

PROCESSING OF INFORMATION

The invention concerns a method for processing information, which information includes content and in which method

- 5 - the information is subjected to digital imaging, and
- the content in the digitally imaged information is subjected to one or more actions.

In addition, the invention also concerns corresponding electronic equipment and a software product for implementation of
10 the method according to the invention.

For the end users of, for example, portable electronic equipment, the making and controlling in the known manner of application documents, such as, for example, Office documents, are
15 complicated and time-consuming. It is especially difficult to make Office documents (for example, on Word, Excel or Power-Point bases) with the small and limited keypads and displays of the equipment.

20 It is also difficult to bring information, which is in non-electronic form originally, from some alternative physical medium into electronic form and further to carry out the desired actions on it in electronic equipment. A more general term to use could be content management. In practice, the information
25 must be brought about from the very beginning on the equipment. To the users of portable equipment these are very frustrating matters and thus they actually constitute a significant usability problem.

30 As is known, in portable equipment the information supply and display means are quite limited. This restrict their use when bringing about and controlling content, such as, for example, text, tables or drawings. In addition, application program systems require that the end user adapt himself to the user
35 interfaces of the application and, in particular, that he

carry on interactive activity with them. For carrying out actions in the applications, this requires that the user trains himself in the use of application. The user is also required to adapt the function series typical of the application to his own working practices, in which case the user has to act on terms of application program. Learning to use application programs smoothly requires attainment of a certain level on the learning curve. In addition, when using application programs the user will constantly drift further from his natural everyday ways of action.

A basic solution illustrating the state of the art in creating content for portable equipment is to use various kinds of office equipment to bring about a document and to use those for printing out the document in a finished form. The resulting document can then be transferred to the portable equipment. However, this is not pleasant in terms of usability, because the user must hereby use two pieces of equipment, which are separate from one another. Transferring the document from one piece of equipment to another also adds further to the difficulty of the action. Furthermore, also possible extra actions to be taken with the document, which may require control even of several applications, are far away from the user's natural ways of action. These may give rise to confusion in the end users, and in the case of repetitive routine activities they may even result in frustration.

One other somewhat more advanced state-of-the-art solution is to apply camera means arranged in various kinds of portable equipment to conversion of non-electronic information into electronic form. One such solution is presented in US Patent 6,202,060 B1 (Tran). Here, too, the user must use the equipment and application program to carry out actions affecting the information.

The purpose of the present invention is to bring about a way to subject to information at least one action, which is effortless and natural from the end users point of view and which is especially suitable for application in portable equipment. The characteristic features of the method according to the invention are presented in the appended Claim 1 and the characteristic features of the equipment are presented in Claim 13. In addition, the invention also concerns a corresponding software product, whose characteristic features are presented in the appended Claim 25.

In the method according to the invention for processing information, which information includes content

- the information is subjected to digital imaging, and
- the content in the digitally imaged information is subjected to one or more actions.

In the method, at least some of the said actions to be taken on the content are decided based on control information adapted in connection with the information.

According to one embodiment, there may be several actions, whereby they are taken in an established order. The simultaneous execution may also be possible if the nature of the action allows that.

The concept of "control information" may be understood very largely in the context of the invention. According to a first embodiment, it can include information expressing an action. According to another embodiment, it can include information expressing the order in which actions are carried out. This is needed, if there are more than one action. Yet, according to a third embodiment, the control information may include information for defining the content with which the action is concerned.

The concept of "action" can also be understood very largely in the context of the invention. According to a first embodiment, actions may at least at some stage of the method according to the invention include directing of the information and embedding it in at least one target recognised from the control information. Furthermore, also editing and distribution of the content may be seen as belonging to possible actions, however, without excluding others.

10 The concept of "target" may also be understood largely. According to one embodiment, it may be at least one application program, such as, for example, some office application. If the application program is, for example, a data transmission application, such as, for example, an electronic mail program,
15 the control information may also include targets, which are submitted to it. They may be, for example, one or more address identifiers, to which content is to be transmitted in an established format.

20 According to one embodiment, pattern recognition knowledge and a knowledge base may be applied at least in the recognition of control information. Actions connected to the control information are defined in them. The equipment is hereby provided with corresponding functionalities for implementing the
25 method.

Owing to the invention, the end user need no longer operate in menus of application programs, which are difficult to learn. In addition, owing to the invention certain actions regarded
30 as routine functions can be implemented to completion short of the end user's acknowledgement by as natural ways of action as possible (for example, using pen and paper). Using a camera and various image, pattern and text recognition the equipment will recognise from the control information the actions de-
35 sired for the content and will carry out the functions defined

by these in the correct order. The natural ways of action provided by the invention for the user are very significant in terms of usability of the equipment.

