

CLAIMS

1. A machine learning method for assessing new product concepts, the method comprising:

receiving an input indicating a plurality of candidate new product concepts, each candidate new product concept comprising a natural language name and description of a candidate new product;

for each candidate new product concept, extracting product ingredient data and product theme data, the product ingredient data indicating at least one product ingredient and the product theme data indicating at least one product theme;

for each candidate new product concept, determining a relevance metric using a market model, the market model comprising a machine learning model trained to provide relevance scores for product themes and product ingredients, and determining an originality metric using a cluster model trained on existing products;

ranking the candidate new product concepts in a ranking order according to the respective relevance metrics and originality metrics;

generating a ranked list of candidate new product concepts according to the ranking order; and

outputting the ranked list of candidate new product concepts.

2. A machine learning method according to claim 1, wherein extracting product ingredient data and product theme data, comprises using an embedding model and a recognition model.

3. A machine learning method according to claim 2, wherein the embedding model comprises mappings from a plurality of languages.

4. A machine learning method according to any one of claims 1 to 3, wherein determining a relevance metric using a market model for each candidate new product concept comprises:

simulating a consumer response to each respective candidate new product concept using a plurality of simulated agents which are configured to update the market model and thereby obtain a respective simulated market model for the respective candidate new product concept, and determining the respective relevance

metric from the respective simulated market model for the candidate new product concept.

5. A machine learning method according to claim 4, wherein simulating the consumer response to the candidate new product using a plurality of simulated agents comprises simulating interactions between simulated agents over a plurality of simulation cycles, wherein each simulated agent of the plurality of simulated agents is configured to be connected to a respective set of other simulated agents of the plurality of simulated agents and thereby influence behavior of the set of other simulated agents.

6. A method according to claim 5, wherein a first simulated agent of the plurality of simulated agents has a higher number of connections than a second simulated agent of the plurality of simulated agents.

7. A method of training a market model to provide relevance scores for product themes and product ingredients, the method comprising:

- monitoring social network posts to collect data;
- extracting product ingredient data and product theme data from the collected data;
- training a recognition engine using the collected data to recognize ingredients and product themes from the collected data; and
- training a market model based on the ingredients and the product themes.

8. A method of training a market model according to claim 7, wherein monitoring social network posts to collect data comprises implementing a plurality of market sensors.

9. A method of training a market model according to claim 7 or claim 8, wherein the collected data comprises text data and image data and wherein extracting product ingredient and product theme data from the collected data comprises implementing a joint text and image embedding layer.

10. A method of training according to any one of claims 7 to 9, wherein extracting product ingredient and product theme data from the collected data comprises implementing a multi-lingual embedding layer.

11. A computer readable medium storing processor executable instructions which when executed on a processor cause the processor to carry out a method according to any one of claims 1 to 10.

12. A machine learning system for assessing new product concepts, the system comprising:

a processor;

a data storage device storing: a market model comprising a machine learning model trained to provide relevance scores for product themes and product ingredients; and a cluster model trained on existing products; and

a program storage device storing computer program instructions operable to cause the processor to:

receive an input indicating a plurality of candidate new product concepts, each candidate new product concept comprising a natural language name and description of a candidate new product;

for each candidate new product concept, extract product ingredient data and product theme data, the product ingredient data indicating at least one product ingredient and the product theme data indicating at least one product theme;

for each candidate new product concept, determining a relevance metric using the market model, and determine an originality metric using the cluster model;

rank the candidate new product concepts in a ranking order according to the respective relevance metrics and originality metrics;

generate a ranked list of candidate new product concepts according to the ranking order; and

output the ranked list of candidate new product concepts.

13. A machine learning system according to claim 12, wherein the program storage device further stores computer program instructions operable to cause the processor to extract product ingredient data and product theme data using an embedding model and a recognition model.

14. A machine learning system according to claim 13, wherein the embedding model comprises mappings from a plurality of languages.

15. A machine learning system according to any one of claims 12 to 14, wherein the program storage device further stores computer program instructions operable to cause the processor to determine a relevance metric using a market model for each candidate new product concept by simulating a consumer response to each respective candidate new product concept using a plurality of simulated agents which are configured to update the market model and thereby obtain a respective simulated market model for the respective candidate new product concept, and determining the respective relevance metric from the respective simulated market model for the candidate new product concept.

16. A machine learning system according to claim 15, wherein the program storage device further stores computer program instructions operable to cause the processor to simulate the consumer response to the candidate new product using a plurality of simulated agents by simulating interactions between simulated agents over a plurality of simulation cycles, wherein each simulated agent of the plurality of simulated agents is configured to be connected to a set of other simulated agents of the plurality of simulated agents and thereby influence behavior of the set of other simulated agents.

17. A machine learning system according to any one of claims 12 to 16, wherein the program storage device further stores computer program instructions operable to cause the processor to train the market model to provide relevance scores for product themes and product ingredients by:

- monitoring social network posts to collect data;
- extracting product ingredient data and product theme data from the collected data;
- training a recognition engine using the collected data to recognize ingredients and product themes from the collected data; and
- training a market model based on the ingredients and the product themes.

18. A machine learning system according to claim 17, wherein the program storage device further stores computer program instructions operable to cause the processor to monitor social network posts to collect data by implementing a plurality of market sensors.

19. A machine learning system according to claim 17 or claim 18, wherein the collected data comprises text data and image data and wherein the program storage device further stores computer program instructions operable to cause the processor to extract product ingredient and product theme data from the collected data by implementing a joint text and image embedding layer.

20. A machine learning system according to any one of claims 17 to 19, wherein the program storage device further stores computer program instructions operable to cause the processor to extract product ingredient and product theme data from the collected data by implementing a multi-lingual embedding layer.