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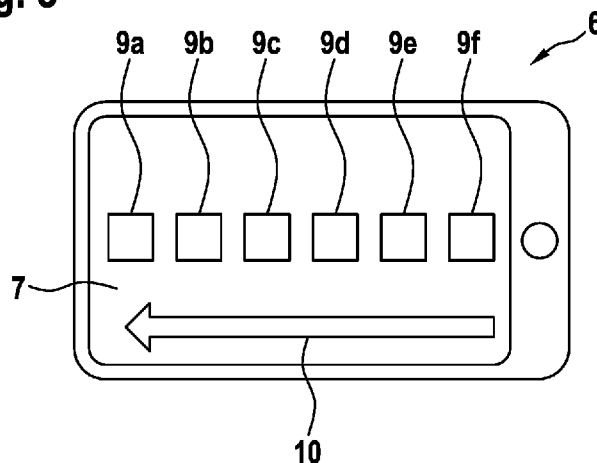
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(54) Title: MANAGEMENT DEVICE, METHOD, COMPUTER PROGRAM AND STORAGE MEDIUM

Fig. 3



(57) Abstract: Management device (6) for managing task priorities (9 a-f), wherein a system comprising system resources is configured to run feature applications (1), wherein the feature application (1) has an application priority comprising at least one task (2), wherein the tasks (2) have a task priority (9 a-f) and are executable by the system, wherein the management device (6) comprises an interface unit and a processing unit, wherein the interface is adapted and/or configured for user based arrangement of the feature applications (1) in an ordinal scale, wherein the ordinal scale is adapted as a scale for the application priority of the feature application (1), wherein the processing unit is adapted and/or configured to set the application priorities of the feature applications (1) based on their arrangement in the ordinal scale.

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Description

Title

Management device, method, computer program and storage medium

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Technical background

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The invention concerns a management device for managing task priorities, wherein a system comprising system resources is configured to run feature applications, wherein the feature application has an application priority and comprises at least one task, wherein each of the tasks has a task priority and is executable by the system.

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Running applications on a system, for example on a computer or mobile device, is well known state of the art. Applications often comprise several tasks, e.g., software components, that are executed by the system and use resources like CPU and RAM. When running applications parallel the usage of the limited resources has to be organized and assigned to the tasks and/or features.

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The document US 2013/0262475 discloses techniques for providing a priority list to a mobile device. Clients and mobile device implement the functionality of task prioritization module without accessing the GUI, wherein the GUI of the mobile device only displays a ranked list.

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Disclosure of the invention

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The invention concerns a management device according to claim 1, a method, a computer program and a storage medium. Preferred and/or advantageous embodiments are disclosed in the subclaims, the description and the figures.

The invention concerns a management device for managing task priorities and/or a feature priority. The management device may comprise a system and/or may be adapted as a hardware device, for example a computer, mobile device, or smart phone. The management device may be adapted as a display and/or graphical user interface preferably. The management device is adapted and/or configured as a human machine interface (HMI).

The system comprises system resources. This system is for example a network, a computer or a processing unit. The system resources include for example CPU, RAM and/or resources for running and/or executing a program, software module and/or an application. The system resources may be central resources or decentral resources like cloud computing. The system is configured and/or adapted to run at least one feature application, especially to run a plurality of feature applications. The feature application is for example a software application and/or is configured to fulfil analytic, processing or different tasks. The feature application comprises and/or include at least one task. In order to run and/or execute the feature application the tasks of the feature application have to be executed. Each feature application has a feature application priority. The feature application priority of the feature application is especially a user configurable priority, which is for example configurable by a user within a certain range of priority. The feature application may have an initial application priority which is preferably configurable. The application priority is e.g., like a ranking of the priority for running and/or executing the feature application. The tasks of a feature application also have priorities, wherein these priorities are called task priority. The task priority is especially an absolute priority. The system is especially adapted and/or configured to run and/or execute the tasks according their task priority, which means that the task with the highest priority will be executed and/or run before others.

