

aspect sentiment for a product aspect from data relating to the product, the method being in accordance with the seventh aspect.

~~A tenth aspect provides~~In a first embodiment, there is provided a method
5 for ranking product aspects based on data relating to the product, the
method comprising: identifying product aspects from the data; generating
a weighting factor for each identified product aspect based on a frequency
of occurrence of the product aspect in the data and a measure of influence
of the identified product aspect; and ranking the identified product aspects
10 based on the generated weighting factors.

~~An eleventh aspect provides~~In a second embodiment, there is provided an
apparatus for ranking product aspects based on data relating to the
product, the apparatus comprising: at least one processor; and at least
15 one memory including computer program code; the at least one memory
and the computer program code configured to, with the at least one
processor, cause the apparatus at least to: identify product aspects from
the data; generate a weighting factor for each identified product aspect
based on a frequency of occurrence of the product aspect in the data and
20 a measure of influence of the identified product aspect; and rank the
identified product aspects based on the generated weighting factors.

~~A twelfth aspect provides~~In a third embodiment, there is provided a
computer-readable storage medium having stored thereon computer
25 program code which when executed by a computer causes the computer
to execute a method for ranking product aspects based on data relating to
the product, the method being in accordance with the ~~tenth aspect~~first
embodiment.

~~A thirteenth aspect provides~~In a fourth embodiment, there is provided a
30 method for determining a product sentiment from data relating to the
product, the method comprising: determining ranked product aspects
relating to the product based on a first portion of the data in accordance

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with the ~~tenth aspect~~first embodiment; identifying one or more features from a second portion of the data, the or each feature identifying

a ranked product aspect and a corresponding opinion; classifying each feature into one of a plurality of opinion classes based on its corresponding opinion, each opinion class being associated with a different opinion; and determining the product sentiment based on which one of the plurality of opinion classes contains the most features.

~~A fourteenth aspect provides~~In a fifth embodiment, there is provided an apparatus for determining a product sentiment from data relating to the product, the apparatus comprising: at least one processor; and at least one memory including computer program code; the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus at least to: determine ranked product aspects relating to the product based on a first portion of the data using the apparatus of the eleventh aspect; identify one or more features from a second portion of the data, the or each feature identifying a ranked product aspect and a corresponding opinion; classify each feature into one of a plurality of opinion classes based on its corresponding opinion, each opinion class being associated with a different opinion; and determine the product sentiment based on which one of the plurality of opinion classes contains the most features.

~~A fifteenth aspect provides~~In a sixth embodiment, there is provided a computer-readable storage medium having stored thereon computer program code which when executed by a computer causes the computer to execute a method for determining a product sentiment from data relating to the product, the method being in accordance with the ~~thirteenth aspect~~fourth embodiment.

~~A sixteenth aspect provides~~In a seventh embodiment, there is provided a method for generating a product review summary based on data relating to the product, the method comprising: determining ranked product aspects relating to the product based on a first portion of the data in accordance with the ~~tenth aspect~~first embodiment; extracting one or more

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data segments from a second portion of the data, calculating a relevance score for the or each extracted data segment based on whether the data segment identifies a ranked product aspect and contains a

corresponding opinion; and, generating a product review summary comprising one or more of the extracted data segments in dependence on their respective relevance scores.

- 5 | ~~A seventeenth aspect provides~~ In an eighth embodiment, there is provided
 an apparatus for generating a product review summary based on data
 relating to the product, the apparatus comprising: at least one processor;
 and at least one memory including computer program code; the at least
 one memory and the computer program code configured to, with the at
 10 | least one processor, cause the apparatus at least to: determine ranked
 product aspects relating to the product based on a first portion of the data
 using the apparatus of the eleventh aspect; extract one or more data
 segments from a second portion of the data, calculate a relevance score
 for the or each extracted data segment based on whether the data
 15 | segment identifies a ranked product aspect and contains a corresponding
 opinion; and, generate a product review summary comprising one or more
 of the extracted data segments in dependence on their respective
 relevance scores.
- 20 | ~~An eighteenth aspect provides~~ In a ninth embodiment, there is provided a
 computer-readable storage medium having stored thereon computer
 program code which when executed by a computer causes the computer
 to execute a method for generating a product review summary based on
 data relating to the product, the method being in accordance with the
 25 | ~~sixteenth aspect~~ seventh embodiment.

