the application is located. Therefore, the upgrade mode of the application is no longer single, but is diversified according to needs, which further improves the level of upgrade intelligence.

On the basis of the embodiment corresponding to FIG. 3, when the upgrade mode of the application is determined as the first priority mode, a specific implementation method for upgrading the application according to the upgrade mode of the application in S103 is described in detail below through a specific embodiment.
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Referring to FIG. 4, illustrated is a specific implementation process of S103 provided by an embodiment of this application, which is described in detail as follows:
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S1031: If a new version of the application is detected, automatically download an installation package of the new version.

In the embodiment of this application, the upgrade mode of the application is the first priority mode, that is, the installation package of the new version is automatically downloaded and automatically upgraded and installed. If detecting a new version of the application and an upgrade mode of the application is the first priority mode, the terminal device automatically downloads an installation package of the new version according to upgrade operation steps of the first priority
30

mode.

S1032: Obtain usage time of the application during the preset time period.

In the embodiment of this application, after downloading the installation package of the new version of the application, the terminal device does not automatically perform upgrade and installation immediately, but first acquires usage time of the application during the preset time period.

The usage time refers to specific time information on that the application is a usage state during the preset time period. For example, within the preset 24 h, the application is opened at 8:00, closed at 8:10, opened at 10:00, closed at 10:50, opened at 14:00, closed at 14:15, opened at 16:30 and closed at 16:45, and then the usage time of the application is 8:00-8:10, 10:00-10:50, 14:00-14:15 and 16:30-16:45.

S1033: Determine a commonly used time period of the user for the application by analyzing the usage time of the application.

In the embodiment of this application, by analyzing the usage time of the application acquired in step S1032, a specific time period when the application is used is determined, and a commonly used time period of the application is determined according to the specific time period.

Continuing with the example in step S1032, the usage time of the application is 8:00-8:10, 10:00-10:50, 14:00-14:15, and 16:30-16:45. By analyzing the usage time, it is obtained that commonly used time periods of the user for the application are a morning time period of 8:00-11:00 and an afternoon time period of 14:00-17:00.

S1034: According to the commonly used time period of the application, determine a time for automatic upgrade and installation, so that the time for automatic upgrade and installation avoids the commonly used time period of the application.

In the embodiment of this application, according to the commonly used time period determined in step S1033, the terminal device automatically avoids the commonly used time period when determining the time for performing upgrade and installation.

Continuing with the example in step S1033, the commonly used time periods of the user for the application is a morning time period of 8:00-11:00 and an afternoon time period of 14:00-17:00, and therefore, when determining a time for upgrade and installation, the terminal device avoids the time periods of 8:00-11:00 and 14:00-17:00, chooses a noon time period of 12:00-14:00 or an evening time period of 18:00-22:00 as the time for automatic upgrade and installation.

S1035: Automatically perform upgrade and installation within the time for automatic upgrade

and installation.

In the embodiment of this application, according to the time for automatic upgrade and installation determined in step S1034, the terminal device automatically performs upgrade and installation within the time for automatic upgrade and installation.

5 Specifically, the terminal device can wait for the time for automatic upgrade and installation by starting a timer, and the duration of the timer is a time difference between the time for automatic upgrade and installation and the current time.

10 In the embodiment corresponding to FIG. 4, when the upgrade mode of the application is the first priority mode, the commonly used time periods of the application are determined by analyzing the usage time of the application during the preset time periods, and a time for automatic upgrade and installation is determined according to the commonly used time periods, so that the time for automatic upgrade and installation avoids the commonly used time periods. The situation that the terminal device automatically upgrades the application when the user uses the application, causing interruption of the user's use and causing interruption to the user is avoided, so that the level of intelligence of upgrade is effectively enhanced, the interruption to the user is reduced, and the overall usability of the terminal is improved.

20 It should be understood that the size of the serial number of each step in the foregoing embodiments does not mean the order of execution. The order of execution of each process should be determined by functions and internal logic thereof, and should not constitute any limitation on the implementation process of the embodiment of this application.

Corresponding to the application upgrade method provided by the foregoing embodiment, FIG. 5 illustrates a structure block diagram of an application upgrade apparatus provided by an embodiment of this application. For the convenience of description, only those parts relevant to the embodiment of this application are shown.