The management device comprises an interface unit and a processing unit. The interface unit and processing unit may be adapted and/or configured as a single unit. The interface unit may be adapted as a display and/or monitor to show and/or display information. Especially, the interface unit comprises an input unit like a keyboard, touchscreen, or mouse.

The interface unit is adapted and/or configured to allow a user to arrange feature applications in an ordinal scale. For example, the arrangement of feature applications can be graphical like ordering in a ranking. The arrangement may be done by track and drop or alphanumeric. Especially, the interface is adapted and/or configured to provide and/or show graphical user interface, wherein the graphical user interface is adapted and/or configured to allow a user the arrangement of the feature applications in the ordinal scale. The user is so able to define which feature application is one with the highest application priority and/or which should run at first. The ordinal scale is adapted and/or configured as a scale of or for the application priority of the feature application. The ordinal scale is especially a ranking, e.g., a scale from 1 to 10.

The processing unit is adapted and/or configured to set the application priorities for the feature applications based on their arrangement and/or position in the ordinal scale. The processing unit is defining, setting and/or determining the application priorities according to their arrangement in the ordinal scale. For example, the application with the highest rank and/or position in the ordinal scale will become the application with the highest application priority. With other words, the arrangement of the feature application in the ordinal scale allows the user an easy handling ranking and simple graphical interpretation, wherein the processing unit is transferring this arrangement in the ordinal scale into real application priorities which are processable for the system.

The invention is based on the idea that for a user who wants to configure a system to run applications according in a special order it is often very difficult to configure it. The management system allows a user to just arrange the feature applications in an ordinal scale, which will be automatically transferred into the correct application priorities.

In a preferred embodiment of the invention the interface comprises a display, for example adapted and/or configured as a touchscreen, which show and/or display information and allows the user to input information and/or interact with it. The interface is adapted and/or configured to show the arrangement of the feature applications on the display, especially to show it graphically. The interface is for example configured to display and/or show the ranking and/or the ordering of the feature applications in the ordinal scale graphically. Especially, the display is

adapted and/or configured to allow a user to change the position of the feature applications within the graphical arrangement, especially using tracking drop. The arrangement and/or position within the graphical arrangement especially defines the position in the ordinal scale.

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The interface is preferably adapted and/or configured to define and/or to show a priority axis on the display, wherein the priority axis is for example oriented in the length of display. The interface and/or display is preferably adapted and/or configured to allow a user to arrange feature applications along this axis and provide a simple possibility for application priorities.

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Preferably, the processing unit is adapted and/or configured to set, determine and/or define the task priorities of the tasks based on the application priorities and/or based on the arrangement of the feature applications within the ordinal scale.

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The processing unit defines and/or sets the task priorities of the tasks based on the application priority, especially after the arrangement of the feature applications in the ordinal scale. Especially, the task priorities are determined in a way that the feature application with the highest application priority is executed, run and/or completed first. This is based on the idea that the user has just to arrange the feature application within the ordinal scale and does not need any knowledge of the task priorities and/or system configuration because the task priorities are configured, set, determined and/or defined by the processing unit.

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In a preferred embodiment of the invention the processing unit is adapted and/or configured to display the tasks sorted and/or arranged according to their task priority on the display. This allows the user to understand and/or check the task priorities after arranging the feature applications within the ordinal scale. By displaying and/or showing the task priorities sorted and/or arranged according to their task priority allows to recognise bottlenecks and/or problems in queueing due to the arrangement of the feature applications.

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The processing unit is preferably adapted and/or configured to transpose the application priorities and/or the task priorities into numerical priorities, digital and/or continuous scale. The arrangement of the feature applications in the

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ordinal scale is transposed into a computer usable, readable and processable scale, like a numerical and/or continuous scale.

Optionally, the management device comprises a control unit. The control unit is adapted and/or configured to map the tasks according to their task priority on an infrastructure of the system and/or to assign systems resources according to their task priority. Especially, the control unit is adapted and/or configured to arrange and/or to queue the tasks for processing and/or execution by the system according to their task priority.

