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**Datasheet for the decision
of 10 June 2022**

Case Number: T 2156/17 - 3.4.01

Application Number: 06749003.7

Publication Number: 1872307

IPC: G06K15/00, G07F19/00, H04N7/18

Language of the proceedings: EN

Title of invention:
METHOD AND APPARATUS FOR DETECTING SUSPICIOUS ACTIVITY USING
VIDEO ANALYSIS

Applicant:
NCR Corporation

Headword:
Detecting suspicious activity using video analysis / NCR
Corporation

Relevant legal provisions:
RPBA 2020 Art. 13(2), 13(1)
EPC Art. 56

Keyword:
Amendment after summons - exceptional circumstances (no) -
cogent reasons (no)
Inventive step - (no) - common general knowledge - mixture of
technical and non-technical features

Decisions cited:
T 0775/90, T 0732/21, T 1175/02, T 0641/00, G 0001/19,
G 0003/08

Case Number: **T 2156/17 - 3.4.01**

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 10 June 2022

Appellant:	NCR Corporation
(Applicant)	864 Spring St NW
	Atlanta, GA 30308 (US)
Representative:	Secerna LLP
	The Old Fire Station
	18 Clifford Street
	York YO1 9RD (GB)
Decision under appeal:	Decision of the Examining Division of the European Patent Office posted on 14 March 2017 refusing European patent application No. 06749003.7 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman	P. Scriven
Members:	P. Fontenay
	C. Almberg

Summary of Facts and Submissions

I.   The present decision relates to the applicant's appeal of the Examining Division's decision to refuse its application for a European patent.

II.   The Examining Division held that claim 1 of the main request and of auxiliary requests 1, 2, and 3 did not define inventive subject-matter.

III.   As examples of prior art, relevant to the claimed subject-matter, reference was made to documents

        D2: EP-A-672 993, and
        D6: WO-A-95/29470.

D6 was cited as evidence that correlation of two data items by recurring time stamping was known. D2 was cited as an example of a method for automatically identifying different objects for purposes of customer billing and inventory control.

IV.   Concretely, the Examining Division held that the contribution to the prior art, consisting of including the number of products registered and sold as a criterion for identifying transactions as fraudulent, was essentially administrative and thus non-technical. The detection of suspicious activity in the context of department stores or retail establishments was regarded as a normal business activity. Apart from the reference to a "video camera" and "transaction terminal" and to

the steps of "automatically analysing frames of video"
and of "automatically comparing", nothing in claim 1 of
the main request implied the use of any technical
feature for carrying out the claimed method.

Rather, the claims defined generic specifications for
the skilled person, and their implementation did not
require any inventive skill. This appeared all the more
true considering that the automation of functions
previously performed by human operators was in line
with the general trend in technology, as acknowledged,
for example, in T 775/90 and T 1175/02.

V.   In the statement of grounds of appeal, the appellant
        requested that the Examining Division's decision be set
        aside and that a patent be granted on the basis of a
        main request or one of a first to fourth auxiliary
        request filed with the statement.

        Claim 1 of each of the main request and the first to
        third auxiliary requests was amended, as compared with
        claim 1 of each of the correspondingly labelled request
        underlying the impugned decision, to specify that the
        methods were computer-implemented.

        The fourth auxiliary request was new on appeal. It also
        defined a computer-implemented method and included the
        step of "identifying and transmitting to a reviewer for
        review a segment of the video data where the video
        event that is not identified as a transaction event
        exists."

VI.   In a communication under Article 15(1) RPBA, the
        appellant was informed of the Board's preliminary

opinion. The Board was minded to admit the main request
and the first to fourth auxiliary requests because, for
the main request and the first to third auxiliary
requests, the amendments did not materially affect the
subject-matter and because the fourth auxiliary request
addressed the Examining Division's misgivings regarding
the invention's technical contribution. By limiting
transmission to relevant sequences only, a reduction of
data transmission or data storage was achieved, as
compared to the methods defined in the previous
requests. On the substance, the Board held that the
Examining Division had been correct to conclude that
the then main request and auxiliary requests 1 to 3
lacked inventive step in view of D2 and D6. Document D1
(US-A-5 083 638) was also a possible starting point for
the assessment of inventive step. Document D4 (EP-
A-843 293) was also relevant. Auxiliary request 4
lacked inventive step because limiting a transmission
to relevant data was an obvious solution, if too much
data were being transmitted or stored.

VII.   In reply to the Board's preliminary opinion, the
        appellant filed a new main request and new first and
        fourth auxiliary requests. These were amended versions
        of the main request and the first and fourth auxiliary
        requests filed with the statement of grounds of appeal.
        The second and third auxiliary requests were maintained
        as before. If the amendments were considered
        admissible, the new requests were to replace the
        corresponding requests on file.

VIII.   Claim 1 of each of the new requests additionally
        comprises, as compared to the correspondingly labelled

request on file, the features of one of more of the
dependent claims:

New main request: claims 18, 19, and 20.
New first auxiliary request: claim 12.
New fourth auxiliary request: claim 5.

