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- (71) **Applicant:** ALCATEL LUCENT [FR/FR]; 148/152
Route de la Reine, F-92100 Boulogne-billancourt (FR).
- (72) **Inventors:** GASTE, Yann; Alcatel-Lucent Bell Labs
France, Centre de Villardceaux, Route de Villejust, F-91620
Nozay (FR). PICAULT, Jerome; 6 allée Ascoli Piceno, F-
91300 Massy (FR). RIBIERE, Myriam; 21 Kenmore
Road, Belmont, MA 02478 (US). HEBBAR, Abdelkrim;
Alcatel-Lucent Bell Labs France, Route de Villejust, F-
91620 Nozay (FR).
- (74) **Agent:** MOUNEY, Jérôme; Alcatel-Lucent International,
148/152 Route de la Reine, F-92100 Boulogne-Billancourt
(FR).

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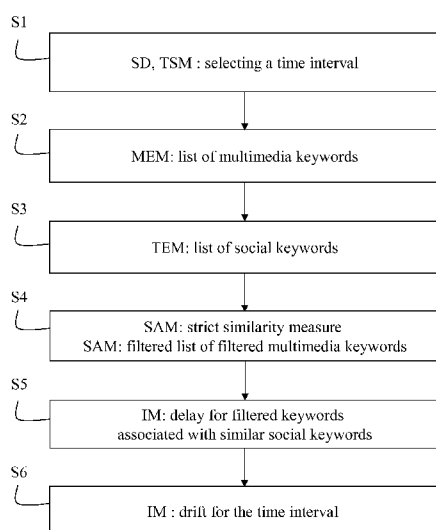
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(54) **Title:** SYNCHRONIZATION BETWEEN MULTIMEDIA FLOWS AND SOCIAL NETWORK THREADS

FIG. 3



(57) **Abstract:** For controlling synchronization between a multimedia flow and a related social network thread, a device able to capture the multimedia flow and the social network thread selects (S1) a time interval, determines (S2) a list of multimedia keywords associated with the multimedia flow and determines (S3) a list of social keywords associated with the social network thread, each multimedia keyword and each social keyword being associated with a timestamp. The device produces (S4) a filtered list of filtered multimedia keywords by selecting distinctive multimedia keywords, each filtered multimedia keyword being associated with a set of similar social keywords, computes (S5) a set of delays for at least one filtered multimedia keyword, each delay corresponding to the time difference between the timestamp of the filtered multimedia keyword and the timestamp of a similar social keyword associated with the filtered multimedia keyword, and determines (S6) a drift for the time interval by means of at least one set of delays.

SYNCHRONIZATION BETWEEN MULTIMEDIA FLOWS AND SOCIAL NETWORK THREADS

FIELD OF THE INVENTION

5 The present invention pertains to a mechanism for synchronization between multimedia flows and social network threads.

BACKGROUND

10 Social media services and micro blogging applications are changing the way in which many people consume traditional broadcast media. Real-time backchannel conversations are now common-place as people simultaneously watch TV whilst using social media to broadcast their own thoughts, sentiments, opinions and emotions related to what they are watching.

15 Yet, content analysis of social interactions such as social network threads may be a good approach for enriching knowledge about multimedia contents. The study of the content of social interactions associated to a multimedia flow can contribute to:

20 - Increase knowledge about the multimedia content: people often speak about what is happening in the multimedia content (events, people, places, etc.). This can be used to enrich the multimedia description, but also express various viewpoints, helpful to categorize the acquired knowledge with different levels of expressiveness.

25 - Extend the content by creating semantic links to other pieces of content (on the basis of similarities of interactions). This will let people discover alternative multimedia resources through other people's conversations.

30 Whatever the relevance of social media comments provided in relationship with a multimedia flow such a TV show, there is a natural delay between the time at which the user decides to react to what he is watching

and the time at which he posts his reaction (delay due to cognition, analysis, reaction and also due to the system: entry mode, device, network).

This delay is somehow considered as not significant and almost ignored by existing algorithms, which is probably relevant to index a whole
5 two hours video sequence for example. But taking into account the delay is particular mandatory:

- to provide efficiently a new format of socialized multimedia stream, containing both social and multimedia data,
- to enable in-media indexation and navigation in order to offer
10 dynamic navigation within the content segments based on the metadata structure.

Moreover, anchoring methods based only on time are not fully satisfactory, due to uncertainties related to the moment social media is produced, the type of platform used, or because social media is produced by
15 bursts which depends on the very content of the media.

Therefore, there is a need to provide a new, more flexible mechanism for synchronization of a broadcast multimedia content with the related social information.

20 SUMMARY

This summary is provided to introduce concepts related to the present inventive subject matter. This summary is not intended to identify essential features of the claimed subject matter nor is it intended for use in determining or limiting the scope of the claimed subject matter.