Preferably, the control unit is adapted and/or configured to display the queue of the tasks and/or to display the completion status of the task on the display. Especially, the control unit is adapted and/or configured to display a percentage of completion of the tasks. Especially, the control unit is adapted and/or configured to display the queue of the feature application and/or the completion of the feature application. Preferably, the processing unit and/or the control unit is adapted and/or configured to determine a runtime characteristic of the tasks and/or of the feature applications. The runtime characteristics is for example displayed on the display. This allows the user to see the behaviour and the execution of the system.

In a preferred embodiment the interface is adapted and/or configured to allow a user to set and/or define a constraint for one or more feature applications. The constraint is especially like a priority of very low rank and/or zero. The processing unit is adapted and/or configured to set the application priorities of the feature applications based on the constraints and/or to use the constraints when defining and/or setting the application priorities.

A further object of the invention concerns a method for managing tasks and/or managing feature applications. Feature applications for running a system are arranged in an ordinal scale. The arrangement is especially done and/or executed by a user and/or using our graphical user interface. For example, the feature applications are arranged graphically on a scale, wherein the position of the feature application within this scale, especially in the ordinal scale defines their application priority relative to the other feature applications within this scale. For the feature applications the application priorities are defined and/or set based

on the position and/or arrangement within the ordinal scale, especially configured to set the application priorities to be understood processable and/or readable by the system and/or a computer. Especially, the method comprises the definition and/or determination of the task priorities for the task comprised by the application features according to the position and/or arrangement of the feature application within the ordinal scale.

A further object of the invention is a computer program, wherein the computer program is adapted and/or configured for running and/or execution on the management device and/or a computer. The computer program is adapted and/or configured to implement and/or execute the method according to claim 11.

A further subject of the invention is a storage medium, wherein the storage medium is computer readable. The computer program is stored on the storage medium.

Further embodiments and/or referable embodiments are disclosed in the attached figures. The attached figure shows:

Figure 1 an example of a feature application;

Figure 2 an example of a management device;

Figure 3 ranking of task priorities.

Figure 1 shows an example of a feature application 1. The feature application 1 is adapted and/or configured for execution on a computer, processing device, mobile device and/or system comprising a device for executing a feature application 1. The feature application 1 is for example a software application. The feature application 1 is especially configured to solve functional problems, to make a change or decision. For example, the feature application 1 is adapted and/or configured for detecting and/or tracking an object in a video stream.

The system and/or computer comprises resources e.g., CPU, GPU and memory. In a multitasking system, the process of dividing these resources befalls the resource manager or higher level. For example, the control unit or the processing

unit assigns and revokes these resources to individual tasks 2. Preferably, the control unit or the processing unit organizes which task 2 will be allowed to use this resources or at what point in time the task 2 is allowed to use this resources based on a priority of the tasks 2.

The feature application 1 comprises and/or can be subdivided into units of execution, called tasks 2. For example, the feature application 1 of figure 1 comprises four tasks 2a, b, c and d. These tasks 2 may run in a single application, but involve multiple software components or may even be deployed on multiple devices of the system, for example an Internet of things network. The tasks 2 are connected either implicitly or explicitly, where the control flow and the data flow do not necessarily need to follow the same path. The path can also change dynamically, either based on the content or based on external factors e.g., load balancing or priorities.

By running and/or starting the feature application 1 the tasks 2a, b, c, d have to be executed, especially in the order defined by the feature application 1 or its graph 3. After execution of the last task 2d a decision 4 has to be made, wherein either action 5a or 5b is triggered.

In general, it is difficult for end-users to prioritize feature applications 1 by manually tweaking the priorities of the underlying software components that execute the tasks 2. This becomes even more challenging if there are multiple feature applications running in parallel, sharing the same resources, system, devices and/or infrastructure or may even depend on each other. According to the state-of-the-art the end-user who wants to prioritise a feature application 1 properly has to perform complex analyses to obtain inside into the relationship between the tasks 2 of the feature application 1 and the dependencies to tasks 2 of other feature applications 1 executed on the system, wherein the user has to translate these priorities to the technical configuration settings of the underlying infrastructure. Especially, when the feature applications need to be mapped more dynamic, as in the case of Internet of things, the state-of-the-art practice may become unfeasible for non-experts, due to the need for continuously switching to different abstraction levels.