5 Owing to the invention, numerous advantages to do with creation and processing of content are achieved. A first advantage is achieved in utilisation of at least partly finished material, which has already been made once, as a formal electronic document and its processing and distribution in the desired
10 manner in the equipment environment. The end user may create the content utilising, for example, some natural presentation medium or basic application program. From this the content can be converted easily and without effort into electronic form and it can be subjected to the desired actions, which according
15 ing to one embodiment constitute a series of actions to be carried out in the established order.

The invention makes possible the creation of application documents, such as, for example, Office documents, directly from
20 the original media, for example, non-electronic ones, by using camera imaging and image recognition, more generally by applying digital imaging. Owing to the invention, the end user may create content and subject it to actions by natural ways of working. Owing to the method according to the invention, the
25 equipment adapts itself in a surprising manner to the user's natural ways of working and it is able to conclude the actions to which the content is to be subjected and even the order of their performance from the established control information, which the end user has fitted into the information. Relative
30 to the prior-art the situation changes completely opposite. Owing to the invention the application programs will work surprisingly on the terms of the user.

Other characteristic features of the invention will emerge from the appended claims, and more achievable advantages are listed in the specification.

5 The invention, which is not limited to the embodiments to be presented in the following, will be described in greater detail by referring to the appended figures, wherein

10 Figure 1 is a rough flow chart showing a principle example of the method according to the invention,

Figure 2 is a flow chart showing a first principle application example of the method according to the invention,

15 Figure 3 is a rough schematic view of a principle application example of electronic equipment according to the invention as applied to the method,

20 Figure 4 shows an application example of a software product according to the invention for processing information in the manner according to the invention in electronic equipment, and

25 Figures 5a and 5b show some application examples of information being processed in accordance with the method of the invention.

The invention concerns a method and also electronic equipment
10 implementing the method for subjecting information INFO to
30 actions. In addition, the invention can be used for converting already existing information INFO into electronic form.

Figure 1 is a rough flow chart presentation of a principle example of the method according to the invention. More specifically defined, the invention relates to the bringing about
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and/or further processing and/or distribution of electronic content, such as, for example, Office documents, in the manner desired by the end user.

5 In the invention, electronic content can be processed and created, for example, from sources already existing, for example, by using a camera CAM and image, pattern and text recognition 12 - 15 provided in the equipment 10. In the method descriptions presented in Figures 1 and 2, reference is made to a principle application example of the electronic equipment 10 according to the invention shown in Figure 3, where it is represented as a rough schematic view. The equipment 10 may be portable equipment, such as, for example, a mobile station or a portable computer, which includes means for implementation 15 of the method. Furthermore, reference is also made to a software product 30 shown in Figure 4, by which the method according to the invention can be implemented at least partly with software in connection with the equipment 10 according to the invention.

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The end user may have information INFO, which is visualised, for example, in electronic or non-electronic form and which he likes to convert at least partly into electronic form in the desired file form in order to subject to at least a part of the information INFO at least one action. On the other hand, even conversion of the information INFO into the desired electronic format either in its entirety or only in desired parts can in the context of the invention be understood as such an action.

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The information INFO may have been brought about manually at least in part or by using some electronic equipment at least in part, an aspect which is not limited in any way by the invention. Information INFO may have been brought about in electronic equipment, such as, for example, in a portable computer 35

using some very easy-to-use and simple basic application program (for example, a Notepad or Wordpad application in MS Windows environment). After bringing about the information INFO this may have been, for example, printed out on paper, whereby
5 it may possibly have been complemented from the selected portion. On the other hand, the source of information may even be surprisingly the display M of a computer, on which it is visualised for the end user and on which the end user has brought about the information in its entirety.

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When the source of the information INFO is, for example, a display M of a computer, the invention makes possible a manner to arrange a data transmission interface between two equipments. The created information with a possible control information according to the invention is visualised in a display M
15 of an equipment in which it has been created. If the information is desired to move to the mobile station 10, for example, it is imaged by the camera means CAM of the equipment 10. After imaging process actions according to the invention are
20 carried out. One example of an advantage achieved by this interface feature is if the user wants to send a document by email which document is created by the laptop without Internet connection. According to this embodiment only the imaging is need to be performed without any wire or wireless connection
25 setups.