25 In accordance with one embodiment, a method is provided for controlling synchronization between a multimedia flow and a related social network thread, the method comprising the following steps in a device able to capture the multimedia flow and the social network thread:

selecting a time interval,

determining a list of multimedia keywords associated with a part of the multimedia flow corresponding to the time interval, each multimedia keyword being associated with a timestamp,

determining a list of social keywords associated with a part of the social network thread corresponding to the time interval, each social keyword being associated with a timestamp,

producing a filtered list of filtered multimedia keywords by selecting distinctive multimedia keywords, each filtered multimedia keyword being associated with a set of similar social keywords,

computing a set of delays for at least one filtered multimedia keyword, each delay corresponding to the time difference between the timestamp of the filtered multimedia keyword and the timestamp of a similar social keyword associated with the filtered multimedia keyword,

determining a drift for the time interval by means of at least one set of delays.

Advantageously, the invention offers a system allowing to deeply synchronize social network threads such as social data streams with multimedia flows, where the mechanism is based on the combination of a timestamp and the semantic similarity between the social network thread and the multimedia flow.

Additionally, beyond simple viewing or sharing facilities, an effective synchronization process between streams will improve the accuracy of the in-media indexation process, enabling more complex usages, consisting in organizing, transforming, decomposing and recomposing multimedia contents.

The benefit of this invention is to enable the synchronization of the broadcast multimedia content with the related social information regardless of the style (live or not live) of media consumption. It provides an innovative solution to anchor social data streams with multimedia content by completing and enhancing a pure timestamp synchronization process.

The system can use temporal information and semantics analysis to assemble different multimedia sources, leveraging and easing the production and the consumption of both social media services and micro blogging applications.

5

In an embodiment, the time interval is selected after having identified a peak in a related social network thread, the time interval end corresponding to the top of the peak.

In an embodiment, a peak is identified by a high variation of
10 messages volume in the social network thread.

In an embodiment, a distinctive multimedia keyword has a low number of occurrences among the multimedia keywords in the corresponding time interval.

In an embodiment, a similar social keyword associated with a filtered
15 multimedia keyword is a keyword that has similar meaning or that is semantically close with respect to the filtered multimedia keyword.

In an embodiment, a delay is computed for each similar social keyword in the list of social keywords.

In an embodiment, the drift for the time interval is determined if the
20 number of filtered multimedia keywords is greater than a predefined threshold.

In an embodiment, the drift for the time interval is determined if the number of delays associated with the filtered multimedia keyword is greater than a given threshold and if the entropy of the delays distribution is low.

25 In an embodiment, the drift for the time interval is determined by means of global delays related to filtered multimedia keywords, a global delay related to a filtered multimedia keyword being an average of a given number of delays associated with the filtered multimedia keyword.

In an embodiment, the drift corresponds to an average of all global
30 delays related to the filtered multimedia keywords.

In an embodiment, the list of multimedia keywords associated with the multimedia flow is determined after having extracted a multimedia fragment of the multimedia flow corresponding to the time interval, and after having analyzed content of the multimedia fragment to generate a multimedia fragment descriptor containing multimedia descriptive elements.

In an embodiment, the list of social keywords associated with the multimedia flow is determined after having analyzed a set of data in the social network thread corresponding to the time interval to generate a thread descriptor containing thread descriptive elements.

10

The invention also pertains to a device for controlling synchronization between a multimedia flow and a related social network thread, the device being able to capture the multimedia flow and the social network thread and comprising:

15 means for selecting a time interval,

means for determining a list of multimedia keywords associated with a part of the multimedia flow corresponding to the time interval, each multimedia keyword being associated with a timestamp,

20 means for determining a list of social keywords associated with a part of the social network thread corresponding to the time interval, each social keyword being associated with a timestamp,

means for producing a filtered list of filtered multimedia keywords by selecting distinctive multimedia keywords, each filtered multimedia keyword being associated with a set of similar social keywords,

25 means for computing a set of delays for at least one filtered multimedia keyword, each delay corresponding to the time difference between the timestamp of the filtered multimedia keyword and the timestamp of a similar social keyword associated with the filtered multimedia keyword,

30 means for determining a drift for the time interval by means of at least one set of delays.

The invention also pertains to a computer program capable of being implemented within a device, said program comprising instructions which, when the program is executed within said device, carry out steps of the method according to the invention.

5

BRIEF DESCRIPTION OF THE FIGURES

The present invention and the benefits thereof shall be better understood upon examining the description below, which makes reference to the attached figures, in which:

10 - FIG. 1 is a schematic block diagram of a communication system according to one embodiment of the invention for controlling a synchronization between a multimedia flow and a related social network thread;

- FIG. 2 illustrates an example of distribution of messages of a
15 network social thread over time; and

- FIG. 3 is an algorithm of a method for controlling a synchronization between a multimedia flow and a related social network thread according to one embodiment of the invention.

The same reference number represents the same element or the
20 same type of element on all drawings.

DESCRIPTION OF EMBODIMENTS

With reference to FIG. 1, a communication system according to the invention comprises a telecommunication network TN, a synchronization
25 device SD, at least one multimedia server MS and at least one social network server SNS.

The telecommunication network TN may be a wired or wireless network, or a combination of wired and wireless networks.

The telecommunication network TN can be a packet network, for
30 example, an IP ("Internet Protocol") high-speed network such as the Internet or an intranet, or even a company-specific private network.