IX.   At oral proceedings before the Board, the appellant
         first clarified that its claim requests were, in order:
         - the new main request;
         - the main request;
         - the new first auxiliary request;
         - the first auxiliary request;
         - the second auxiliary request;
         - the third auxiliary request;
         - the new fourth auxiliary request;
         - the fourth auxiliary request.

         The Board decided to admit the new main request, but
         not to admit the new first and fourth auxiliary
         requests. The appellant then withdrew its main request
         and new first auxiliary request, and filed auxiliary
         request 1a. Subsequently, the appellant also filed
         auxiliary request 5, so that at the end of oral
         proceedings, the following claim requests remained, in
         order:

         I)   the new main request;
         II)   auxiliary request 1a;
         III) the first auxiliary request;
         IV)   the second auxiliary request;
         V)   the third auxiliary request;
         VI)   the new fourth auxiliary request;
         VII) the fourth auxiliary request;
         VIII) auxiliary request 5.

X.   With regard to the admissibility of the new main
        request, and the new fourth auxiliary request, the
        appellant emphasised that the amendments were meant to
        address the new objection of lack of an inventive step
        starting from document D1 that had been raised for the
        first time in the Board's preliminary opinion. In the
        appellant's view, a decision not to admit these new
        requests would *de facto* deprive it of its right to be
        heard, under Article 113 EPC, on this new objection.

XI.   Auxiliary request 1a was ranked higher than the first
        auxiliary request, and was meant to replace the latter
        if considered admissible. The appellant stressed that
        the filing of auxiliary request 1a was justified by the
        approach followed by the Board, relying on the
        criterion of convergence, in not admitting the new
        first and fourth auxiliary requests. Claim 1 of
        auxiliary request 1a combined the features of claim 1
        according to the main request and claim 1 of the
        withdrawn new first auxiliary request. It was thus
        convergent.

XII.   Claim 1 of auxiliary request 5 comprises additional
        limitations, compared with claim 1 of the new main
        request. The appellant underlined that it had faced
        objections of lack of inventive step that relied on
        common general knowledge, for which no evidence had
        been provided. This had come as a surprise. The filing
        of auxiliary request 5 was a reaction to this unusual
        situation and justified its consideration, even at this
        late stage of the appeal proceedings.

XIII.   The appellant emphasised that document D6 was only
         focused on a manual approach and was not concerned with
         video analysis. It did not contain any indication as to
         how analysis of video frames could be performed. It was
         further underlined that the present invention claimed
         priority from 2005, when the possibilities in the field
         of video processing were limited, compared to what is
         possible now. This made it even less likely that the
         skilled person would have recognised the benefits of
         automating the process of D6. The appellant neither
         agreed nor disagreed with the Board's view that gain
         control was a well-known process in the field of image
         processing, but stressed that the recited processing
         steps in claim 1 of the new main request had to be read
         in conjunction. The invention was intended accurately
         to align the transaction data and the video data in
         order to identify mismatches, while avoiding
         detrimental effects resulting from autogain correction.

         Similar considerations applied to the additional
         processing steps defined in claim 1 of the auxiliary
         requests. In the absence of evidence of the common
         general knowledge in 2005, the skilled person had no
         inducement to consider automating the process of D6
         along the lines of the claimed inventions.

XIV.   Claim 1 of the new main request reads:

             *A computer-implemented method for detecting
             a transaction outcome, the method
             comprising:
             obtaining video data associated with a
             transaction area;
             analyzing at least a portion of the video
             data to obtain at least one video parameter*

*concerning at least a portion of a
transaction associated with the transaction
area, wherein the step of analyzing
comprises automatically analyzing frames of
video from at least one region of interest
in the at least a portion of the video data
to identify a respective event indicating
the presence of an item associated with the
transaction;
obtaining at least one transaction
parameter originated from a transaction
terminal associated with the transaction
area, wherein the step of obtaining
comprises analyzing at least a portion of
transaction data from a transaction
terminal to identify a sequence of items
identified as being transacted in the
transaction; and
automatically comparing the at least one
video parameter to the at least one
transaction parameter to identify a
transaction outcome, wherein the step of
automatically comparing comprises analyzing
the sequence of items identified as being
transacted in the transaction from the
transaction data in comparison to the
events produced from analysis of the video
data to determine if the item represented
by at least one event produced from the
analysis of the video data is indicated as
an item for transacting in the at least a
portion of transaction data, and
correlating video timestamps of events from
the analysis of the video data to
transaction timestamps of items reflected
as having been transacted in the*

*transaction data to identify events
indicating an item in the video data that
does not have a corresponding record in the
transaction data,*
obtaining video data further comprising:
*obtaining video data originating from at
least one elevated video camera that
monitors a transaction area defining the
region of interest; and*
*wherein analyzing at least a portion of the
video data comprises:*
*analyzing the video data to track items
involved in the transaction in the
transaction area; and*
*wherein automatically comparing the at
least one video parameter to the at least
one transaction parameter to identify a
transaction outcome comprises:*
*comparing the video analysis of the tracked
items to transaction data produced from a
transaction terminal to identify suspicious
activity, the comparison including
associating scanned item data with video
data such that the timestamp of the scan is
synchronized with the timestamp of the
video;*
*wherein analyzing at least a portion of the
video data comprises:*
*defining at least one region of interest
within the video data;*
*calculating an object map that identifies a
change between a current image of the at
least one region of interest and an updated
background image of the at least one region
of interest;*