Information INFO includes content CONT1 - CONT5. In the context of the invention, the content CONT1 - CONT5 may be understood very largely. It may be, for example, text CONT1, CONT2,
30 CONT5 numeric data, tables CONT4, drawings, images CONT3, graphic descriptors, diagrams, presentation graphics, lines 80, objects, patterns etc. Of course, it is also possible to combine contents of different types with one another. Contents CONT1 - CONT5 may further include various style editings,

which the user may like to keep also in the electronic form of contents CONT1 - CONT5.

Some other examples of possible sources / creation mediums of information are generally physical and tangible printed products, flip-over pads and even visualising means for electronic devices, (for example, a video projector screen, the display of a mobile station, a television set or a computer display M etc.). The invention concerns also the use of the method and the use of the equipment 10 applying the method for process the information.

Referring to the simplified application example shown in Figure 1, in method stage (i) the user adapts in connection with the information INFO he has created or which already exists to established control information 70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4 according to the invention. The adaptation, as also the creation of the information may be carried out, for example, by using some simple application program. According to one embodiment, the control information may be connected or fitted in the established manner to the content CONT1 - CONT5 in information INFO. The manner of connection and/or the form of the control information may be established separately for each application, so they are in no way limited by the application examples to be presented in the following. The control information may be natural characters (W, o, r, d, ",), words formed by characters (Word, "Please..."), natural symbols, such as, for example, graphic figures (→, a rectangle, an ellipse, a circle etc.) and other such. In general, control information may be understood as natural instructions, which are established to mean an unambiguous meaning (action) and which one the end user desires to focus to the information INFO in question. The control information may be established and positioned on an application-specific basis, so its location in the information INFO and the fixed definition of its form need

not necessarily be restricted to any certain form and corresponding meaning.

In stage (ii), the end user aims at the information INFO he
5 likes to be the target with a camera CAM arranged in connection with the equipment 10 and takes a picture of source M of information INFO by capturing information INFO optically with the camera CAM. In more general terms, the action in question is known as digital imaging.

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In stage (iii), the captured information INFO is converted in equipment 10 into electronic data DATA1 - DATA3. When speaking about information INFO in the following and about the data DATA1 - DATA3 formed of it, the meaning is the same in principle.
15 The conversion may take place in a manner known as such from camera equipment CAM, for example, in its image processing chain or in corresponding software. Even digital imaging may as such produce the desired data.

20 In stage (iv), the control information 70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4 set by the end user in information INFO in stage (i) is recognised from the information INFO as well as the content CONT1 - CONT3 connected to it in the established manner. To this end, equipment 10 contains corresponding functionalities
25 tionalities 12 - 15 for analysing the image information INFO, which will be further described later a little bit precisely with reference to Figures 3 and 4. The recognition and the following further actions (for example, the converting and distributing of the content CONT1 - CONT3) may take place, for
30 example, by using a program code 31, which can be executed by a processor unit CPU, 16 of equipment 10 and which the invention also concerns.

In stage (v), one or more actions is decided, to which at
35 least one content CONT1 - CONT3 is to be subjected. Equipment

10 makes the decision based on the control information recognised from image information INFO. For recognition of the control information and for making the decision, the equipment 10 is provided with corresponding intelligent image analysis functionality 12 and knowledge provided for it, such as, for example, a (pattern recognition) knowledge base 14, 15. Besides for them the equipment also includes a command dispatcher functionality 16 which process the content CONT1 - CONT3 in the equipment 10 in an established manner defined by the control information.

In stage (vi), it is possible, for example, based on the stages of conclusion carried out before, to carry out at least one action on the content CONT1 - CONT3. As will be presented hereinafter, the action may be understood as a very large concept in the context of the invention. It may be converting of content CONT1 - CONT3, for example, in the established application 50 - 56 and/or it may also be transmission of the content CONT1 - CONT3 converted into electronic form through a data transmission network to established quarters 71.1, 71.2 in an established manner. After this, the process according to the invention is completed in its basic form.

According to one embodiment, the control information may include information 70.1 - 70.5, 71.1, 71.2 expressing the action or target. If there are several actions or targets, then the control information may also include information 73.1 - 73.4, 74.1 - 74.4 expressing the order in which the steps are carried out. Hereby the steps may be carried out mainly in the order according to the order of performance recognised from the control information. Some other criterion for defining this order is, for example, an organized list of commands, which are gone through during the execution. In this list the command "Word", for example, may be before the command "Email"

because the in reverse order would be not probable in most of cases. This makes possible even complex action sequences.

