

6. The network device of claim ~~3~~5, wherein computing the spectral content further comprises performing an aggregation of the spectral coefficients for a time series.

7. The network device of claim 1, wherein performing grouping comprises selecting a number of groups to be used, based on employing a test set of data to compute a delta log-likelihood function for the test set of data, and selecting the number of groups when the delta log-likelihood function falls below a specified threshold value.

8. The network device of claim 1, wherein generating a plurality of groups comprises applying an expectation-maximization algorithm to a mixture model to generate the plurality of groups, and wherein classifying each customer further comprises computing likelihoods under the mixture model of the spectral coefficient representation for each customer, and associating the customer to the group with the largest likelihood among the plurality of groups.

9. The network device of claim 8, wherein the mixture model is a Gaussian mixture model.

10. A system, comprising:

one or more non-transitory storage devices usable to store customer data; and
one or more processors operative to perform actions, comprising:

receiving telecommunications customer data for a plurality of customers;
extracting from the data a time series for each of the plurality of

customers;

computing for each of the plurality of customers, spectral content for
each time series data within a time window;

performing grouping from the spectral content to generate a plurality of
groups; and

classifying each customer time series within one of the plurality of
groups, the groups usable to dynamically market to at least one customer identified by a
group.

11. The system of claim 10, wherein extracting a time series for each of the plurality
of customers, further comprises performing an interpolation of each time series to a

uniform time grid, using at least one of a smoothing, an abrupt, or a hybrid interpolation algorithm.

12. The system of claim 10, wherein computing spectral content for each time series is based on determining coefficients of a Fourier transform from each time series, and employing a complex moduli of the coefficients as spectral coefficients expressing spectral content of a each time series.

13. The system of claim 12, wherein computing the spectral content further comprises performing an aggregation of the spectral coefficients for a time series.

14. The system of claim 10, wherein performing ~~clustering~~ grouping comprises selecting a number of groups to be used, based on employing a test set of data to compute a delta log-likelihood function for the test set of data, and selecting the number of groups when the delta log-likelihood function falls below a specified threshold value.

15. The system of claim 10, wherein generating a plurality of groups comprises applying an expectation-maximization algorithm to a mixture model to generate the plurality of groups.

16. The system of claim 15, wherein the mixture model is a Gaussian mixture model.

17. The system of claim ~~14~~ 15, wherein classifying each customer further comprises computing likelihoods under the mixture model of the spectral coefficient representation for each customer, and associating the customer to the group with the largest likelihood among the plurality of groups.

18. An apparatus comprising a non-transitory computer readable medium, having computer-executable instructions stored thereon, that in response to execution by a computing device, cause the computing device to perform operations, comprising:
receiving telecommunications customer data for a plurality of customers;
extracting from the data a time series for each of the plurality of customers;
computing for each of the plurality of customers, spectral content for each time series data within a time window;

6. The network device of claim 5, wherein computing the spectral content further comprises performing an aggregation of the spectral coefficients for a time series.
7. The network device of claim 1, wherein performing grouping comprises selecting a number of groups to be used, based on employing a test set of data to compute a delta log-likelihood function for the test set of data, and selecting the number of groups when the delta log-likelihood function falls below a specified threshold value.
8. The network device of claim 1, wherein generating a plurality of groups comprises applying an expectation-maximization algorithm to a mixture model to generate the plurality of groups, and wherein classifying each customer further comprises computing likelihoods under the mixture model of the spectral coefficient representation for each customer, and associating the customer to the group with the largest likelihood among the plurality of groups.
9. The network device of claim 8, wherein the mixture model is a Gaussian mixture model.
10. A system, comprising:
 - one or more non-transitory storage devices usable to store customer data; and
 - one or more processors operative to perform actions, comprising:
 - receiving telecommunications customer data for a plurality of customers;
 - extracting from the data a time series for each of the plurality of customers;
 - computing for each of the plurality of customers, spectral content for each time series data within a time window;
 - performing grouping from the spectral content to generate a plurality of groups; and
 - classifying each customer time series within one of the plurality of groups, the groups usable to dynamically market to at least one customer identified by a group.
11. The system of claim 10, wherein extracting a time series for each of the plurality of customers, further comprises performing an interpolation of each time series to a

uniform time grid, using at least one of a smoothing, an abrupt, or a hybrid interpolation algorithm.

12. The system of claim 10, wherein computing spectral content for each time series is based on determining coefficients of a Fourier transform from each time series, and employing a complex moduli of the coefficients as spectral coefficients expressing spectral content of a each time series.

13. The system of claim 12, wherein computing the spectral content further comprises performing an aggregation of the spectral coefficients for a time series.

14. The system of claim 10, wherein performing grouping comprises selecting a number of groups to be used, based on employing a test set of data to compute a delta log-likelihood function for the test set of data, and selecting the number of groups when the delta log-likelihood function falls below a specified threshold value.

15. The system of claim 10, wherein generating a plurality of groups comprises applying an expectation-maximization algorithm to a mixture model to generate the plurality of groups.

16. The system of claim 15, wherein the mixture model is a Gaussian mixture model.

17. The system of claim 15, wherein classifying each customer further comprises computing likelihoods under the mixture model of the spectral coefficient representation for each customer, and associating the customer to the group with the largest likelihood among the plurality of groups.

18. An apparatus comprising a non-transitory computer readable medium, having computer-executable instructions stored thereon, that in response to execution by a computing device, cause the computing device to perform operations, comprising:
receiving telecommunications customer data for a plurality of customers;
extracting from the data a time series for each of the plurality of customers;
computing for each of the plurality of customers, spectral content for each time series data within a time window;