comprehensive audio and video recordings relative to each day, and thus enable the users to generate a digital storage of their life lived. Even today's smartphone applications may be configured to track context, such as location and time, through publicly available application programming interfaces. Data that can be collected in a smartphone may naturally be used locally in the same device. For instance, obtained temperature data can be shown on the screen of the phone. However, some data could be, at least occasionally, worth sending to remote entities.

A number of prior art arrangements specifically propose exploiting information on the usage of data in wireless devices for providing personalized service in return. For example, publication US2004181604 discloses a method for enhancing the relevance of content provided to communication devices, comprising: pushing content notifications relating to a plurality of topics to a communication device via a notification service; receiving content usage information from the communication device; modifying the topics targeted for the communication device based on the content usage information of the communication device; and pushing the content notifications related to the modified topics to the communication device via the notification service.

Although various prior art solutions mention collecting data from wireless devices, they do not really provide tangible means for proceeding with data analysis, exploration and exploitation. The solutions simply disclose collecting some predetermined data items from wireless devices or executing generic analytics regarding the usage of e.g. the Internet with simple statistical tools, for example. Moreover, the contemporary techniques highly rely on manual labour, are more or less use-case centric, typically monitor only a very limited number of events according to fixed and substantially memoryless schemes, and store and distribute the gathered data basically as is with narrow analytical scope.

SUMMARY OF THE INVENTION

Embodiments~~The objective~~ of the present invention seek~~is~~ to alleviate at least some of the drawbacks of the prior art solutions and provide an intelligent, flexible, effective and adaptive centralized alternative for monitoring and analyzing the usage and context of wireless devices. According to an embodiment, there is provided~~The objective is met by~~ an automated data mining engine and related platform~~ of the present invention~~, which may be implemented as a server arrangement, e.g. software architecture therein. The devised server arrangement may be configured to execute processing and interpretation of behavioural,

contextual, and preferably also technical observations provided by a plurality of wireless devices, operations of an automated data mining engine, and distribution of the derived information through application programming interfaces (APIs) towards external systems. The server arrangement may be applied in various kinds of analysis and/or control applications of both today and the future, which often have significant practical relevance.

According to an aspect, there is provided a server arrangement to process observation data of wireless devices, comprising: data input logic to obtain observation data from the wireless devices the observation data comprising application usage data; data mining logic to process the observation data to identify temporally adjacent applications to generate usage metric data; and data distribution logic to transmit advertisements to the wireless devices based on the usage metric data.

Accordingly, in an embodiment~~aspect~~ of the present invention, a server arrangement for managing observation data of wireless devices, such as smartphones, comprises

a data input logic for obtaining observation data from a number of wireless devices and optionally supplementary data from a number of other external data sources, the obtained data including behavioural, contextual, and optionally technical raw data relative to the wireless devices,

a data mining logic for establishing a number of derived data elements, such as data tables or databases, on the basis of processing and analysing the obtained observation and optional supplementary data, said processing and analysing incorporating aggregation and optionally correlation, clustering, and/or factoring procedures, wherein at least one derived data element includes usage metrics with contextual and optionally technical dimension relative to one or more applications or other features of one or more wireless devices and users thereof,

a data storage for storing the obtained data and the number of derived information elements, and

a data distribution logic for providing derived data to one or more other entities.

In one embodiment, the data distribution logic may, for example, push data to another entity or serve a data query constructed by the another entity through provision of derived information from one or more derived data elements according to the push logic settings or query parameters, respectively.

The contextual dimension may refer to contextual elements, e.g. time or location, in relation to which the behavioural usage data is established. Technical dimension may correspondingly refer to technical data.

Last, various embodiments of the data distribution layer of the present invention may provide a unique approach to modularize the use of the data extracted from wireless devices, and to integrate the data mining system with different practical applications. The defined API facilitates independent processing and analysis of data within the arrangement, and optimized provisioning of the data, either in a push or pull mode, to external systems and entities (which may still be physically integrated with the server). These external systems and entities might be, for example, mobile advertising platforms or network management platforms.

According to another aspect, there is provided a method to cultivate observation data for wireless devices, comprising: obtaining and storing the observation data from the wireless devices, the observation data including application usage data; to identify temporally adjacent applications to generate usage metric data; and transmitting advertisements to the wireless devices based on the usage metric data.

In an embodiment~~another aspect~~, a method for cultivating observation data provided by a number of wireless devices, comprises

-obtaining and storing observation data from a number of wireless devices and optionally supplementary data from a number of other external data sources, the obtained data including behavioural, contextual, and optionally technical raw data relative to the wireless devices,

-establishing and storing a number of derived data elements on the basis of processing and analysing the obtained observation and optional supplementary data, said processing and analysing incorporating aggregating and optionally correlating, clustering, and/or factoring procedures, wherein at least one derived data element includes usage metrics with contextual and optionally technical dimension relative to one or more applications or other features of one or more wireless devices and users thereof, and

-providing derived data from one or more derived data elements to one or more other entities, such as serving a data query created by an external entity through provision of derived information from one or more derived data elements according to the query parameters.

In view of the terminology generally applied in this document, "behavioural data" is related to actual usage habits and behavior of the end-users of the wireless devices. Behavioural data may reflect the usage of applications, communication patterns, content consumption and/or interaction with the device user interface, for example. In this specific context the behavioural data supplied by the wireless devices is also rather specific to particular platforms (e.g. available smartphone device platforms, such as Google Android, RIM Blackberry, Windows Mobile, Symbian S60, Apple iPhone) and in that way incomparable to behavioural data acquired from other