As an introduction, a few terms and concepts that are helpful for understanding the invention are defined below.

The invention aims at offering a synchronization device SD intended
5 for computing a set of delays over the time based on a semantic analysis of a multimedia flow and social network thread related to a same multimedia content.

A multimedia flow is provided by a multimedia server MS toward a requesting communication device through the telecommunication network
10 TN.

A multimedia flow can be an IPTV (Internet Protocol TeleVision) stream, or may be any other kind of video stream, an audio stream, a slideshow, a text stream such as a news title stream, and the like.

The multimedia flow can be a live stream that is broadcasted by the
15 multimedia server MS and that is associated with an online or a real-time multimedia content. Alternatively, the multimedia flow can be associated with offline content like an uploaded content used by a dedicated service of the multimedia server.

20 A social network thread is an aggregation of essentially user posted messages, possibly in reply to each other, and possibly with enclosed or embedded contents such as pictures, short videos, links, etc. The social network threads are stored in social network databases that are located on remote at least one social network server SNS forming a social network
25 platform and are accessed via the internet.

For instance, social network threads may be annotations, like comments from a person about one element of a multimedia content, or conversations between people about a multimedia content.

In a social network thread, each message is associated with a time
30 stamp.

The timestamp associated to a message in a social network thread corresponds to the absolute time that has been registered by the social network platform when receiving the message, which is different from the reference time that is the moment of time in the multimedia flow the message is referring. Therefore, a strategy has to be put in place to perform a “drift correction” corresponding to the delay between the two different times.

The synchronization device SD comprises a time selection module TSM, a thread extraction module TEM, a multimedia extraction module MEM, a semantic analysis module SAM, an inspection module IM.

The time selection module TSM identifies peaks in social network threads.

To that end, the time selection module TSM selects a time window to build a map threads distribution over time.

As the amount and the distribution of data in threads can significantly vary over time, the time selection module TSM can use filtering algorithms like moving average or Gaussian filters in order to smooth out short-term fluctuations and to highlight longer-term trends or cycles. The threshold between short-term and long-term depends on the application, and the parameters of the moving average can be set accordingly.

The time selection module TSM can use peak detection algorithms, for example as described in reference “Simple Algorithms for Peak Detection in Time-Series”, [in Proc. 1st Int. Conf. Advanced Data Analysis, Business Analytics and Intelligence, 2009] in order to identify peaks or spikes in a given time-series of social network threads.

The smoothing out of short-term fluctuations allows to delete small variations that can correspond to some kind of noise or anomalies without relation with the topic of the social network thread.

The time selection module TSM selects a small length multimedia flow segment (e.g. 5 min, the value can be determined empirically) before an

“event” or a peak identified by a consequent variation of messages volume, i.e. numbers of messages in a social network thread during the length of the multimedia flow segment. In this way, each relevant peak identifies a time interval or a multimedia flow segment to target.

- 5 In reference with FIG. 2, the messages of a network social thread are for example “tweets” from TwitterTM. The distribution of the number of tweets over time is shown. Each selected multimedia flow segment to target is represented by a rectangle that coincides with a peak in the number of tweets. More precisely, the time of end of a segment coincides with a peak.
- 10 The peak means that an event has occurred, in other terms that users have reacted to the previous multimedia flow segment by posting many messages.

Referring back to FIG. 1, the thread extraction module TEM and the multimedia extraction module MEM are responsible for gathering knowledge

15 information from raw data streams related to social network threads and multimedia flows for targeted time intervals.

The thread extraction module TEM uses predictive methods for analyzing social network threads that are unstructured information and for generating descriptors for social network threads, potentially enriched with

20 context information and extended with general-purpose thesauri or dictionaries. The thread extraction module TEM captures vectors of keywords from social network threads associated to a time interval.

The multimedia extraction module MEM uses feature descriptors in image and video processing (or audio transcripts if available) to extract

25 knowledge information for the multimedia flows. The multimedia extraction module MEM applies analysis techniques to extract a vector of keywords. In a possible embodiment for audio streams, the multimedia extraction module MEM can use technologies such as speech to text plus keyword extraction for each sentence from a multimedia segment; for video streams, object

30 recognition, person recognition techniques can be used.

More especially, the multimedia extraction module MEM is configured to extract parts of a multimedia content as fragments, and to isolate multimedia fragments, containing frames or pictures, scenes or sound extracts.

5 The multimedia extraction module MEM can convert the multimedia fragments in data usable for search queries or analysis, by extracting descriptive elements and properties from the fragments. For example, if the fragments comprise a picture of an actor, the multimedia extraction module MEM may use a face recognition subunit to identify said actor, and isolate
10 his name as a relevant descriptive element to use in search queries. Other possible data sources include object recognition on the pictures, music and sound recognition on the audio track, optical character recognition (OCR), speech-to-text conversion, chromatic analysis and the like. The processes and techniques used to analyse the multimedia flow may be varying
15 according to the nature of said multimedia flow.