Figure 2 shows an example of a management device 6. The management device 6 comprises a display 7 to show information and/or allow a user to interact with the management device 6. For example, the display 7 is adapted as a touchscreen.

The management device 6 comprises an interface, where the interface comprises the display 7. The management device 6 is configured to display the feature applications 1a, b, c, d, e, f, g, h on the display 7, for example to display and/or show them as icons, picture elements or boxes. Furthermore, the interface is adapted and/or configured to show a priority axis 8. In this embodiment, the priority axis 8 defines in an upwards direction an increasing priority and in downwards direction a decreasing priority. The management device 6 and especially the interface allows the user to arrange the feature applications 1 a-f according to his wishes of prioritization. By arranging and/or positioning the feature applications 1 a-f or especially their icons on a position according to the priority axis 8 the user can increase and/or decrease a feature priority of the feature applications 1 a-f relative to the other feature applications 1 a-f. This arrangement and/or positioning is executed in an ordinal scale. The ordinal scale is for example adapted and/or configured as a ranking of the feature applications according to their application priority relative to the others, especially without knowing an explicit definition of application priority and/or independent of units and/or detailed knowledge in computer science.

The management device 6 comprises a processing unit which is adapted and/or configured to define the application priorities, especially for usage and/or interpretation by the system and/or the resources, based on their arrangement in the ordinal scale. The processing unit is defining the application priorities of the feature applications 1 a-f arranged in the ordinal scale based on their position in the ordinal scale and/or their relative position to the other feature applications 1 a-f. The system is then running and/or executing the feature applications 1 a-f according to their application priority which are defined and/or set in this way.

This enables a user to set priorities and/or constraints on the whole control flow and/or a data flow of the feature applications instead of managing resources and/or priorities of the individual. Instead of attributing numbers to feature

applications 1 or tasks 2, the user uses an ordinal scale and/or ordinal system to input the priority.

Since a user is maybe interested in the priority of the tasks 2 relative to other tasks 2, e.g., of other feature applications 1, a processing unit of the management device 6 is adapted and/or configured to determine and/or set task priorities 9a-f for the tasks 2 comprised by the feature applications 2. The processing unit is setting the task priorities 9a-f in a way, that the execution of the feature applications 2 will be done in the order of their arrangement in the ordinal scale and/or based on their set and/or a defined application priority. The interface is as shown in figure 3 adapted and/or configured to show the ranking and/or order of the task priorities 9a-f. For example, a queueing axis 10 is generated and/or displayed, which shows the execution order of the tasks 2.

Claims

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1. Management device (6) for managing task priorities (9 a-f),

10 wherein the management device (6) comprises a system comprising system resources, wherein the system is configured to run feature applications (1), wherein each of the feature application (1) has an application priority and comprises at least one task (2 a-d), wherein the tasks (2 a-d) have a task priority (9 a-f) and are executable by the system,

15 wherein the management device (6) comprises an interface and a processing unit,

20 wherein the interface is adapted and/or configured for user based arrangement of the feature applications (1) in an ordinal scale, wherein the ordinal scale is adapted as a scale for the application priorities of the feature applications (1),

25 wherein the processing unit is adapted and/or configured to set the application priorities of the feature applications (1) based on their arrangement in the ordinal scale.

2. Management device (6) according to claim 1, wherein the interface comprises a display (7), wherein the interface is adapted and/or configured for showing a graphical arrangement of the feature applications (1) on the display (7).

- 30 3. Management device (6) according to claim 2, wherein the interface is adapted and/or configured to define and/or show a priority axis (8) on the display (7) for the graphical arrangement.