25 Referring to FIG. 5, the application upgrade apparatus includes:

an acquisition unit 51, configured to obtain usage data of an application on a terminal in respect of a preset time period;

a matching unit 52, configured to determine an upgrade mode of the application according to the usage data during the preset time period; and

30 an upgrade unit 53, configured to upgrade, if a new version of the application is detected, the application according to the upgrade mode of the application. Optionally, the usage data of the

application during the preset time period includes usage frequency, consumed network traffic, and consumed power. The matching unit 52 includes:

a weighted calculation subunit, configured to perform a weighted calculation on the usage frequency, the consumed network traffic, and the consumed power to obtain an upgrade evaluation value of the application; and

an upgrade mode determining subunit, configured to determine, according to a preset threshold interval where the upgrade evaluation value is located, an upgrade mode corresponding to the threshold interval as an upgrade mode of the application, where upgrade modes corresponding to different threshold intervals have different priorities. Optionally, the weighted calculation subunit is further configured to:

calculate the upgrade evaluation value according to the following formula:

$$P = fx + \frac{t_0}{t} y + \frac{q_0}{q} z$$

where p is the upgrade evaluation value, f is the usage frequency of the application during the preset time period, x is a preset frequency weight corresponding to the usage frequency, t_0 is network traffic consumed by the application during the preset time period, t is total network traffic consumed by the terminal during the preset time period, y is a preset traffic weight corresponding to the network traffic consumed by the application, q_0 is power consumed by the application during the preset time period, q is total power consumed by the terminal during the preset time period, z is a preset power weight corresponding to the power consumed by the application, and $x + y + z = 1$.

Optionally, the upgrade mode includes a first priority mode, a second priority mode, and a third priority mode. The first priority mode is to automatically download an installation package of a new version and perform automatic upgrade and installation. The second priority upgrade mode is to automatically download the installation package of the new version, and perform upgrade and installation after a message of user confirmation for installation is received, The third priority upgrade mode is to download the installation package after the message of user confirmation for installation is received of the new version and perform upgrade and installation. The upgrade mode determining subunit is further configured to:

if the upgrade evaluation value is greater than a preset first threshold, determine the upgrade mode as the first priority mode;

if the upgrade evaluation value is less than or equal to the first threshold and greater than a preset

second threshold, determine the upgrade mode as the second priority mode, where the first threshold is greater than the second threshold; and

if the upgrade evaluation value is less than or equal to the second threshold, determine the upgrade mode as the third priority mode.

5 Optionally, if the upgrade mode is the first priority mode, the upgrade unit 53 includes:

a download subunit, configured to automatically download, if a new version of the application is detected, an installation package of the new version;

a usage time acquisition subunit, configured to obtain usage time of the application during the preset time period;

10 a commonly used time period analysis subunit, configured to determine a commonly used time period of the user for the application by analyzing the usage time; an upgrade time determining subunit, configured to determine, according to the commonly used time period, a time for automatic upgrade and installation, so that the time for automatic upgrade and installation avoids the commonly used time period; and

15 an upgrade and installation subunit, configured to automatically perform upgrade and installation within the time for automatic upgrade and installation

Referring to FIG. 6, illustrated is a schematic diagram of a terminal device according to an embodiment of this application. As shown in FIG. 6, a terminal device 6 of this embodiment includes a processor 60, a memory 61, and a computer readable instruction 62 stored in the memory 61 and
20 executable on the processor 60, such as an application upgrade program. When the processor 60 executes the computer readable instruction 62, the steps of the application upgrade method provided by each foregoing embodiment, such as steps S101 to S103 shown in FIG. 1, are implemented. Alternatively, when the processor 60 executes the computer readable instruction 62, functions of each of the units of the device provided by each foregoing embodiment, such as functions of the modules 51
25 to 53 in FIG. 5, are executed.

Exemplarily, the computer readable instruction 62 may be divided into one or more units that are stored in the memory 61 and executed by the processor 60, to complete this application. The one or more units may be instruction segments of a series of computer readable instruction segments capable of performing a specific function, and the instruction segments are used to describe the process of
30 execution of the computer readable instructions 62 in the terminal device 6. For example, the computer readable instruction 62 may be divided into an acquisition unit, a matching unit, and an

upgrade unit. Specific functions of each unit are as follow.