For example, if the multimedia flow is a radio or more generally a sound stream, the multimedia extraction module MEM can run voice detection methods to identify the presence of a speech. In case a speech is detected, the multimedia extraction module MEM uses a speech-to-text
20 conversion subunit to transcript the sound in searchable words. If no speech is detected, or in addition or in parallel to the speech-to-text transcription, the multimedia extraction module MEM may use sound or music recognition subunits, for example to identify the title and artist of a played music track, or the name of a sound source (instrument, animal, etc.) and use them as
25 keywords.

If the multimedia stream is a video stream or slide show, the multimedia extraction module MEM can use for example face or object recognition subunits, to identify people or objects on the multimedia fragment. The names obtained are then used as keywords.

30 The multimedia extraction module MEM may also use structural or descriptive metadata. For example, on an IPTV program, the title, a short

synopsis and/or the cast and authors and producers may be broadcasted by multiplexing the data with the multimedia content.

The thread extraction module TEM produces a list of social
5 keywords from the analysis of descriptors for social network threads in the time interval. Each social keyword is associated with a timestamp.

The multimedia extraction module MEM produces a list of multimedia keywords from the analysis of descriptors for the fragment of multimedia flow corresponding to the time interval. Each multimedia keyword is associated
10 with a timestamp.

The semantic analysis module SAM is in charge of performing a semantic analysis in the list of social keywords and the list of multimedia keywords.

15 For each time interval, a strict similarity measure is computed and used for the multimedia keywords. Any similarity metric of the literature can be used as far as it satisfies the following constraints:

1) a very high similarity ratio for comparing the diversity of sets a multimedia keywords, using for example semantic analysis with respect to
20 social keywords, and

2) multimedia keywords are previously filtered to only select distinctive words in the list of multimedia keywords.

As an example, a term frequency–inverse document frequency (TF–IDF) or dictionaries could be used to emphasize with a meaningful keywords
25 which happen the less frequently. A strict similarity measure process therefore provides possible co-occurrences with a high probability of pertinence. Examples of similarities include e.g. the cosine similarity or a similarity such as the Sorensen–Dice coefficient.

The semantic analysis module SAM produces a filtered list of filtered
30 multimedia keywords after the strict similarity measure on the initial list of multimedia keywords. For that, the semantic analysis module SAM selects

distinctive multimedia keywords that have a high similarity ratio with social keywords. For each distinctive multimedia keyword, “similar” keywords can appear several times in the social thread, and each similar social keyword can have several occurrences.

5 The semantic analysis module SAM selects similar social keywords that are present in the list of social keywords, and that are similar to filtered multimedia keyword. For each filtered keyword in the filtered list of filtered multimedia keywords, at least one similar social keyword in the list of social keywords is selected. Other occurrences of a similar social keyword can
10 appear in the list of social keywords; in this case, these occurrences are also selected. It is assumed that similar social keywords are keywords that have similar meaning or that are semantically close. At the end, each filtered multimedia keyword is associated with a set of similar social keywords.

15 The inspection module IM computes a delay value for a filtered multimedia keyword by taking the time difference between the timestamp of a similar social keyword in the list of social keywords and the timestamp of the filtered multimedia keyword in the filtered list of filtered multimedia keywords. A delay value is computed for each similar social keyword in the
20 list of social keyword.

 Finally, the inspection module IM provides a final list of keyword, each keyword being associated with a list of delays, the number of delays per keyword corresponding to the number of similar social keywords in the list of social keywords.

25

 The inspection module IM identifies if the time interval is qualified or not. A time interval is qualified if a significant number (defined empirically) of relevant keywords is found.

 To identify if a keyword is considered as relevant, the inspection
30 module IM checks two criteria:

1/ the numbers of delays associated with the keyword is greater than a threshold that is defined empirically; and

2/ the entropy (the variance for example) of the delays distribution is low. It means that delays calculated are more or less of the same order of magnitude.

The inspection module IM can then calculate a global delay for the keyword, for example as an average of all delays associated with the keyword or as an average of a given number of delays associated with the keyword.

10 If a time interval is considered as not relevant (i.e. there is no significant number of relevant keywords), the related results and the time interval are ignored for future synchronization process.

The inspection module IM determines a final drift for this qualified time interval by means of different global delays related to the relevant keywords. For example, the final drift corresponds to an average of all global delays related to the relevant keywords.

20 With reference to FIG. 3, a method for controlling a synchronization between a multimedia flow and a related social network thread according to one embodiment of the invention comprises steps S1 to S6 executed within the communication system.

In step S1, the time selection module TSM of the synchronization device SD selects a time interval, corresponding to a multimedia flow segment. The time interval is identified after having identified at least one peak in a related social network thread, the time interval end corresponding to the top of a peak.

In step S2, the multimedia extraction module MEM determines a list of multimedia keywords associated with the part of the multimedia flow

30

corresponding to the time interval, each multimedia keyword being associated with a timestamp.

For example, a fragment of the multimedia flow corresponding to the time interval is analysed for extracting significant elements such as: face,
5 object and character recognition for embedded images and videos, music and sound recognition for audio tracks.