According to one embodiment, the control information may also
5 include information 72.1 - 72.5 for definition of the content
CONT1 - CONT3 to be subjected to the action or target. Accord-
ing to one embodiment, this information may be a graphic ob-
ject of an established form, such as, for example, a closed
circle/periphery, which surrounds in an established manner the
10 content CONT1, CONT3, CONT4, CONT5 forming the target or a
content written into some special character (for example, "").
From the form of the circle it is possible, for example, to
conclude the type of the content CONT1 - CONT5, which may be
established in a circle of an established form. In Figures 5a
15 and 5b references CONT1, CONT3 - CONT5 are used to refer to
the actual content to be embedded in the target applications
50, 51, 55, 56. The circles lining 72.1, 72.3, 72.5 these form
angular objects, such as, for example, rectangles. The defini-
tion of the content provides, among others, additional cer-
20 tainty for the recognition of the content and its target de-
fining.

According to one embodiment, the control information may in-
clude information 70.1, 70.2, 71.1 expressing the action. Ac-
25 cording to one embodiment, the step may be understood as di-
recting the content CONT1 - CONT3 to at least one target 50,
55, 71.1 recognised from the control information 70.1, 70.2.
According to one embodiment, the target may be at least one
application program 50, 55. The character of the application
30 program may determine the steps to be taken on the content, of
which directing the content and embedding it in the applica-
tion program and storing it there in the desired file format
can be mentioned as the most usual ones. Also, the conversion
of the patterns of the content to be application program spe-
35 cific objects is also possible, of course. This gives opportu-

nities for further actions that may be subjected to the content of the document. For example, the content having text patterns may be converted to be text objects, so they can be edit in the application software(s) in a desired manner.

5 Hereby the control information 70.1 - 70.5 may include, for example, a text identifier formed by letters for defining the application. In the application examples of Figures 5a and 5b, such are Word, Excel and Adobe Distiller. The content CONT1 - CONT3 is converted into the established file format while embedding it into application program 50, 55, which may be the

10 default format for the application program, for example.

According to another embodiment, the target may be, for example, a data transmission application, one example of which is

15 an electronic mail program 55, and as a content more specifically in connection with it an attachment file to be adapted to it. Of course, also FTP applications or even application programs used for compiling WEB pages are other examples of such possible application programs, of course. As can be seen

20 from the application examples, instead of the pure name identifier (Word, Excel, Adobe Distiller) of an application it is also possible to use the desired function (Email). The function is hereby performed by the default program established for it, which in this case is the Outlook e-mail application

25 program 55 in question.

In the case of a data transmission application 55, the target may still be one or more address identifiers 71.1, 71.2. One example of such is an e-mail address, to which the user may

30 wish to send content CONT1 - CONT5. As is shown in Figures 5a and 5b, instead of the pure e-mail address it is also possible to give the names of the recipients 71.1, 71.2. Based on these, the e-mail application 55 will from its list of addresses fetch the e-mail addresses established for the corresponding

persons 71.1, 71.2 and will complement them in the recipient field of the application 55.

Also information 73.1 - 73.4, 74.1 - 74.4 expressing the order
5 of performance of actions can be defined in an established manner. In the application examples it is described by arrow symbols 73.1 - 73.4, 74.1 - 74.4 provided with heads. Also this pattern recognition knowledge of arrow symbols 73.1 -
73.4, 74.1 - 74.4 is in the database 13, 15, which can also be
10 applied generally at least in the recognition of control information 70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4.

Figure 2 is a flow chart showing in some greater detail a principle application example of the method according to the
15 invention referring to Figure 5a. In this embodiment a situation is described, where there are several (at least two) steps to be carried out one after the other. At least part of the steps are hereby carried out in an order according to the established one, which may be recognised, for example, from
20 the arrows 73.1 - 73.4 arranged as control information in information INFO and from the closed circles 72.1, 72.5 limiting the content CONT1, CONT2. References in parallel parentheses (i - vi) refer to the basic partial steps forming the method.

25 After stages 201 - 203, in stage the first connection 73.1 of the series of steps is recognised from information INFO as control information. There may even be several alternatives for recognising the first connection 73.1. According to a first embodiment, information INFO may be searched for a control
30 arrow located uppermost in image information INFO. According to another embodiment, the search may also be for a closed circle 72.1 having an established form, from which a pattern recognisable as a control arrow 73.1 emerges.

Next in stage 205 a target 70.1 defined by the first connection 73.1 is recognised from information INFO. The target can be recognised at that end of the arrow 73.1 indicating the first found connection, where the point of the arrow is. In the case of the embodiment shown in Figure 5a, the target 70.1 is an application program (Word 50). Also the content CONT1, CONT3 to be embedded in the established manner in connection with the target 50 is recognised from the closed periphery 72.1 surrounding it. From the inner side of the periphery 72.1 may further be recognised as content a drawing CONT3 that is also framed with a periphery 72.5. It may be linked to the file content converted in the application program 50 in a manner known as such.