The acquisition unit is configured to obtain usage data of an application on a terminal in respect of a preset time period.

5 The matching unit is configured to determine an upgrade mode of the application according to the usage data during the preset time period.

The upgrade unit is configured to upgrade, if a new version of the application is detected, the application according to the upgrade mode of the application.

Optionally, the usage data of the application during the preset time period includes usage frequency, consumed network traffic, and consumed power. The matching unit includes:

10 a weighted calculation subunit, configured to perform a weighted calculation on the usage frequency, the consumed network traffic, and the consumed power to obtain an upgrade evaluation value of the application; and

15 an upgrade mode determining subunit, configured to determine, according to a preset threshold interval where the upgrade evaluation value is located, an upgrade mode corresponding to the threshold interval as an upgrade mode of the application, where upgrade modes corresponding to different threshold intervals have different priorities.

Optionally, the weighted calculation subunit is further configured to:

calculate the upgrade evaluation value according to the following formula:

$$P = fx + \frac{t_0}{t} y + \frac{q_0}{q} z$$

20 where p is the upgrade evaluation value, f is the usage frequency of the application during the preset time period, x is a preset frequency weight corresponding to the usage frequency, t_0 is network traffic consumed by the application during the preset time period, t is total network traffic consumed by the terminal during the preset time period, y is a preset traffic weight corresponding to the network traffic consumed by the application, q_0 is power consumed by the application during the preset time period, q is total power consumed by the terminal during the preset time period, z is a preset power weight corresponding to the power consumed by the application, and $x + y + z = 1$.

Optionally, the upgrade mode includes a first priority mode, a second priority mode, and a third priority mode. The first priority mode is to automatically download an installation package of a new version and perform automatic upgrade and installation. The second priority upgrade mode is to

automatically download the installation package of the new version, and perform upgrade and installation after a message of user confirmation for installation is received. The third priority upgrade mode is to download the installation package after the message of user confirmation for installation is received of the new version and perform upgrade and installation. The upgrade mode determining

subunit is further configured to:

if the upgrade evaluation value is greater than a preset first threshold, determine the upgrade mode as the first priority mode;

if the upgrade evaluation value is less than or equal to the first threshold and greater than a preset second threshold, determine the upgrade mode as the second priority mode, where the first threshold is greater than the second threshold; and

if the upgrade evaluation value is less than or equal to the second threshold, determine the upgrade mode as the third priority mode.

Optionally, if the upgrade mode is the first priority mode, the upgrade unit includes:

a download subunit, configured to automatically download, if a new version of the application is detected, an installation package of the new version;

a usage time acquisition subunit, configured to obtain usage time of the application during the preset time period;

a commonly used time period analysis subunit, configured to determine a commonly used time period of the user for the application by analyzing the usage time;

an upgrade time determining subunit, configured to determine, according to the commonly used time period, a time for automatic upgrade and installation, so that the time for automatic upgrade and installation avoids the commonly used time period; and

an upgrade and installation subunit, configured to automatically perform upgrade and installation within the time for automatic upgrade and installation.

The terminal device 6 may be a desktop computer, a notebook, a palmtop computer, a cloud server, and the like. The terminal device 6 may include, but is not limited to, the processor 60 and the memory 61. A person of ordinary skill in the art may understand that FIG. 6 is only an example of the terminal device 6, and does not constitute a limitation on the terminal device 6, and may include more or fewer components than those illustrated, or combine some components or different components. For example, the terminal device 6 may further include an input/output device, a network access device, a bus, and the like.

The processor 60 may be a Central Processing Unit (CPU), or may be other general-purpose processor, a Digital Signal Processor (DSP), an Application Specific Integrated Circuit (ASIC), a Field-Programmable Gate Array (FPGA) or other programmable logic devices, a discrete gate or a transistor logic device, a discrete hardware component, and the like. The general-purpose processor
5 may be a microprocessor or any conventional processor or the like.