It is to be understood that in the following description, the further features
 and advantages of one aspect, for example, a method, are equally
 applicable and are hereby restated in respect of corresponding aspects,
 30 | for example, a corresponding apparatus or a corresponding computer-
 readable medium.

extract from the data segment an opinion corresponding to the product aspect to which the data segment relates; and

classify the extracted opinion into one of a plurality of opinion classes, each opinion class being associated with a different opinion, the aspect sentiment being the opinion associated with the one opinion class.

27. A computer-readable storage medium having stored thereon computer program code which when executed by a computer causes the computer to execute a method for determining an aspect sentiment for a product aspect from data relating to the product, the method being in accordance with any one of claims 24 to 25.

~~28. A method for ranking product aspects based on data relating to the product, the method comprising:~~

~~identifying product aspects from the data;~~

~~generating a weighting factor for each identified product aspect based on a frequency of occurrence of the product aspect in the data and a measure of influence of the identified product aspect; and~~

~~ranking the identified product aspects based on the generated weighting factors.~~

~~29. The method of claim 28, wherein identifying a product aspect from the data comprises extracting one or more noun phrases from the data.~~

~~30. The method of claim 29, further comprising classifying an extracted noun phrase into an aspect class if the extracted noun phrase corresponds with a product aspect associated with the aspect class, the aspect class being associated with one or more different product aspects.~~

~~31. The method of claim 29 or 30, further comprising clustering together multiple different extracted noun phrases, wherein each of the multiple~~

~~different extracted noun phrases comprises a corresponding synonym term.~~

~~32. The method of any of claims 28 to 31, further comprising:~~

~~determining an aspect sentiment for an identified product aspect based on the data; and~~

~~determining the measure of influence of the identified product aspect using the aspect sentiment.~~

~~33. The method of claim 32, wherein determining an aspect sentiment comprises:~~

~~extracting one or more aspect opinions from the data, the or each aspect opinion identifying the identified product aspect and a corresponding opinion;~~

~~classifying the or each aspect opinion into one of a plurality of opinion classes based on its corresponding opinion, each opinion class being associated with a different opinion; and~~

~~determining the aspect sentiment for the identified product aspect based on which one of the plurality of opinion classes contains the most aspect opinions.~~

~~34. The method of claim 32, wherein determining an aspect sentiment is performed in accordance with the method of claim 24.~~

~~35. The method of any one of claims 32 to 34, wherein determining the measure of influence comprises:~~

~~determining a product sentiment for the product from the data, the product sentiment being associated with an opinion; and~~

~~comparing the aspect sentiment for the identified product aspect and the product sentiment for the product to determine the measure of influence.~~

~~36. The method of claim 35, wherein determining the product sentiment comprises:~~

~~extracting one or more product opinions from the data, the or each product opinion identifying the product and a corresponding opinion;~~

~~classifying the or each product opinion into one of a plurality of opinion classes based on its corresponding opinion, each opinion class being associated with a different opinion; and~~

~~determining the product sentiment for the product based on which one of the plurality of opinion classes contains the most product opinions.~~

~~37. The method of any one of claims 28 to 36 wherein identifying a product aspect from the data is performed in accordance with the method of claim 19.~~

~~38. An apparatus for ranking product aspects based on data relating to the product, the apparatus comprising:~~

~~at least one processor;~~

~~and at least one memory including computer program code;~~

~~the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus at least to:~~

~~identify product aspects from the data;~~

~~generate a weighting factor for each identified product aspect based on a frequency of occurrence of the product aspect in the data and a measure of influence of the identified product aspect; and~~

~~rank the identified product aspects based on the generated weighting factors.~~