As can be seen in Figure 5b, various established focusing parameters may also be fitted into the target definition. This may relate, for example, to editings desired in the content CONT4, CONT5 or to its manner of presentation in the target application 51. In the example according to Figure 5b, a parameter (Bar_Diagram) is recognised and it is set to bring about the formation of a bar diagram of the appended kind in the spreadsheet application 51 forming the target. The created bar diagram may have object properties that are characterized for the bar diagrams in general, such as editable titles, axis and colours. It should be understood that Figure 5b only shows an extremely rough and in that mind only an illustrating example of the existence of parameters and of the reporting on them in the control information 70.3. In reality, they may of course be more sophisticated. Another example of parameters could be, for example, parameters (not shown) defining presentation/document templates typical of presentation graphics or text processing applications. In this case, too, there are numerous alternatives.

Upon recognition of the connection target 70.1 and the content CONT1, CONT3 concerning it, the data corresponding to the content CONT1, CONT3 is embedded into its target 50. The embedding performed in stage 206 may take place in a manner known as such. As an additional step it may also include a spontaneous conversion and storing of the data in the file format of the target application 50. There is no need to describe this in greater detail in this context.

10 As the following stage 207, the image information INFO is searched for more possible connections, that is, in the case according to the embodiments, for pointed arrows. If other connections are not found, the process moves on to stage END in order to end the method according to the invention. The sequel to the method may be such, for example, if, for example, some application program was the target for the content CONT1, CONT3, that the content CONT1, CONT3 is in the application program 50 as an open file, whereby it can be processed in the desired manner by the end user.

20 But if it is found in stage 207 that the image information INFO still contains unprocessed connections 73.2 - 73.4, the process moves on to stage 208. The arrow 73.2 indicating an unprocessed connection can be searched for at stage 208 applying pattern recognition 13, 15 in the manner described above, for example, from the neighbourhood of the target 70.1 defined by the first connection 73.1.

From stage 208 the process may return back to stage 205. This loop is performed, until the condition of stage 207 is untrue and the method has thus been brought to completion.

Still referring to the application example of Figure 5a, the following arrow 73.2 emerging from the Word identifier is recognised in stage 208. In the stage 205 following this, an e-

mail application (Email) is recognised as the above converted Word file target. The Word file created at stage 206 of the preceding loop circuit is now to be understood as content that is embedded in the established manner, now in the e-mail application 55. In the case of e-mail application 55, the established manner may be setting the Word file as an attachment file, which is intended for transmission using the e-mail application 55. In the flow chart, this corresponds to stage 206.

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In stage 207, the existence of other possible as yet unprocessed connections 73.3, 73.4 is again noted (whether arrows are found). The following connection of the series of steps recognised in stage 208 includes three arrows 73.3 of equal value. In stage 205 they are recognised as indicating names surrounded by an oval-like periphery 72.2. The equality of the arrows 73.3 may now be recognised from the command identification 70.2 from which they are originated. Since the preceding target was an e-mail program 55, these following possibly one or more connections 73.3 are set to mean e-mail addresses, to which the concerned Word attachment file understandable as content is to be sent. The e-mail addresses corresponding to the names recognised as stage 206 are fetched from the list of addresses of the application 55 or contact information application and they are attached to the recipient field of the e-mail application 55.

Furthermore, in stage 207 one more unprocessed connection 73.4 is noted, which in stage 208 is recognised as being content CONT2, which is to be set in the e-mail heading field. Since the text intended to be a heading is now in between quotation marks and a directing arrow 73.4 indicating from it to an e-mailing step 70.2, it is recognised as a heading in stage 205. The text between quotation marks in stage 206 is embedded in the heading field of the e-mail application 55. If from the

text between quotation marks would be an arrow, for example; to a control information 70.1 indicating the Word-application 50, this text would be interpreted a name to be given for that Word document.

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Since in the following stage 207 no more unprocessed connections are found in the embodiment of Figure 5a, the method may be brought to completion (END). In the embodiment according to Figure 5a, it is possible to remain waiting for the end user's approval of the e-mail transmission. On the other hand, it is also possible to use a spontaneous transmission triggered by the e-mail application 55. However, it may be more practical that a final approval of the e-mail transmission is requested of the end user. This is so firstly because, for example, in the stage of text recognition and forming of a Word document an error may have occurred, which ought to be corrected before transmitting the attachment file formed of the content CONT1, CONT3. The pattern to object conversion gives an advantage to this matter. And secondly, because an error may also have occurred in the recognition of recipients 71.1. The e-mail will not hereby necessarily go to those recipients, for whom it was intended originally. Of course, this would be very embarrassing.