*isolating at least one operator object
within the at least one region of interest;
detecting if an analysis of the object map
and the operator object identifies at least
one of the removal and introduction of an
object to the at least one region of
interest; and
applying image adjustment processing to the
video data to compensate for an autogain
characteristic across an entire area of the
video data, the image adjustment processing
restricting its application to a portion of
the region of interest captured within the
video data;
wherein applying image adjustment
processing comprises:
restricting focus to objects in the
transaction area that remain stationary and
that exhibit at least one of a color shift
and a brightness shift.*

XV.   Claim 1 according to auxiliary request 1a differs from
        that of the new main request in that it includes, at
        the end of the claim, the following additional
        limitations:

        *...;
        producing a set of detection events
        indicating detection of items by at least
        one detector within at least one region of
        interest of at least one portion of the
        video data;
        wherein automatically comparing the at
        least one video parameter to the at least
        one transaction parameter comprises:*

for each detector, comparing the set of detection events for that detector to at least a portion of transaction data taken at the time of the event to identify at least one apparent discrepancy in a number of items detected by that detector from a number of items indicated in the at least a portion of the transaction data; and identifying an overall suspicion level for the transaction based on apparent discrepancies identified by the at least one detector,
wherein analyzing at least a portion of the video data comprises:
identifying motion of an operator within a region of interest in the transaction area that indicates the presence of an item for transacting within the region of interest;
wherein obtaining at least one transaction parameter comprises:
indicating if a record of the item occurs within the transaction data corresponding to identifying the motion of the operator; and
wherein automatically comparing the at least one video parameter to the at least one transaction parameter comprises: identifying a situation when the motion of the operator within the region of interest in the transaction area indicates the presence of the item for transacting but the record of the item does not occur in the transaction data, and in response, indicating suspicious activity.

XVI.   Claim 1 of the first auxiliary request differs from
        claim 1 of the new main request (and from claim 1 of
        the withdrawn main request) in that the whole section
        starting with the step of comparing the video analysis
        of the tracked items to transaction data produced from
        a transaction terminal to identify suspicious activity,
        until the end of the claim, instead reads:

        ...
        comparing the video analysis of the tracked
        items to transaction data produced from a
        transaction terminal to identify suspicious
        activity,
        producing a set of detection events
        indicating detection of items by at least
        one detector within at least one region of
        interest of at least one portion of the
        video data;
        wherein automatically comparing the at
        least one video parameter to the at least
        one transaction parameter comprises:
        for each detector, comparing the set of
        detection events for that detector to at
        least a portion of transaction data taken
        at the time of the event to identify at
        least one apparent discrepancy in a number
        of items detected by that detector from a
        number of items indicated in the at least a
        portion of the transaction data; and
        identifying an overall suspicion level for
        the transaction based on apparent
        discrepancies identified by the at least
        one detector.

XVII.   Claim 1 of the second auxiliary request differs from
        claim 1 of the new main request (and claim 1 of the
        withdrawn main request) in that the whole section
        starting with the step of comparing the video analysis
        of the tracked items to transaction data produced from
        a transaction terminal to identify suspicious activity,
        until the end of the claim, instead reads:

> *...*
> *comparing the video analysis of the tracked*
> *items to transaction data produced from a*
> *transaction terminal to identify suspicious*
> *activity by comparing a first frame and an*
> *empty base image by subtraction and*
> *thresholding to create a binary object map*
> *of items for containing new objects in the*
> *image that are not part of the empty base*
> *image, including an operator object and*
> *other objects within the region of*
> *interest.*

XVIII. Claim 1 of the third auxiliary request differs from
        claim 1 of the new main request (and claim 1 of the
        withdrawn main request) in that the whole section
        starting with the step of comparing the video analysis
        of the tracked items to transaction data produced from
        a transaction terminal to identify suspicious activity,
        until the end of the claim, instead reads:

> *...*
> *comparing the video analysis of the tracked*
> *items to transaction data produced from a*
> *transaction terminal to identify suspicious*
> *activity,*

defining a region of interest within the transaction area;
automatically identifying a first frame of video data that indicates a first set of items in the region of interest;
automatically identifying a second frame of video data that indicates a second set of items in the region of interest, the first set of items being visually distinct from the second set of items; and
automatically indicating the visual distinctness of the first set of items from the second set of items as an event indicating an item existed within the region of interest of the video data; and
wherein obtaining at least one transaction parameter comprises:
obtaining transaction data associated with the transaction terminal associated with the transaction area, the transaction data indicating if the item was registered as a transaction item with the transaction terminal; and
wherein automatically comparing the at least one video parameter to the at least one transaction parameter comprises:
identifying suspicious activity when the transaction data is missing transaction data for an item for which an event indicates the item existed within the region of interest.