The memory 61 may be an internal storage unit of the terminal device 6, such as a hard disk or a memory of the terminal device 6. The memory 61 may also be an external storage device of the terminal device 6, such as, a plug-in hard disk provided on the terminal device 6, a Smart Memory Card (SMC), a Secure Digital (SD), and a Flash Card. Further, the memory 61 may also include both
10 an internal storage unit of the terminal device 6 and an external storage device. The memory 61 is configured to store the computer readable instruction and other programs and data required by the terminal device 6. The memory 61 can also be configured to temporarily store data that has been output or is about to be output.

It will be clearly understood by a person of ordinary skill in the art that, for convenience and
15 brevity of description, only the foregoing function modules and the division of the function modules are exemplified. In practical applications, the foregoing functions may be assigned to different function modules for completion according to needs. That is, the internal structure of the apparatus is divided into different function modules to complete all or some of the functions described above. Each function module and module in the embodiment may be integrated into one processing module,
20 or each module may exist physically separately, or two or more modules may be integrated into one module. The foregoing integrated module can be implemented in the form of hardware or in the form of software function modules. In addition, specific names of the respective functional modules and modules are only for the purpose of facilitating mutual differentiation, and are not intended to limit the protection scope of this application. For the specific working process of the modules in the
25 foregoing system, reference may be made to the corresponding processes in the foregoing method embodiments, and details are not described herein again.

A person of ordinary skill in the art may be aware that the modules and algorithm steps of the various examples described in connection with the embodiments disclosed herein can be implemented in electronic hardware or a combination of computer software and electronic hardware.
30 Whether these functions are performed in the form of hardware or software depends on specific applications and design constraints of the solutions. A person of ordinary skill in the art can use different methods for each particular application to implement the described functions, but such implementation should not be considered to be beyond the scope of this application.

In the embodiments provided by this application, it should be understood that the disclosed apparatus and method may be implemented in other manners. For example, the system embodiment described above is merely illustrative. For example, the division of the modules is only a logical function division. In actual implementation, there may be another division manner. For example, multiple modules or components can be combined or integrated into another system, or some features can be ignored or not executed. In addition, the mutual coupling or direct coupling or communication connection shown or discussed may be an indirect coupling or communication connection through some interfaces, apparatuses or modules, and may be in electrical, mechanical or other form.

The modules described as separate components may be or may not be physically separated. The components displayed as modules may or may not be physical modules, that is, the components may be located in one place, or may be distributed to multiple network modules. Some or all of the modules may be selected according to actual needs to achieve the objective of the solution of the embodiment.

In addition, each function module in each embodiment of this application may be integrated into one processing module, or the modules may physically exist separately, or two or more modules may be integrated in one module. The foregoing integrated modules can be implemented in the form of hardware or in the form of a software function module.

The integrated module, if implemented in the form of a software function module and sold or used as a standalone product, may be stored in a computer readable storage medium. Based on such understanding, the technical solution of the embodiment of this application which is essential or a part contributing to the prior art or all or part of the technical solution may be embodied in the form of a software product, the computer software product is stored in a storage medium and includes a plurality of instructions for causing a computer device (which may be a personal computer, a server, or a network device) or a processor to execute all or some steps of the method according to each embodiment of this application. The foregoing storage medium includes: a USB flash disk, a mobile hard disk, a Read-Only Memory (ROM), a , Random Access Memory (RAM), a magnetic disk, or an optical disk, and the like, which can store program codes.

The foregoing embodiments are only used to explain the technical solutions of this application, and are not intended to limit the same. Although this application has been described in detail with reference to the foregoing embodiments, those of ordinary skill in the art should understand that they can still modify the technical solutions described in the foregoing embodiments, or make equivalent substitutions on some technical features therein. Moreover, these modifications or substitutions do not make the essence of the corresponding technical solutions be deviated from the spirit and scope of

the technical solutions of the embodiments of this application, and shall fall within the protection scope of this application.

CLAIMS

1. An application upgrade method, comprising:

obtaining usage data of an application on a terminal in respect of a preset time period;

determining an upgrade mode of the application according to the usage data; and

5 if a new version of the application is detected, upgrading the application according to the upgrade mode.