25 In the following, the application example presented in Figure 5b will be described briefly. It can be dealt with in accordance with the flow chart procedure shown in Figure 2 in a similar manner as was done in the application example according to Figure 5a. In this context there is no need for returning unnecessarily to the flow chart of Figure 2. The end user has now created with a pen and a paper a content CONT4, CONT5 including information INFO in table form. Furthermore, the end user has also drawn control information 74.1 - 74.4, 70.3 - 70.5, 72.3, 72.4, 71.2 characteristic of the invention in con-

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nection with the information INFO for carrying out the actions he likes on the content CONT4, CONT5 he has created.

The content CONT4, CONT5 is directed after the imaging and data forming steps 201 - 203 to a spreadsheet application Excel 51. This is recognised from the arrow 74.1 drawn by the end user's control information in the information INFO, which leads to the identifier 70.3 for the concerned application program. Using a parameter specifier in the control information 70.3 it is now possible also to determine a presentation mode for the table data in the application program 51, which is also presented herewith framed by dashed lines. The bar descriptor BD of XLS file form and framed by dashed lines as shown in Figure 5b, which is formed of the content CONT4, CONT5 in the spreadsheet application 51, is not of course in the information INFO created by the end user on a sheet of paper / display, but it is only presented for the sake of illustration in the context of Figure 5b.

The XLS file formed as the following stage in the spreadsheet application 51 and presented within a frame BD of dashed lines is directed by the directing arrow 74.2 to the identification 70.4 illustrating a pdf conversion program 56, which may be, for example, some program known as such. The PDF file thus converted by this, the end user wishes to direct for the e-mail program 55 for further for transmission to the established recipients 71.2 also noted on a sheet of paper. These stages may be carried out analogously in accordance with the application example shown in Figure 5a.

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Figure 4 is a rough schematic view of a principle application example of the electronic equipment 10 according to the invention. At the same time reference is made to the stages of the flow chart in Figure 2 as regards relevant equipment technology. The equipment 10 which may be, for example a mobile sta-

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tion, includes camera means CAM for digital imaging of information INFO including content CONT1 - CONT3 at stage 202. The imaged information INFO is processed, for example, by the processor CPU of the equipment 10 into digital form to be data
5 DATA1 - DATA3 for the functionalities required by the invention at stage 203. Besides these, the equipment 10 may also be provided with a camera interface CAMIMAPI of a kind known as such, which is used to process in the desired manner the image data DATA formed by sensor CAM and this is directed further to
10 the functionalities 12 - 16 according to the invention.

The equipment 10 also includes one or more applications 50 - 56, which may be divided, for example, according to their type, for example, application suites 60 - 62.

15 For recognition of control information, the equipment 10 includes pattern knowledge data 14, 16 and corresponding functionalities 12, 13 for recognition of control information from the image data formed by the camera means CAM. By providing
20 this knowledge data 14, 15 for use by the processor unit CPU running an image analysing function 12 it is possible to find out the control information contained in the image information INFO as well as the actions established to correspond with these. The knowledge 14, 15 may also take care of the pattern
25 to application program specific object conversion. The performing and controlling of the actions may be control by the command dispatcher 16. It provides (maps) established portions of the image information INFO formed by camera means CAM to the application interfaces and further at the same time com-
30 mands the application programs 50 - 56 or the chains formed by them for processing and handling the information INFO in the way defined in the control information.

The invention also concerns a camera element CAM, which can be adapted for use not only with the electronic equipment 10 but also in connection with the method according to the invention.

5 Figure 4 is a rough schematic view of an application example of a software product 30 according to the invention. The software product 30 may include memory means MEM and a program code 31 executable by the processor unit CPU of the equipment 10 and written in the memory means MEM for processing of information in accordance with the method of the invention at least
10 partly in the software level, which information INFO includes content CONT1 - CONT3. The memory means MEM for program code 31 may be, for example, a memory card adaptable in connection with portable equipment, CD media adaptable in a PC environment or also a static or dynamic application memory of the
15 equipment 10, wherein it can be integrated directly.

The program code 31 may include several code means 31.1 - 31.5, which can be executed by processor means CPU, 16 and the
20 operation of which can be adapted to the method descriptions just presented above. The code means 31.1 - 31.5 may form a set of processor commands executable one after the other, which are used to bring about the functionalities desired in the invention in the equipment 10 according to the invention.