XIX.   Claim 1 of the new fourth auxiliary request differs
        from claim 1 of the new main request (and claim 1 of

the withdrawn main request) in that the section
starting with

> *...*
> *obtaining video data further comprising:*
> *obtaining video data originating from at*
> *least one elevated video camera ...*

which extends until the end of the claim, instead
reads:

> *..., and*
> *identifying and transmitting to a reviewer*
> *for review a segment of the video data*
> *where the video event that is not*
> *identified as a transaction event exists;*
> *wherein analyzing at least a portion of the*
> *video data comprises:*
> *applying an automated machine-based video*
> *analysis technique to detect a video event*
> *of an item associated with the transaction*
> *area;*
> *wherein obtaining at least one transaction*
> *parameter concerning a transaction that*
> *occurs in the transaction area comprises:*
> *identifying transaction data indicating*
> *transaction events of items associated with*
> *the transaction area; and*
> *wherein automatically comparing the at*
> *least one video parameter to the at least*
> *one transaction parameter comprises:*
> *determining if the video event is not*
> *identified as a transaction event in the*
> *transaction data, and in response,*
> *identifying a specific segment of the video*
> *data that indicates where the video event*

not identified as a transaction event
exists.

XX.   Claim 1 of the fourth auxiliary request differs from
        claim 1 of the new main request (and claim 1 of the
        withdrawn main request) in that the whole section
        starting with the step of

        ...
        obtaining video data further
        comprising: ...

        and extending until the end of the claim, instead
        reads:

        ...
        identifying and transmitting to a reviewer
        for review a segment of the video data
        where the video event that is not
        identified as a transaction event exists.

XXI.   Claim 1 of auxiliary request 5 differs from claim 1 of
        the new main request in that the last feature

        ... restricting focus to objects in the transaction
        area that remain stationary and that exhibit at
        least one of a color shift and a brightness shift

        instead reads:

        ...
        restricting focus to objects in the
        transaction area that remain stationary and
        that exhibits a color shift,

wherein restricting focus to objects in the
transaction area that remain stationary and
that exhibit at least one of a color shift
and a brightness shift is achieved by:
comparing a current image via subtraction
and thresholding from a current updated
background image to get a noisy binary map
of background pixels,
computing color statistics for the current
image and the background image using the
background pixels only, wherein the
background pixels are used as they
correspond to the same, static objects that
exhibit the colour shift that needs to be
corrected for, and
once the color statistics for the
background pixels has been computed,
applying a change to the current image to
bring its colors into correspondence with
the colors of the background image.

Reasons for the Decision

New main request - Admissibility (Article 13(2) RPBA 2020)

1.   The new main request was filed after notification of
        the summons to oral proceedings, in reaction to the
        Board's preliminary opinion. It addresses,
        specifically, the objection of lack of inventive step
        on the basis of document D1, raised by the Board for
        the first time. Its admission depends on the conditions
        set out in Article 13(2) RPBA 2020, which reads:

> *Any amendment to a party's appeal case made*
> *[...] after notification of a summons to*
> *oral proceedings shall, in principle, not*
> *be taken into account unless there are*
> *exceptional circumstances, which have been*
> *justified with cogent reasons by the party*
> *concerned.*

2.   The appellant's reasons are cogent. Although the
      objection of lack of inventive step based on D6, relied
      upon by the Examining Division, was essentially
      endorsed by the Board in its preliminary opinion, the
      new objection, based on D1, relied on a completely new
      approach towards inventive step.

3.   The Board considers that the new objection constitutes
      exceptional circumstances in the sense of Article 13(2)
      RPBA 2020. It considers, further, that the amendments
      define additional technical limitations over D1, thus
      directly addressing the new objection.

4.   The new main request is, therefore, admitted into the
      proceedings.

New main request – Inventive step (Article 56 EPC)

5.   Document D6 was cited by the Examining Division as
      evidence for a method relying on time stamps to
      establish correlations between two sets of data items.

6.   D6 is particularly relevant to the inventive merits of
      the claimed invention. It discloses a surveillance
      method for reviewing behavioural and transaction events
      which occur at one or more point-of-sale (POS)
      terminals in a retail environment. It comprises the

steps of generating video image and transaction
signals, generating a synchronising signal, and
correlating these three signals (page 5, lines 12-19).
It can be used to monitor or identify suspicious
activity (page 10, lines 1-4; page 25, lines 7-9).

7.   D6 is not limited just to a method of time stamping a
        sequence of events synchronously recorded on a video
        tape and a floppy disk, in order, later, to allow video
        data to be aligned with transaction data.