In step S3, the thread extraction module TEM determines a list of social keywords associated with the part of the social network thread corresponding to the time interval, each social keyword being associated
10 with a timestamp.

Recurrent keywords are listed with the number of times they occur in the considered social network thread.

In step S4, the semantic analysis module SAM filters the list of multimedia keywords by using a strict similarity measure on the keywords in
15 the list. The semantic analysis module SAM produces a filtered list of filtered multimedia keywords after the strict similarity measure on the initial list of multimedia keywords.

To that end, the semantic analysis module SAM selects distinctive multimedia keywords that have a high similarity ratio with social keywords. It
20 is assumed that a distinctive multimedia keyword has a relative low number of occurrences among the set of multimedia keywords with respect to other multimedia keywords.

The similarity ratio can be based on a semantic analysis.

For each filtered multimedia keyword in the filtered list, the semantic
25 analysis module SAM selects a set of social keywords in the list of social keywords that are similar to the filtered multimedia keyword. Each filtered multimedia keyword is then associated with a set of similar social keywords.

In step S5, the inspection module IM computes a delay value for a filtered multimedia keyword by taking the time difference between the
30 timestamp of the filtered multimedia keyword and the timestamp of a similar social keyword associated with the filtered multimedia keyword. A delay

value can be computed for each similar social keyword in the list of social keywords. The inspection module IM computes a delay value for each filtered multimedia keyword.

The inspection module IM provides a final list of filtered multimedia
5 keywords, each filtered multimedia keyword being associated with a list of delays, the number of delays per filtered multimedia keyword corresponding to the number of similar social keywords in the list of social keywords. Each filtered multimedia keyword in the final list can be a multimedia keyword as each multimedia keyword has only one occurrence in the filtered list of
10 multimedia keywords.

In step S6, the inspection module IM identifies if the time interval is qualified or not. A time interval is qualified if a significant number of different relevant filtered multimedia keywords is found, i.e. if the number of different
15 relevant filtered multimedia keywords is greater than a predefined threshold.

A filtered multimedia keyword is considered as relevant if the numbers of delays associated with the filtered multimedia keyword is greater than a given threshold and if the entropy of the delays distribution is low.

The inspection module IM calculates a global delay for the filtered
20 multimedia keyword, by means of the delays related to the filtered multimedia keyword.

The inspection module IM determines a final drift for the qualified time interval by means of different delays related to the relevant filtered
25 multimedia keywords, more especially by means of different global delays related to the relevant filtered multimedia keywords. The final drift is representative of the average time difference between the multimedia flow and the related social network thread.

For example, the final drift value can be used to adjust the real
30 timestamp of tweets to be displayed together with a “replay-able” socialized multimedia content, i.e. a multimedia content that can be downloaded and

that is associated with a social network thread. Thus, the final drift value is used to synchronize the multimedia flow with the social network thread.

The invention described here relates to a method and a device for
5 controlling a synchronization between a multimedia flow and a related social network thread. According to one implementation of the invention, the steps of the invention are determined by the instructions of a computer program incorporated into a device, such as the synchronization device SD. The program comprises program instructions which, when said program is loaded
10 and executed within the device, carry out the steps of the method.

Consequently, the invention also applies to a computer program, particularly a computer program on or within an information medium, suitable to implement the invention. This program may use any programming language, and be in the form of source code, object code, or intermediate
15 code between source code and object code, such as in a partially compiled form, or in any other form desirable for implementing the method according to the invention.

CLAIMS

1. A method for controlling synchronization between a multimedia flow and a related social network thread, comprising the following steps in a
5 device able to capture the multimedia flow and the social network thread:
 selecting (S1) a time interval,
 determining (S2) a list of multimedia keywords associated with a part of the multimedia flow corresponding to the time interval, each multimedia keyword being associated with a timestamp,
10 determining (S3) a list of social keywords associated with a part of the social network thread corresponding to the time interval, each social keyword being associated with a timestamp,
 producing (S4) a filtered list of filtered multimedia keywords by selecting distinctive multimedia keywords, each filtered multimedia keyword
15 being associated with a set of similar social keywords,
 computing (S5) a set of delays for at least one filtered multimedia keyword, each delay corresponding to the time difference between the timestamp of the filtered multimedia keyword and the timestamp of a similar social keyword associated with the filtered multimedia keyword,
20 determining (S6) a drift for the time interval by means of at least one set of delays.
2. A method according to claim 1, wherein the time interval is selected after having identified a peak in a related social network thread, the time
25 interval end corresponding to the top of the peak.
3. A method according to claim 2, wherein a peak is identified by a high variation of messages volume in the social network thread.