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The program code 31 is adapted as input to receive digitally imaged information INFO and to the content CONT1 - CONT3 in the information INFO subject to one or more actions. For this purpose the program code 31 includes first code means 31.1
30 configured to recognise from the information INFO control information 70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4. In addition the program code may also include second code means 31.2 configured to decide on at least some of the one or more actions based on the recognised control information 70.1, 70.2,

71.1, 72.1, 72.2, 73.1 - 73.4, to which the content CONT1 - CONT3 is to be subjected.

The program code 31 may also includes a third code means 31.3
5 configured to recognise from the control information 70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4 the order in which actions are carried out. Furthermore the program code 31 may also includes fourth code means 31.4 configured to recognise the content CONT1 - CONT3 to be subjected to actions and still fifth
10 code means 31.5 configured to direct content CONT1 - CONT3 to at least one target 50, 55, 71.1 recognised from the control information 70.1, 70.2, 72.2.

In connection with the program code 31 pattern recognition
15 knowledge 14, 15 is adapted in order to recognise at least control information 70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4 from the information INFO. Pattern recognition knowledge 14, 15 allows also convert recognized content patterns to be revised objects that are characterised for each application pro-
20 gram. The program code 31 includes corresponding code means 31.6 for that purpose.

It is obvious to a professional in the art that the program codes 31 may be implemented in an established manner either as
25 independent applications or they may also form modules. Hereby at least some of them can be integrated or linked up with other applications, such as, for example, with the above-mentioned application programs 50 - 56 or also with application suites 60 - 62 or directly on the operating system level.

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Although, on the above the invention is described in the case of embodiment in which the mobile station 10 equipped with camera means CAM is used to process information according to the invention the basic concept may also be applied in connec-
35 tion with the laptop computers, for example. In such case the

camera means CAM of the equipment (mobile station or digital camera) is operatively connected to the laptop computer. The connection may be on its type any known kind, for example, an USB-connection or some wireless connection, such as Bluetooth
5 connection. The image information INFO is captured by camera means CAM and it is transmitted to the laptop computer in which the processing according to the invention is then performed. Thus the camera CAM may not necessarily be in the same equipment in which the method according to the invention is
10 carried out.

It should be understood that the above specification and the figures relating to it are only intended to illustrate the present invention. Thus, the invention is not limited only to
15 the embodiments presented above or to those defined in the claims, but many various such variations and modifications of the invention will be obvious to the professional in the art, which are possible within the scope of the inventive idea defined in the appended claims.

CLAIMS

1. Method for processing information (INFO), which information (INFO) includes content (CONT1 - CONT3) and in which method
- 5 - the information (INFO) is subjected to digital imaging, and
- the content (CONT1 - CONT3) in the digitally imaged information (INFO) is subjected to one or more actions,
- 10 characterised in that at least some of the said actions to which the content (CON1 - CONT3) is to be subjected are decided based on control information (70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4) fitted in connection with the information (INFO).
- 15
2. Method according to claim 1, characterised in that the control information (70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4) is connected to the content (CONT1 - CONT3) in the information (INFO).
- 20
3. Method according to claim 1 or 2, characterised in that the actions are carried out in an established order.
4. Method according to any claim 1 - 3, characterised in that
- 25 the control information includes information (70.1, 70.2, 71.1) expressing an action and information (73.1 - 73.4) expressing the order in which actions are carried out.
5. Method according to any claim 1 - 4, characterised in that
- 30 the control information includes information (72.1, 72.2) for defining content (CONT1 - CONT3) to be subjected to an action.
6. Method according to any claim 1 - 5, characterised in that the said actions include directing of content (CONT1 - CONT3)

to at least one target (50, 55, 71.1) recognised from the control information (70.1, 70.2, 72.2).

7. Method according to any claim 1 - 6, characterised in that
5 the said target is at least one application program (50, 55).

8. Method according to any claim 1 - 7, characterised in that
the said content (CONT1 - CONT3) is converted into the applicable format of the application program (50, 55) including,
10 for example, objects.

9. Method according to any claim 1 - 8, characterised in that
the said target is a data transmission application, such as,
for example, an e-mail program (55).

15 10. Method according to any claim 1 - 9, characterised in that
the said target is one or more address identifiers (71.1), to
which the content (CONT1 - CONT3) is transmitted.

20 11. Method according to any claim 1 - 10, characterised in
that pattern recognition knowledge (14, 15) is applied at
least in the recognition of the control information (70.1,
70.2, 71.1, 72.1, 72.2, 73.1 - 73.4).