2. The application upgrade method according to claim 1, wherein the usage data comprises usage frequency, consumed network traffic, and consumed power; and the determining an upgrade mode of the application according to the usage data comprises:

10 performing a weighted calculation on the usage frequency, the consumed network traffic, and the consumed power to obtain an upgrade evaluation value of the application; and

according to a preset threshold interval where the upgrade evaluation value is located, determining an upgrade mode corresponding to the threshold interval as an upgrade mode of the application, wherein upgrade modes corresponding to different threshold intervals have different
15 priorities.

3. The application upgrade method according to claim 2, wherein the performing a weighted calculation on the usage frequency, the consumed network traffic, and the consumed power to obtain an upgrade evaluation value of the application comprises:

calculating the upgrade evaluation value according to the following formula:

$$20 \quad P = fx + \frac{t_0}{t} y + \frac{q_0}{q} z$$

wherein P is the upgrade evaluation value, f is the usage frequency, x is a preset frequency weight corresponding to the usage frequency, t_0 is network traffic consumed by the application during the preset time period, t is total network traffic consumed by the terminal during the preset time period, y is a preset traffic weight corresponding to the network traffic consumed by the application,
25 q_0 is power consumed by the application during the preset time period, q is total power consumed by the terminal during the preset time period, z is a preset power weight corresponding to the power consumed by the application, and $x + y + z = 1$.

4. The application upgrade method according to claim 2 or 3, wherein the upgrade mode

comprises a first priority mode, a second priority mode, and a third priority mode; the first priority mode is to automatically download an installation package and perform automatic upgrade and installation; the second priority upgrade mode is to automatically download the installation package, and perform upgrade and installation after a message of user confirmation for installation is received; and the third priority upgrade mode is to download the installation package after the message of user confirmation for installation is received and perform upgrade and installation; the determining, according to a preset threshold interval where the upgrade evaluation value is located, an upgrade mode corresponding to the threshold interval as an upgrade mode of the application comprises:

if the upgrade evaluation value is greater than a preset first threshold, determining the upgrade mode as the first priority mode;

if the upgrade evaluation value is less than or equal to the first threshold and greater than a preset second threshold, determining the upgrade mode as the second priority mode, wherein the first threshold is greater than the second threshold; and

if the upgrade evaluation value is less than or equal to the second threshold, determining the upgrade mode as the third priority mode.

5. The application upgrade method according to claim 4, wherein if the upgrade mode is the first priority mode, the upgrading, if a new version of the application is detected, the application according to the upgrade mode comprises: if a new version of the application is detected, automatically downloading an installation package of the new version;

obtaining usage time of the application during the preset time period;

determining a commonly used time period of the user for the application by analyzing the usage time;

determining, according to the commonly used time period, a time for automatic upgrade and installation, so that the time for automatic upgrade and installation avoids the commonly used time period; and

automatically performing upgrade and installation within the time for automatic upgrade and installation.

6. An application upgrade apparatus, comprising:

an acquisition unit, configured to obtain usage data of an application on a terminal in respect of a preset time period;

a matching unit, configured to determine an upgrade mode of the application according to the usage data; and

an upgrade unit, configured to upgrade, if a new version of the application is detected, the application according to the upgrade mode.

5 7. The application upgrade apparatus according to claim 6, wherein the usage data comprises usage frequency, consumed network traffic, and consumed power, and the matching unit comprises:

a weighted calculation subunit, configured to perform a weighted calculation on the usage frequency, the consumed network traffic, and the consumed power to obtain an upgrade evaluation value of the application; and

10 an upgrade mode determining subunit, configured to determine, according to a preset threshold interval where the upgrade evaluation value is located, an upgrade mode corresponding to the threshold interval as an upgrade mode of the application, wherein upgrade modes corresponding to different threshold intervals have different priorities.

15 8. The application upgrade apparatus according to claim 6, wherein the weighted calculation subunit is specifically configured to: calculate the upgrade evaluation value according to the following formula:

$$P = f \cdot x + \frac{t_0}{t} \cdot y + \frac{q_0}{q} \cdot z$$

20 wherein P is the upgrade evaluation value, f is the usage frequency, x is a preset frequency weight corresponding to the usage frequency, t_0 is network traffic consumed by the application during the preset time period, t is total network traffic consumed by the terminal during the preset time period, y is a preset traffic weight corresponding to the network traffic consumed by the application, q_0 is power consumed by the application during the preset time period, q is total power consumed by the terminal during the preset time period, z is a preset power weight corresponding to the power consumed by the application, and $x + y + z = 1$.