4. A method according to any of claims 1 to 3, wherein a distinctive multimedia keyword has a low number of occurrences among the multimedia keywords in the corresponding time interval.
- 5 5. A method according to any of claims 1 to 4, wherein a similar social keyword associated with a filtered multimedia keyword is a keyword that has similar meaning or that is semantically close with respect to the filtered multimedia keyword.
- 10 6. A method according to any of claims 1 to 5, wherein a delay is computed for each similar social keyword in the list of social keywords.
7. A method according to claims 1 to 6, wherein the drift for the time interval is determined if the number of filtered multimedia keywords is
15 greater than a predefined threshold.
8. A method according to any of claims 1 to 7, wherein the drift for the time interval is determined if the number of delays associated with the filtered multimedia keyword is greater than a given threshold and if the
20 entropy of the delays distribution is low.
9. A method according to any of claims 1 to 8, wherein the drift for the time interval is determined by means of global delays related to filtered multimedia keywords, a global delay related to a filtered multimedia keyword
25 being an average of a given number of delays associated with the filtered multimedia keyword.
10. A method according to claim 9, wherein the drift corresponds to an average of all global delays related to the filtered multimedia keywords.

11. A method according to any of claims 1 to 10, wherein the list of multimedia keywords associated with the multimedia flow is determined after having extracted a multimedia fragment of the multimedia flow corresponding to the time interval, and after having analyzed content of the multimedia
5 fragment to generate a multimedia fragment descriptor containing multimedia descriptive elements.

12. A method according to any of claims 1 to 11, wherein the list of social keywords associated with the multimedia flow is determined after
10 having analyzed a set of data in the social network thread corresponding to the time interval to generate a thread descriptor containing thread descriptive elements.

13. A device (SD) for controlling synchronization between a multimedia
15 flow and a related social network thread, the device being able to capture the multimedia flow and the social network thread and comprising:

means (TSM) for selecting a time interval,

means (MEM) for determining a list of multimedia keywords associated with a part of the multimedia flow corresponding to the time
20 interval, each multimedia keyword being associated with a timestamp,

means (TEM) for determining a list of social keywords associated with a part of the social network thread corresponding to the time interval, each social keyword being associated with a timestamp,

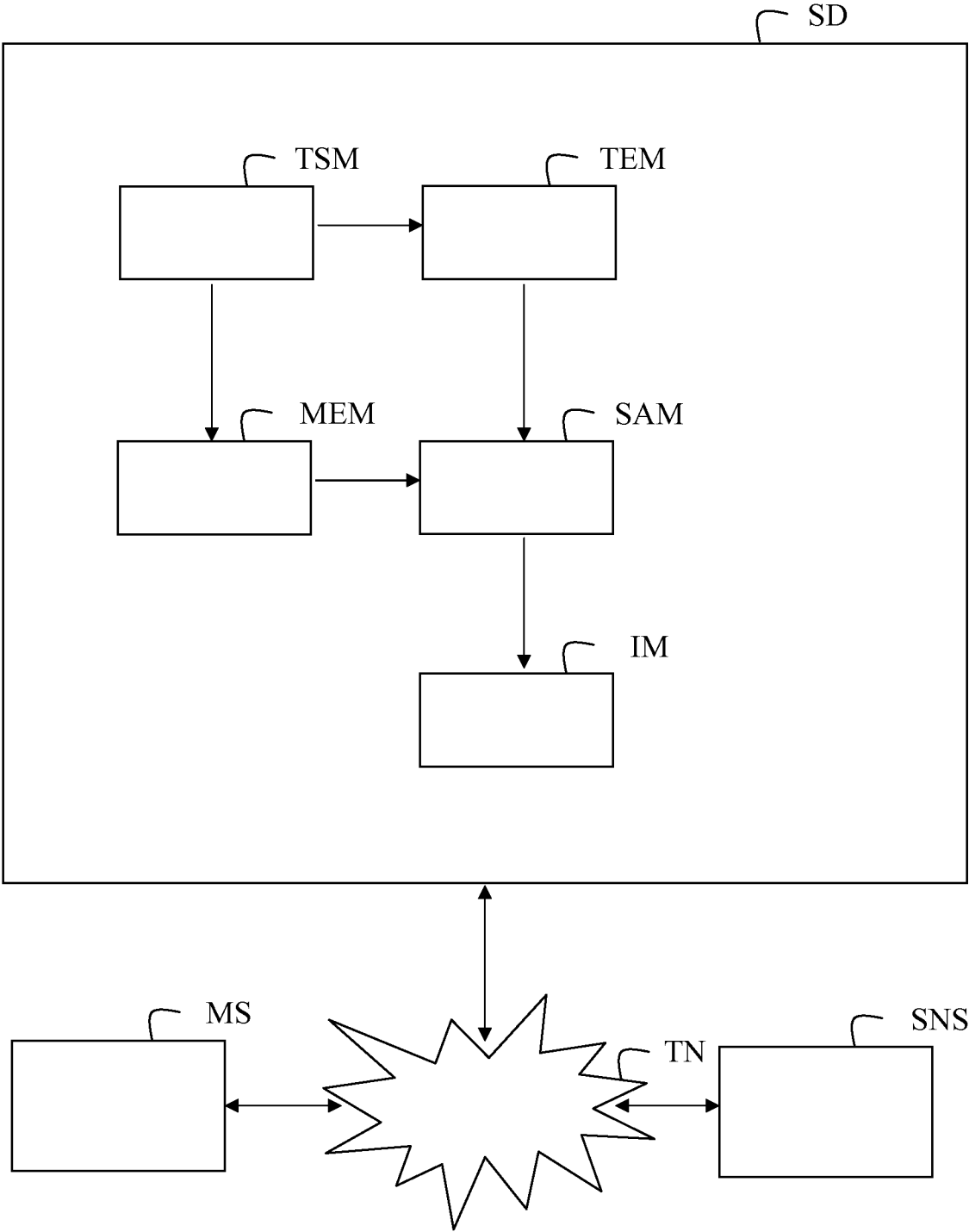
means (SAM) for producing a filtered list of filtered multimedia
25 keywords by selecting distinctive multimedia keywords, each filtered multimedia keyword being associated with a set of similar social keywords,