- 35 4. Management device (6) according to claim 2 or 3, wherein the processing unit is adapted and/or configured to display the tasks (2 a-d) sorted by their task

priorities (9 a-f) on the display (2).

5 5. Management device (6) according to one of the previous claims, wherein the processing unit is adapted and/or configured to set, determine and/or define the task priorities of the tasks (2 a-d) to execute and/or process the feature applications (1) according to the application priorities.

10 6. Management device (6) according to one of the previous claims, wherein the processing unit is adapted and/or configured to transpose and/or transfer the applications priorities and/or task priorities (9 a-f) into a numerical and/or continuous scale.

15 7. Management device (6) according to one of the previous claims, with a control unit, wherein the control unit is adapted and/or configured to map the tasks (2 a-d) according to their task priority (9 a-f) on an infrastructure of the system, the resources of the system and/or to queue the tasks for processing and/or execution on the system.

20 8. Management device (6) according to claim 7, wherein the control unit is adapted and/or configured to display the queue of tasks and/or its completion status on the display (7).

25 9. Management device (6) according to one of the previous claims, wherein the processing unit and/or the control unit is adapted and/or configured to determine a runtime characteristic for the tasks (2 a-d) and to display the runtime characteristic on the display (7).

30 10. Management device (6) according to one of the previous claims, wherein the interface is adapted and/or configured to constrain feature applications (1) by a user input, wherein the processing unit is adapted and/or configured to set the application priorities of the feature applications based on the constraints.

35 11. Method for managing tasks and/or managing feature applications, wherein the feature applications for running a system are arranged in an ordinal scale based on a user input and/or user interaction, wherein application priorities for the arranged feature applications are defined and/or set based on the

position and/or arrangement of the feature application in the ordinal scale.

5 12. Computer program, wherein the computer program is adapted and/or configured for execution and/or implementation by a computer and/or the management device (6) according to one of the claims 1 to 10, wherein the computer program is adapted and/or configured to execute at least one step of the method according to claim 11.

10 13. Storage medium, wherein the program according to claim 12 is stored on the storage medium.

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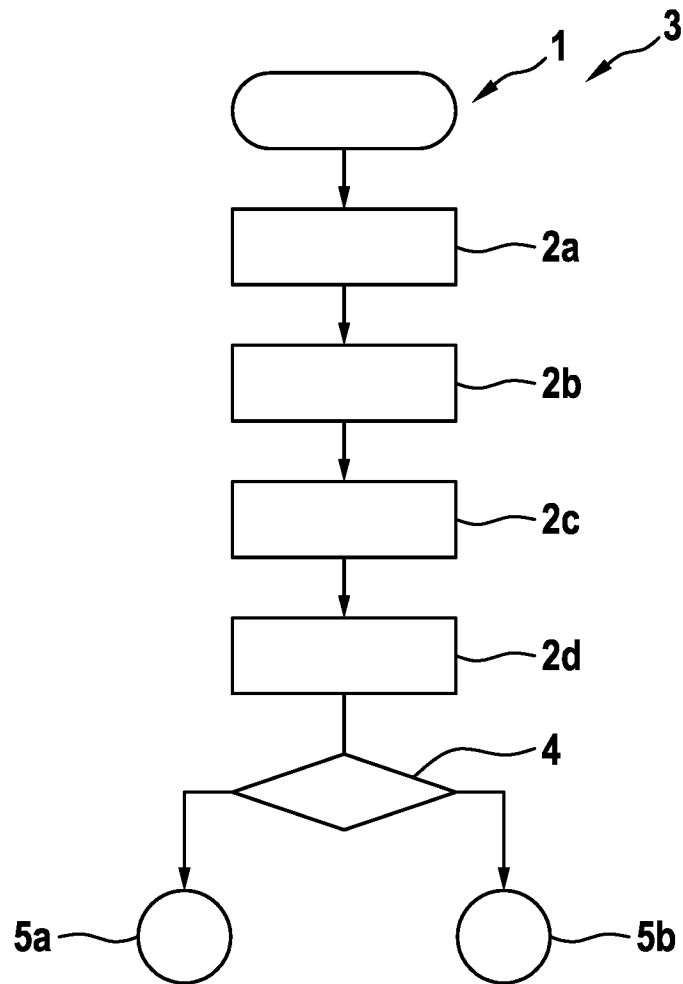
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Fig. 1