25 12. Method according to any claim 1 - 11, characterised in
that imaged information (INFO) is visualized in the electronic
equipment.

13. Electronic equipment (10), including
30 - first means (CAM) arranged in connection with the
equipment (10) for digital imaging of information
(INFO) including content (CONT1 - CONT3), and
- processor means (CPU, 12, 13) for subjecting to the
content (CONT1 - CONT3) in the digitally imaged in-
35 formation (INFO) one or more actions,

characterised in that the processor means (CPU, 12, 13) is adapted to recognise from the information (INFO) control information (70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4), based on which it is arranged to conclude at least some of the actions to which the content (CONT1 - CONT3) is to be subjected.

14. Equipment (10) according to claim 13, characterised in that the control information (70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4) is connected to the content (CONT1 - CONT3) in the information (INFO).

15. Equipment (10) according to claim 13 or 14, characterised in that the actions are adapted to be carried out in an established order.

16. Equipment (10) according to any claim 13 - 15, characterised in that the control information is adapted to include information (70.1, 70.2, 71.1) expressing an action and information (73.1 - 73.4) expressing the order in which actions are carried out.

17. Equipment (10) according to any claim 13 - 16, characterised in that the control information is adapted to include information (72.1, 72.2) for defining content (CONT1 - CONT3, 71.1) to be subjected to an action.

18. Equipment (10) according to any claim 13 - 17, characterised in that the said actions are adapted to include directing of content (CONT1 - CONT3) to at least one target (50, 55, 71.1) recognised from the control information (70.1, 70.2, 72.2).

19. Equipment (10) according to any claim 13 - 18, characterised in that the said target is at least one application program (50, 55).

20. Equipment (10) according to any claim 13 - 19, characterised in that the said content (CONT1 - CONT3) is adapted for conversion into the applicable format of the application program (50, 55).

21. Equipment (10) according to any claim 13 - 20, characterised in that the said target is a data transmission application, such as, for example, an e-mail program (55).

22. Equipment (10) according to any claim 13 - 21, characterised in that the said target is one or more address identifiers (71.1), to which the content (CONT1 - CONT3) is to be transmitted.

23. Equipment (10) according to any claim 13 - 22, characterised in that pattern recognition knowledge (14, 15) arranged in connection with the equipment (19) is adapted for application at least in the recognition of control information (70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4).

24. Equipment (10) according to any claim 13 - 23, characterised in that the information (INFO) is arranged to be imaged from a visualizing element of a electronic equipment.

25. Software product (30) for processing information (INFO), which information (INFO) includes content (CONT1 - CONT3), while the software product (30) includes memory means (MEM) and a program code (31), which can be executed by the processor means (CPU) and is written in the memory means (MEM), which is adapted as input to receive digitally imaged information (INFO) and to the content (CONT1 - CONT3) in the information (INFO) subject to one or more actions, characterised in that the program code (31) includes

- first code means (31.1) configured to recognise from the information (INFO) control information (70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4) and in addition
- 5 - second code means (31.2) configured to decide on at least some of the one or more actions based on the recognised control information (70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4), to which the content (CONT1 - CONT3) is to be subjected.

10

26. Software product (30) according to claim 25, characterised in that the program code (31) also includes a third code means (31.3) configured to recognise from the control information (70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4) the order in which
15 actions are carried out.

27. Software product (30) according to any claim 25 or 26, characterised in that the program code (31) also includes fourth code means (31.4) configured to recognise the content
20 (CONT1 - CONT3) to be subjected to actions.

28. Software product (30) according to any claim 25 - 27, characterised in that the program code (31) in addition includes fifth code means (31.5) configured to direct content
25 (CONT1 - CONT3) to at least one target (50, 55, 71.1) recognised from the control information (70.1, 70.2, 72.2).

29. Software product (30) according to any claim 25 - 28, characterised in that some of the program code's (31) code
30 means (31.1 - 31.5) are integrated in connection with an application program (50 - 56).

30. Software product (30) according to any claim 25 - 29, characterised in that in connection with the program code (31)
35 pattern recognition knowledge (14, 15) is adapted in order to

recognise at least control information (70.1, 70.2, 71.1, 72.1, 72.2, 73.1 - 73.4) from the information (INFO).

31. Camera element (CAM), which can be adapted for use in connection with the method according to any claim 1 - 12.

32. Camera element (CAM), which can be adapted for use in the electronic equipment (10) according to any claim 13 - 24.

33. Use of the method according to any claim 1 - 12 to process electronic information.

34. Use of the electronic equipment (10) according to any claim 13 - 24 to process electronic information.