means (IM) for computing a set of delays for at least one filtered multimedia keyword, each delay corresponding to the time difference between the timestamp of the filtered multimedia keyword and the timestamp
30 of a similar social keyword associated with the filtered multimedia keyword,

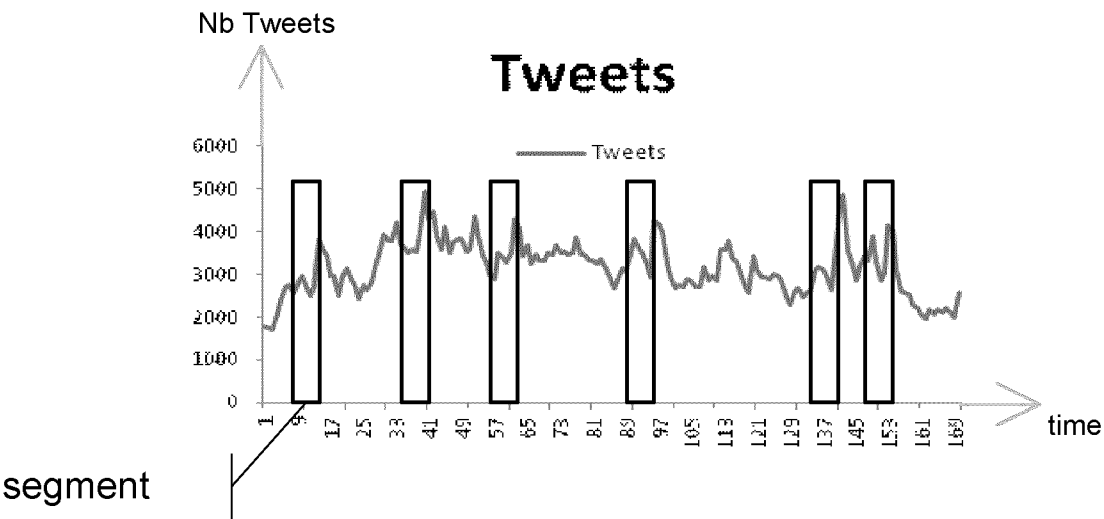
means (IM) for determining a drift for the time interval by means of at least one set of delays.

14. A computer program capable of being implemented within a device
5 for controlling synchronization between a multimedia flow and a related social network thread, the device being able to capture the multimedia flow and the social network thread, said program comprising instructions which, when the program is loaded and executed within said device, carry out the following steps:
- 10 selecting (S1) a time interval,
determining (S2) a list of multimedia keywords associated with a part of the multimedia flow corresponding to the time interval, each multimedia keyword being associated with a timestamp,
determining (S3) a list of social keywords associated with a part of
15 the social network thread corresponding to the time interval, each social keyword being associated with a timestamp,
producing (S4) a filtered list of filtered multimedia keywords by selecting distinctive multimedia keywords, each filtered multimedia keyword being associated with a set of similar social keywords,
20 computing (S5) a set of delays for at least one filtered multimedia keyword, each delay corresponding to the time difference between the timestamp of the filtered multimedia keyword and the timestamp of a similar social keyword associated with the filtered multimedia keyword,
determining (S6) a drift for the time interval by means of at least one
25 set of delays.