8.   In the terms of claim 1, D6 discloses

>   *A ~~computer-implemented~~ method for detecting
>   a transaction outcome, the method
>   comprising:*
>   *obtaining video data associated with a
>   transaction area;*
>   *analyzing at least a portion of the video
>   data to obtain at least one video parameter
>   concerning at least a portion of a
>   transaction associated with the transaction
>   area, ~~wherein the step of analyzing~~*
>   *~~comprises automatically analyzing frames of~~*
>   *~~video from at least one region of interest~~*
>   *~~in the at least a portion of the video data~~*
>   *~~to identify a respective event indicating~~*
>   *~~the presence of an item associated with the~~*
>   *~~transaction;~~*
>   *obtaining at least one transaction
>   parameter originated from a transaction
>   terminal associated with the transaction
>   area, wherein the step of obtaining
>   comprises analyzing at least a portion of
>   transaction data from a transaction
>   terminal to identify a sequence of items*

identified as being transacted in the
transaction; and
~~automatically~~ comparing the at least one
video parameter to the at least one
transaction parameter to identify a
transaction outcome, wherein the step of
~~automatically~~ comparing comprises analyzing
the sequence of items identified as being
transacted in the transaction from the
transaction data in comparison to the
events produced from analysis of the video
data to determine if the item represented
by at least one event produced from the
analysis of the video data is indicated as
an item for transacting in the at least a
portion of transaction data, and
correlating video timestamps of events from
the analysis of the video data to
transaction timestamps of items reflected
as having been transacted in the
transaction data to identify events
indicating an item in the video data that
does not have a corresponding record in the
transaction data,
obtaining video data further comprising:
obtaining video data originating from at
least one ~~elevated~~ video camera that
monitors a transaction area defining the
region of interest; and
wherein analyzing at least a portion of the
video data comprises:
analyzing the video data to track items
involved in the transaction in the
transaction area; and
wherein ~~automatically~~ comparing the at
least one video parameter to the at least

one transaction parameter to identify a
transaction outcome comprises:
comparing the video analysis of the tracked
items to transaction data produced from a
transaction terminal to identify suspicious
activity, the comparison including
associating scanned item data with video
data such that the timestamp of the scan is
synchronized with the timestamp of the
video.

9.   Document D6 describes a manual process of comparing the
       video data with the transaction data, and it does not
       disclose the features added to claim 1 in response to
       the Board's provisional opinion, according to which
       analyzing at least a portion of the video data
       comprises:

       defining at least one region of interest
       within the video data;
       calculating an object map that identifies a
       change between a current image of the at
       least one region of interest and an updated
       background image of the at least one region
       of interest;
       isolating at least one operator object
       within the at least one region of interest;
       detecting if an analysis of the object map
       and the operator object identifies at least
       one of the removal and introduction of an
       object to the at least one region of
       interest; and
       applying image adjustment processing to the
       video data to compensate for an autogain
       characteristic across an entire area of the
       video data, the image adjustment processing

> *restricting its application to a portion of*
> *the region of interest captured within the*
> *video data;*
> *wherein applying image adjustment*
> *processing comprises:*
> *restricting focus to objects in the*
> *transaction area that remain stationary and*
> *that exhibit at least one of a color shift*
> *and a brightness shift.*

10. The analysing steps define, in relation with the recited steps of "automatically analysing frames of video" and of "automatically comparing", further technical contributions of the claimed subject-matter over D6.

11. The appellant's view, that D6 neither disclosed the step of comparing multiple records of the transaction area at the transaction time nor the step of identifying items found in the video data but not in the transaction data, is rejected. The disclosure of D6 concerns surveillance systems that record transaction events for review at a later date (page 1, lines 4, 5). The very purpose of the system disclosed in D6 is to allow such review of video data and corresponding transaction data by an operator (claim 1). The fact that the comparison is made by the operator, when reviewing the synchronised video and transaction data, does not affect this.

12. The distinguishing features identified above are the consequences of significant differences between the claimed method and the disclosure of D6. In effect, the claimed method differs from the method disclosed in D6, essentially, in that it is computer implemented and

performed automatically, and in that the video data
originates from an elevated video camera.

13.   The selection of an elevated camera merely reflects the
        need for a complete and unhindered view of the regions
        to be monitored. By itself, it does not justify the
        existence of an inventive step. The skilled person
        would have selected the most adequate location for the
        camera, depending on the circumstances and the scene to
        be monitored.

14.   The main problem addressed by the distinguishing
        features identified above is the adaptation of the
        system of D6 to make it autonomous, so that it does not
        require the presence of a human operator. Solving this
        main problem entails addressing further technical
        issues resulting from the need to exclude false
        interpretations of video data, as may result from a
        POS-operator being present in the region of interest or
        from autogain corrections.

15.   As observed by the Examining Division, with reference
        to decisions T 775/90 and T 1175/02, *the mere
        automation of functions previously performed by human
        operators (supervisor) is in line with the general
        trend in technology* (Decision, paragraph 19). Although
        the decision to automate the process of D6 undoubtedly
        requires a very different approach and involves a
        multiplicity of secondary issues as to the processing
        strategy best adapted to the intended purpose, there is
        no obstacle, in principle, to such a step.

16.   In D6, the sets of video and transaction data are both
        recorded and time stamped. This permits a precise
        alignment of the two, when replayed afterwards by the
        respective playback means. Contrary to the appellant's

view, no improvement in terms of alignment of video
data and transaction data result from the claimed
process compared to the manual process of D6.

17.   However, the steps of focusing on a stationary area, in
        order to compensate for the autogain correction,
        contribute to the reliability of the automated process,
        insofar as the determination of (moving) transaction
        items is concerned.