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Fig. 2

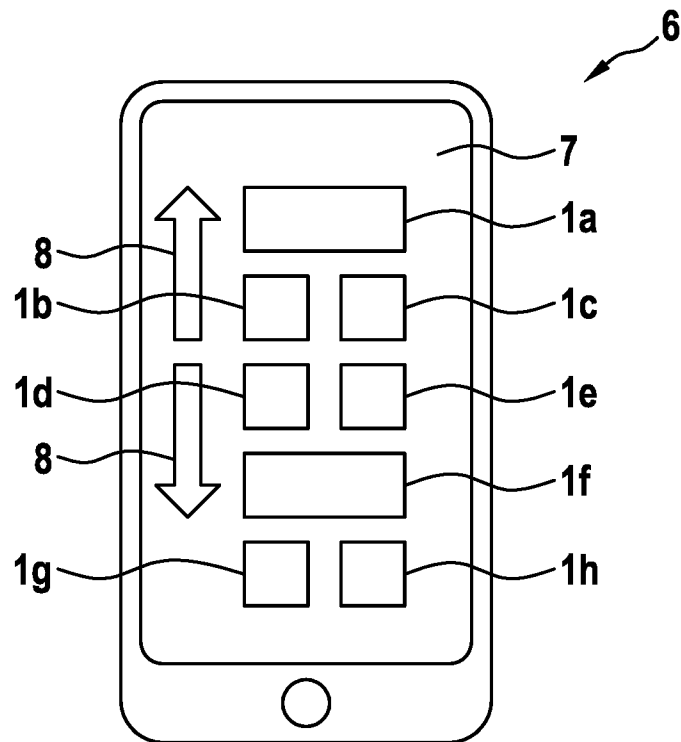
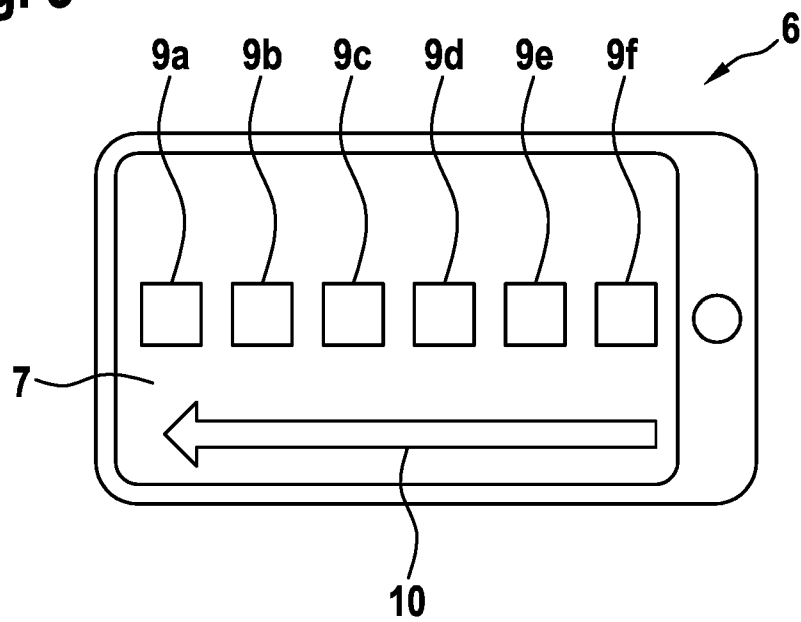


Fig. 3



INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. G06F9/48 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) G06F		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 9 November 2022		Date of mailing of the international search report 17/11/2022
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Michel, Thierry

INTERNATIONAL SEARCH REPORT

International application No

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