~~39. A computer-readable storage medium having stored thereon computer program code which when executed by a computer causes the computer to execute a method for ranking product aspects based on data relating to the product, the method being in accordance with any one of claims 28 to 37.~~

~~40. A method for determining a product sentiment from data relating to the product, the method comprising:~~

~~determining ranked product aspects relating to the product based on a first portion of the data in accordance with the method of any one of claims 28 to 36;~~

~~identifying one or more features from a second portion of the data, the or each feature identifying a ranked product aspect and a corresponding opinion;~~

~~classifying each feature into one of a plurality of opinion classes based on its corresponding opinion, each opinion class being associated with a different opinion; and~~

~~determining the product sentiment based on which one of the plurality of opinion classes contains the most features.~~

~~41. The method of claim 40, wherein the product sentiment is determined based on the aspect rankings corresponding to the features.~~

~~42. The method of claim 40 or 41, wherein the plurality of opinion classes includes a positive opinion class and a negative opinion class.~~

~~43. The method of any one of claims 40 to 42, wherein the first portion of the data comprises a plurality of separate reviews of the product and the second portion of the data comprises a single review of the product.~~

~~44. The method of any one of claims 40 to 42, wherein the second portion of the data comprises a plurality of reviews of the product, and the method further comprises:~~

~~representing each review in the second portion of the data as a vector, each vector indicating the presence or absence of each feature in the associated review, wherein each feature is weighted in the vector based on the aspect ranking corresponding to the feature; and~~

wherein a product sentiment is determined based on each vector to determine a product sentiment for each review in the second portion of the data.

5 ~~45.~~An apparatus for determining a product sentiment from data relating to the product, the apparatus comprising:

at least one processor;

and at least one memory including computer program code;

10 the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus at least to:

determine ranked product aspects relating to the product based on a first portion of the data using the apparatus of claim 38;

15 identify one or more features from a second portion of the data, the or each feature identifying a ranked product aspect and a corresponding opinion;

classify each feature into one of a plurality of opinion classes based on its corresponding opinion, each opinion class being associated with a different opinion; and

20 determine the product sentiment based on which one of the plurality of opinion classes contains the most features.

25 ~~46.~~A computer-readable storage medium having stored thereon computer program code which when executed by a computer causes the computer to execute a method for determining a product sentiment from data relating to the product, the method being in accordance with any one of claims 40 to 44.

~~47.~~A method for generating a product review summary based on data relating to the product, the method comprising:

30 determining ranked product aspects relating to the product based on a first portion of the data in accordance with the method of any one of claims 28 to 36;

extracting one or more data segments from a second portion of the data;

calculating a relevance score for the or each extracted data segment based on whether the data segment identifies a ranked product aspect and contains a corresponding opinion; and,

generating a product review summary comprising one or more of the extracted data segments in dependence on their respective relevance scores.

48. The method of claim 47, wherein the relevance score of an extracted data segment is dependent on the ranking of the ranked product aspect identified by the data segment.

49. The method of claim 47 or 48, wherein the relevance score of an extracted data segment is dependent on whether its corresponding opinion matches an overall opinion of the product.

50. The method of any one of claims 47 to 50, further comprising:

comparing the relevance score for an extracted data segment against a predetermined threshold; and,

including the extracted data segment in the product review summary in dependence on the comparison.

51. An apparatus for generating a product review summary based on data relating to the product, the apparatus comprising:

at least one processor;

and at least one memory including computer program code;

the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus at least to:

determine ranked product aspects relating to the product based on a first portion of the data using the apparatus of claim 38;

extract one or more data segments from a second portion of the data;

~~calculate a relevance score for the or each extracted data segment based on whether the data segment identifies a ranked product aspect and contains a corresponding opinion; and,~~

5 ~~generate a product review summary comprising one or more of the extracted data segments in dependence on their respective relevance scores.~~

10 ~~52. A computer-readable storage medium having stored thereon computer program code which when executed by a computer causes the computer to execute a method for generating a product review summary based on data relating to the product, the method being in accordance with any one of claims 47 to 50.~~