25 9. The application upgrade apparatus according to claim 7 or 8, wherein the upgrade mode comprises a first priority mode, a second priority mode, and a third priority mode; the first priority mode is to automatically download an installation package and perform automatic upgrade and installation; the second priority upgrade mode is to automatically download the installation package, and perform upgrade and installation after a message of user confirmation for installation is received; and the third priority upgrade mode is to download the installation package after the message of user confirmation for installation is received and perform upgrade and installation;

30

the upgrade mode determining subunit is specifically configured to:

if the upgrade evaluation value is greater than a preset first threshold, determine the upgrade mode as the first priority mode;

if the upgrade evaluation value is less than or equal to the first threshold and greater than a preset second threshold, determine the upgrade mode as the second priority mode, wherein the first threshold is greater than the second threshold; and

if the upgrade evaluation value is less than or equal to the second threshold, determining the upgrade mode as the third priority mode.

10. The application upgrade apparatus according to claim 9, wherein if the upgrade mode is the first priority mode, the upgrade unit comprises:

a download subunit, configured to automatically download, if a new version of the application is detected, an installation package of the new version;

a usage time acquisition subunit, configured to obtain usage time of the application during the preset time period;

15 a commonly used time period analysis subunit, configured to determine a commonly used time period of the user for the application by analyzing the usage time;

an upgrade time determining subunit, configured to determine, according to the commonly used time period, a time for automatic upgrade and installation, so that the time for automatic upgrade and installation avoids the commonly used time period; and

20 an upgrade and installation subunit, configured to automatically perform upgrade and installation within the time for automatic upgrade and installation.

11. A terminal device, comprising a memory, a processor, and a computer readable instruction stored in the memory and executable on the processor, wherein when the processor executes the computer readable instruction, the following steps are implemented:

25 obtaining usage data of an application on a terminal in respect of a preset time period;

determining an upgrade mode of the application according to the usage data; and

if a new version of the application is detected, upgrading the application according to the upgrade mode.

12. The terminal device according to claim 11, wherein the usage data comprises usage frequency, consumed network traffic, and consumed power; and the determining an upgrade mode of

the application according to the usage data comprises:

performing a weighted calculation on the usage frequency, the consumed network traffic, and the consumed power to obtain an upgrade evaluation value of the application; and

5 according to a preset threshold interval where the upgrade evaluation value is located, determining an upgrade mode corresponding to the threshold interval as an upgrade mode of the application, wherein upgrade modes corresponding to different threshold intervals have different priorities.

10 13. The terminal device according to claim 12, wherein the performing a weighted calculation on the usage frequency, the consumed network traffic, and the consumed power to obtain an upgrade evaluation value of the application comprises:

calculating the upgrade evaluation value according to the following formula:

$$P = fx + \frac{t_0}{t}y + \frac{q_0}{q}z$$

15 wherein P is the upgrade evaluation value, f is the usage frequency, x is a preset frequency weight corresponding to the usage frequency, t_0 is network traffic consumed by the application during the preset time period, t is total network traffic consumed by the terminal during the preset time period, y is a preset traffic weight corresponding to the network traffic consumed by the application, q_0 is power consumed by the application during the preset time period, q is total power consumed by the terminal during the preset time period, z is a preset power weight corresponding to the power consumed by the application, and $x + y + z = 1$.

20 14. The terminal device according to claim 12 or 13, wherein the upgrade mode comprises a first priority mode, a second priority mode, and a third priority mode; the first priority mode is to automatically download an installation package and perform automatic upgrade and installation; the second priority upgrade mode is to automatically download the installation package, and perform upgrade and installation after a message of user confirmation for installation is received; and the third
25 priority upgrade mode is to download the installation package after the message of user confirmation for installation is received and perform upgrade and installation; the determining, according to a preset threshold interval where the upgrade evaluation value is located, an upgrade mode corresponding to the threshold interval as an upgrade mode of the application comprises:

30 if the upgrade evaluation value is greater than a preset first threshold, determining the upgrade mode as the first priority mode;

if the upgrade evaluation value is less than or equal to the first threshold and greater than a preset second threshold, determining the upgrade mode as the second priority mode, wherein the first threshold is greater than the second threshold; and

5 if the upgrade evaluation value is less than or equal to the second threshold, determining the upgrade mode as the third priority mode.