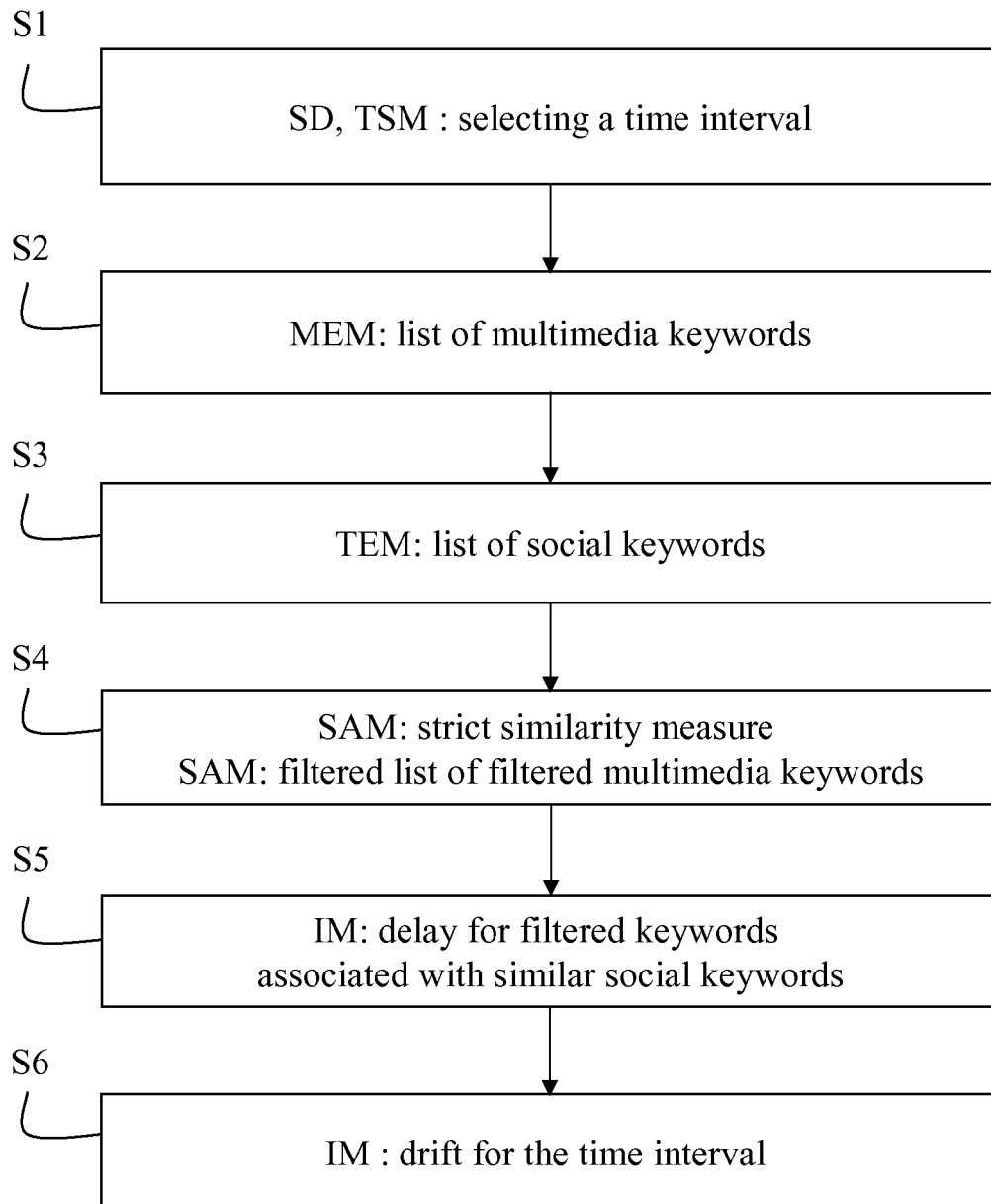
1/3
FIG. 1



2/3
FIG. 2



3/3
FIG. 3



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/061362

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04N21/4788 H04N21/845 G06Q50/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04N G06Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2011/009101 A1 (BLUEFIN LAB INC [US]; FLEISCHMAN MICHAEL BEN [US]; ROY DEB KUMAR [US]) 20 January 2011 (2011-01-20) paragraph [0062] - paragraph [0065] paragraph [0075] - paragraph [0098] paragraph [0105] paragraph [0120] - paragraph [0122] figures 1-12B	1-14
A	----- ADAM MARCUS ET AL: "Twitinfo", CHI 2011, 7 May 2011 (2011-05-07), page 227, XP055044158, DOI: 10.1145/1978942.1978975 ISBN: 978-1-45-030228-9 abstract section "Event Detection"; page 230 - page 231 ----- -/--	8



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"P" document published prior to the international filing date but later than the priority date claimed

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Date of the actual completion of the international search

30 July 2014

Date of mailing of the international search report

05/08/2014

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Arpaci, Mutlu

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/061362

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	MASAMI NAKAZAWA ET AL: "Social Indexing of TV Programs: Detection and Labeling of Significant TV Scenes by Twitter Analysis", ADVANCED INFORMATION NETWORKING AND APPLICATIONS WORKSHOPS (WAINA), 2012 26TH INTERNATIONAL CONFERENCE ON, IEEE, 26 March 2012 (2012-03-26), pages 141-146, XP032169774, DOI: 10.1109/WAINA.2012.188 ISBN: 978-1-4673-0867-0 abstract section III.A "Significant Scene Detection"; page 142 figure 1	8
A	----- WO 2013/045123 A1 (IBM [US]; IBM UK [GB]; WOULD DANIEL EDWARD [GB]; WHITBOURNE MATTHEW [G] 4 April 2013 (2013-04-04) abstract	1-14
A	----- SHAWNDRA HILL ET AL: "Social TV", DATA MINING FOR ONLINE ADVERTISING AND INTERNET ECONOMY, ACM, 2 PENN PLAZA, SUITE 701 NEW YORK NY 10121-0701 USA, 12 August 2012 (2012-08-12), pages 1-9, XP058009583, DOI: 10.1145/2351356.2351360 ISBN: 978-1-4503-1545-6 abstract -----	1-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2014/061362

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			EP 2454712 A1 23-05-2012
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			US 2013086489 A1 04-04-2013
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