18.   In the Board's judgment, the initial decision to
        automate the process of D6, to make it fully
        autonomous, would have inevitably led the skilled
        person to consider subordinated issues associated with
        the treatment of digital video data. The skilled person
        would, in particular, have been confronted with the
        problem of discriminating between (moving) transaction
        items, a moving operator and (stationary) background
        objects.

19.   The Board has no doubt that comparison by way of
        subtraction within a sequence of images, in order to
        identify changes within a region of interest, was well-
        known at the priority date (2005). The same applies to
        autogain correction techniques. The Board has also no
        doubt that the techniques consisting of modifying an
        image on the basis of statistics obtained from a
        selected area of it, was also well known.

20.   This view is confirmed by the very content of the
        application, that does not elaborate on these specific
        aspects of the invention, but refers to them merely in
        passing. The Board observes that a different finding
        would have led, in the absence of specific indications
        as to the content of these measures, to an objection of
        lack of sufficiency under Article 83 EPC.

21.   Nothing that was not obvious results from the step of
        comparing images by way of subtraction, in order to
        identify changes, that is, motion within the field of
        view. Being aware of autogain correction techniques,
        the skilled person would have recognised that it would
        directly interfere with the reliability of the
        comparison process. Faced with wrong interpretations
        resulting from autogain corrections when a large
        object, not part of the transaction, appears within the
        field of view of the camera (page 27, lines 30-35), the
        skilled person would have considered compensating for
        this detrimental effect.

22.   The solution entails quantifying the effect to be
        compensated. It implies determining on a statistical
        basis (histogram analysis) how pixels in a a portion of
        the image that remained stationary have been affected.
        Concretely, the portion of the image to be considered
        was a portion of the image the content of which, in the
        absence of correction, would not have been modified.
        This reflects the necessity not to incorporate in the
        statistical analysis required for the compensation the
        moving object at the origin of the problem
        (application, page 27, line 36 - page 28, line 9).

23.   The claimed solution did not require any inventive
        skills. It resulted in a straightforward manner from
        the application of the known techniques referred to
        above, and from mere logical considerations as to the
        use of these well known techniques to solve predictable
        problems.

24.   The subject-matter of claim 1 according to the new main
        request is thus not inventive in the sense of Article
        56 EPC.

Auxiliary request 1a – Admissibility

25.   Auxiliary request 1a was filed during the oral
       proceedings before the Board, so its admission is
       subject to Article 13(2) RPBA 2020 (cf. point 1,
       above), and also the criteria of Article 13(1) RPBA
       2020.

26.   Auxiliary request 1a is an attempt to parry the Board's
       decision not to admit the new first and fourth
       auxiliary requests on the ground of lack of
       convergence, when compared to the new main request.
       (The admissibility of the fourth auxiliary request is
       discussed, below).

27.   The appellant's arguments are not sufficient to decide
       favourably on the admissibility of auxiliary request
       1a. The circumstances referred to by the appellant are
       not exceptional, but relate, on the contrary, to
       ordinary aspects of the appeal proceedings.

28.   There is nothing exceptional in the board applying the
       criterion of convergence to question the admissibility
       of an auxiliary request freshly filed in appeal
       proceedings (Article 13(2) RPBA 2020). Although
       convergence, as stressed by the appellant, is not the
       sole criterion, there is also nothing surprising in the
       Board applying it to the new first and fourth auxiliary
       requests filed in response to the communication of the
       Board. It was up to the appellant to consider the rules
       of procedure and the criteria applied according to the
       case law, and the possible consequences resulting from
       this new request being filed in reaction to the Board's
       preliminary opinion.

29.   The right to be heard under Article 113 EPC does not
        entail the right to be given further possibilities to
        file new requests if earlier attempts fail. In the
        Board's judgment, the appellant's right to be heard is
        met under the circumstances, since they were aware of
        the objections to the admissibility of the earlier
        requests, and had the opportunity to contest this and
        present their arguments (T 732/21).

30.   Auxiliary request 1a is thus not admitted into the
        proceedings (Article 13(2) RPBA 2020).

First auxiliary request - Inventive step (Article 56 EPC)

31.   The claimed invention is a mixture of technical and
        non-technical features. The approach generally followed
        to assess inventive step of the subject-matter of a
        claim comprising a mixture of technical and non-
        technical features derives from T 641/00, *Two
        identities/COMVIQ*, OJ EPO 2003, 352. This approach was
        generally endorsed by the Enlarged Board of Appeal in
        G 1/19 *Pedestrial simulation, OJ EPO 2021, A77, points
        31-34, and points 35 and 36 with explicit reference to
        G 3/08, Programs for computers, OJ EPO 2011, point
        10.13.2).*

32.   The distinguishing feature of obtaining video data
        originating from at least one elevated video camera
        that monitors a transaction is not inventive for the
        reasons explained above with regard to the new main
        request.

33.   The claimed method is further distinguished from the
        method of D6 in that the process is automatic, in that
        it incorporates a step of comparing the set of

transaction events with the transaction data in order
to identify a discrepancy in the respective number of
items, and in the further step of identifying an
overall "suspicion level" for the transaction.