15 15. The terminal device according to claim 14, wherein if the upgrade mode is the first priority mode, the upgrading, if a new version of the application is detected, the application according to the upgrade mode comprises:

10 if a new version of the application is detected, automatically downloading an installation package of the new version;

obtaining usage time of the application during the preset time period;

determining a commonly used time period of the user for the application by analyzing the usage time;

15 determining, according to the commonly used time period, a time for automatic upgrade and installation, so that the time for automatic upgrade and installation avoids the commonly used time period; and

automatically performing upgrade and installation within the time for automatic upgrade and installation.

20 16. A computer readable storage medium storing a computer readable instruction, wherein when the computer readable instruction is executed by at least one processor, the following steps are implemented:

obtaining usage data of an application on a terminal in respect of a preset time period;

determining an upgrade mode of the application according to the usage data; and

25 if a new version of the application is detected, upgrading the application according to the upgrade mode.

17. The computer readable storage medium according to claim 16, wherein the usage data comprises usage frequency, consumed network traffic, and consumed power; and the determining an upgrade mode of the application according to the usage data comprises:

30 performing a weighted calculation on the usage frequency, the consumed network traffic, and the consumed power to obtain an upgrade evaluation value of the application; and

according to a preset threshold interval where the upgrade evaluation value is located, determining an upgrade mode corresponding to the threshold interval as an upgrade mode of the application, wherein upgrade modes corresponding to different threshold intervals have different priorities.

- 5 18. The computer readable storage medium according to claim 16, wherein the performing a weighted calculation on the usage frequency, the consumed network traffic, and the consumed power to obtain an upgrade evaluation value of the application comprises:

calculating the upgrade evaluation value according to the following formula:

$$P = fx + \frac{t_0}{t}y + \frac{q_0}{q}z$$

- 10 wherein p is the upgrade evaluation value, f is the usage frequency, x is a preset frequency weight corresponding to the usage frequency, t_0 is network traffic consumed by the application during the preset time period, t is total network traffic consumed by the terminal during the preset time period, y is a preset traffic weight corresponding to the network traffic consumed by the application, q_0 is power consumed by the application during the preset time period, q is total power consumed by the terminal during the preset time period, z is a preset power weight corresponding to the power consumed by the application, and $x + y + z = 1$.

19. The computer readable storage medium according to claim 17 or 18, wherein the upgrade mode comprises a first priority mode, a second priority mode, and a third priority mode; the first priority mode is to automatically download an installation package and perform automatic upgrade and installation; the second priority upgrade mode is to automatically download the installation package, and perform upgrade and installation after a message of user confirmation for installation is received; and the third priority upgrade mode is to download the installation package after the message of user confirmation for installation is received and perform upgrade and installation; the determining, according to a preset threshold interval where the upgrade evaluation value is located, an upgrade mode corresponding to the threshold interval as an upgrade mode of the application comprises:

if the upgrade evaluation value is greater than a preset first threshold, determining the upgrade mode as the first priority mode;

- if the upgrade evaluation value is less than or equal to the first threshold and greater than a preset second threshold, determining the upgrade mode as the second priority mode, wherein the first threshold is greater than the second threshold; and

if the upgrade evaluation value is less than or equal to the second threshold, determining the upgrade mode as the third priority mode.

20. The computer readable storage medium according to claim 19, wherein if the upgrade mode is the first priority mode, the upgrading, if a new version of the application is detected, the application according to the upgrade mode comprises:

if a new version of the application is detected, automatically downloading an installation package of the new version;

obtaining usage time of the application during the preset time period;

determining a commonly used time period of the user for the application by analyzing the usage time;

determining, according to the commonly used time period, a time for automatic upgrade and installation, so that the time for automatic upgrade and installation avoids the commonly used time period; and

automatically performing upgrade and installation within the time for automatic upgrade and installation.