34.   Contrary to the appellant's view, the step of comparing
        the set of detection events with the set of transaction
        data to identify a discrepancy is not technical.
        Independently of the nature of the events, it must be
        stressed that the comparison carried out simply
        compares data. All in all, the claimed step of
        comparing said data amounts to a mere comparison of
        lists by computer means.

35.   The origin of the data are without bearing on the
        claimed step of comparing. The technicality of the
        transaction, as it manifests itself in the movement of
        items in a sequence of video frames, is lost when it
        comes to the step of comparing the data. The Board
        further rejects the view that the count that results
        from the comparison is technical in the context of the
        invention. The mere fact that the identification of a
        discrepancy is used to generate a "suspicion level" is
        also not sufficient to confer technical character to
        said method. The notion of "suspicion" is essentially
        subjective and as such not technical. The same applies
        to any parameters that may be derived therefrom.

36.   It follows that the only feature of a technical nature,
        beyond the step of obtaining video data by means of an
        elevated camera, that distinguishes the claimed method
        from that of D6 resides in the automation of the
        process.

37.   As explained above, this distinguishing feature
       reflects a general trend in technology and is not
       sufficient for an inventive step.

38.   The subject-matter of claim 1 according to the first
       auxiliary request is thus not inventive in the sense of
       Article 56 EPC.

Second auxiliary request – Inventive step (Article 56 EPC)

39.   Claim 1 of the second auxiliary request includes
       limitations regarding the step of comparing the video
       analysis of the tracked items to transaction data
       produced from a transaction terminal to identify
       suspicious activity. Concretely, the step is performed
       by comparing a first frame and an empty base image, by
       subtraction and thresholding and the creation of a
       "binary object map", to identify new objects in the
       image that are not part of the empty base image,
       including an operator "object" and other objects within
       the region of interest.

40.   The appellant stressed that it was not required to
       automate the process of D6 in order to identify
       transaction items. The claimed subject-matter extended
       beyond a mere automation of the process, since it
       required additional steps to arrive at the
       determination of the transaction items. There was no
       indication, in the prior art, that identification of
       objects could be obtained by subtraction of images
       followed by thresholding and the generation of a binary
       object map. Document D4 referred in general terms to
       techniques of thresholding in order to generate binary
       images. D4 was concerned with the identification of
       items based on characteristics that could be derived

from video images. It did not suggest using these
techniques to create object maps in order to identify
objects entering or leaving a region of interest.

41.   In the Board's judgement, the claimed subject-matter
       results in a straightforward manner from the initial
       decision of automating the process of D6. As stressed
       above, with regard to claim 1 of both the new main
       request and the first auxiliary request, no inventive
       step is involved in this initial step.

42.   It would have been obvious for the skilled person,
       seeking to identify objects entering or leaving the
       region of interest, to rely on the dynamic inherent to
       the process, as it manifests itself in changes in the
       content between successive frames. Hence, it would have
       been obvious for the skilled person to use image
       processing techniques adapted for identifying such
       changes.

43.   The Board has no doubt that the basic operations of
       subtracting images, and thresholding to create binary
       images were well-known in 2005. As stressed above, if
       this were not so, and in the absence of any details as
       to the implementation of these steps in application, an
       objection of insufficiency under Article 83 EPC would
       have been justified.

44.   The issue of obviousness under Article 56 EPC appears
       thus to hinge on the question whether it would have
       been obvious, in the context of automating the process
       of D6, to use such known processes.

45.   The comparison of frames by way of subtraction is
       straightforward in that it serves exactly the purpose
       of identifying changes between successive frames. It is

particularly adapted to the present purpose of
identifying objects entering, moving within, or leaving
the region of interest. The comparison of an image with
an empty base image (that is, an updated version of the
background image (application, page 25, lines 18-23))
is a direct consequence of this finding. In order to
allow reliable identification of transaction items,
that is of objects entering, moving within, or leaving
the region of interest, the skilled person would have
recognised that processes of thresholding, to obtain a
binary image of the region of interest, would have been
particularly adapted to reducing the noise component in
the resulting image.

46.   The subject-matter of claim 1 according to the second
        auxiliary request is thus not inventive in the sense of
        Article 56 EPC.

Third auxiliary request - Inventive step (Article 56 EPC)

47.   Similar considerations apply to the steps defined in
        claim 1 according to the third auxiliary request in
        order to obtain the video parameter.

48.   The terminology is somewhat different, claim 1 defines
        a more general version of the comparison with a base
        image in claim 1 of the second auxiliary request. This
        is apparent in the following step:

        ...
        defining a region of interest within the
        transaction area;
        automatically identifying a first frame of video
        data that indicates a first set of items in the
        region of interest;

automatically identifying a second frame of video
data that indicates a second set of items in the
region of interest, the first set of items being
visually distinct from the second set of items: and
automatically indicating the visual
distinctness of the first set of items from
the second set of items as an event
indicating an item existed within the
region of interest of the video data ....

In particular, the Board sees no difference in meaning
between an "updated background image" (or "empty base
image" in the terms of claim 1 according to the second
auxiliary request) and a first frame of video data that
indicates a first set of items in the region of
interest.

49.   The step of automatically indicating the visual
        distinctness of the first set of items from the second,
        as an event indicating that an item existed within the
        region of interest, refers to the actual result of the
        subtracting and thresholding processes envisaged above.

50.   For the reasons developed above with regard to the
        second auxiliary request, the recited features would
        have been obvious.

51.   The manual process of D6 also relies on the step of
        obtaining transaction data associated with the
        transaction terminal associated with the transaction
        area. The transaction data are indicative of items
        being registered as transaction items with the
        transaction terminal. The step of obtaining one
        transaction parameter means, in the context of the
        claimed invention, the automation of this step. It is

thus a step already envisaged when deciding on
automating the process of D6.

52.   In D6, the step of identifying suspicious activity,
        when transaction data are missing for an item indicated
        as being within the region of interest, is performed by
        the operator. The method of the invention simply
        automates this step. Independently of those two facts,
        however, the Board stresses that identifying suspicious
        activity does no more than reflect the discrepancy
        between the two sets of data. As emphasised above, it
        is the result of a mere comparison of lists of events
        deprived of any technical character.

53.   The subject-matter of claim 1 according to the third
        auxiliary request is thus not inventive in the sense of
        Article 56 EPC.

New fourth auxiliary request – Admissibility

54.   The new fourth auxiliary request was filed after
        notification of the summons to oral proceedings, in
        reaction to the accompanying preliminary opinion. Thus,
        its admission is subject to Article 13(2) RPBA 2020
        (cf. point 1 above) and the criteria of Article 13(1)
        RPBA 2020.

55.   The new fourth auxiliary request attempts to address
        the Board's preliminary view that the subject-matter of
        claim 1 according to the fourth auxiliary request was
        not inventive.

56.   The features added to claim 1 stem from original claims
        5, 9, and 10. Claim 1, however, does not incorporate
        the features of original claims 15, 26, and 27 which

were added in the new main request. While the newly
added features indeed address the objection of lack of
inventive step, claim 1 of the new fourth auxiliary
request focuses on aspects different than those pursued
in claim 1 of the new main request. The two sets of
claims are not convergent.

57.   The new fourth auxiliary request is thus not admitted
into the appeal proceedings.

Fourth auxiliary request - Inventive step (Article 56 EPC)

58.   Claim 1 of the fourth auxiliary request includes the
features of *identifying and transmitting to a reviewer
for review a segment of the video data where the video
event that is not identified as a transaction event
exists*.

59.   The added steps contribute, in the appellant's opinion,
to a reduction of data transmission or data storage.
They define a technical feature of the claimed method.

60.   The primary purpose of the added step is to allow a
review of mismatches.

61.   In the Board's judgment, the review suspicious activity
identified in the course of the automated process of
surveillance can be achieved in two alternative ways.
Whether the segment of video data identified as
referring to a possibly suspicious event is to be
transmitted or consulted by the reviewer on the video
terminal is merely a matter of preference. Neither of
the alternatives is inventive.

62.   Although transmission bandwidths were certainly more
        limited in 2005 than now, this would not constitute an
        obstacle for such transmission taking place. The Board
        is persuaded that the claimed alternative of
        identifying and transmitting a segment of the video
        data, would have been envisaged by the skilled person.

63.   For this reason, the subject-matter of claim 1
        according to the fourth auxiliary request is considered
        to be obvious in the sense of Article 56 EPC.

Auxiliary request 5 - Admissibility

64.   Auxiliary request 5 was filed during oral proceedings
        before the Board, in reaction to the non-admission or
        non-allowance of all the previous requests. Thus, its
        admission is subject to Article 13(2) RPBA 2020 (cf.
        point 1 above) and the criteria of Article 13(1) RPBA
        2020.

65.   The arguments put forward by the appellant are not
        sufficient to decide favourably on the admission of
        auxiliary request 5. The circumstances referred to by
        the appellant are not exceptional.

66.   The objections to lack of inventive step, set out in
        the Board's preliminary opinion, were along the same
        lines as in the Examining Division's refusal. Both the
        Examining Division (point 19 of the impugned decision)
        and the Board (points 16 and 34 of the preliminary
        opinion) referred to common general knowledge with
        regard to the general trend of automation and to
        certain aspects of image processing. It is not
        surprising that the debate during the oral proceedings
        concentrated on these aspects in more detail.

67.   The Board has not provided direct evidence for the
        existence of the common general knowledge referred to.
        This is justified under the circumstances, in view of
        the content of the description, which refers to the
        image processing techniques in question without
        explaining them or showing any implementation. This is
        an unambiguous indication that they were well-known. As
        mentioned above, a different conclusion would have led
        to an objection under Article 83 EPC, since the skilled
        person would have been at a loss as to what the terms
        used to define the techniques actually implied, and
        would have been unable to implement them.

68.   It follows that the arguments based on common general
        knowledge were to be expected. The appellant cannot
        rely on the element of surprise to justify the
        admissibility of auxiliary request 5.

69.   The present circumstances are not exceptional, and do
        not justify the admission of auxiliary request 5 which
        is thus not admitted into the proceedings (Article
        13(2) RPBA 2020).

70.   In the absence of an allowable claim request, the
        appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

D. Meyfarth   P. Scriven

Decision electronically authenticated