CLAIMS

1. A computer-implemented method ~~(200)~~ comprising:

- a first step of clustering ~~(210)~~ pipe sections of a pipe network into a number of classes, based on pipe parameters relative to the structure or to the environment of the pipe sections;
- and, for each class of said number of classes:
  - a second step of extracting ~~(220)~~ a sample of pipes sections of the class, said second step comprising:
    - a first sub-step of initializing a set of candidate samples of pipe sections;
    - a second sub-step of iteratively modifying said set of candidate samples using:
      - a genetic algorithm based on an objective function comprising a minimization of the difference of average pipe parameters of the pipe sections of the sample, and
      - the average pipe parameters of the pipe sections of the class;
    - a third sub-step of selecting the candidate sample that optimizes said objective function;
- a third step of obtaining ~~(230)~~, for each pipe section sample, one or more pipe condition scores determined by a condition assessment procedure;
- a fourth step of performing ~~(240)~~ an estimation of one or more pipe condition scores for pipe sections that do not belong to the sample based on said pipe parameters, said estimation being parameterized with the pipe condition scores and pipe parameters of the pipe sections of the sample extracted at the second step.

2. The computer-implemented method of claim 1, wherein said number of classes is a predefined number of classes, and the first step comprises the

application of a Gaussian Mixture Model (GMM) to the pipes for clustering the pipe sections into said predefined number of classes.

~~3. The computer-implemented method according to any one of claims 1 to 2, wherein the second step of extracting the sample comprises:~~

- ~~a fifth step of initializing a set of candidate samples of pipe sections;~~
- ~~a sixth step of iteratively modifying said set of candidate samples using:~~
  - ~~a genetic algorithm based on an objective function comprising a minimization of the difference of average pipe parameters of the pipe sections of the sample, and~~
  - ~~the average pipe parameters of the pipe sections of the class;~~
- ~~a seventh step of selecting the candidate sample that optimizes said objective function.~~

4~~3~~. The computer-implemented method according to ~~any one of~~ claim~~s~~ 1 ~~to 3~~or 2, wherein the relative size of each samples is negatively correlated with the relative homogeneity of each corresponding class, said relative homogeneity being determined by using standard deviations of the pipe parameters of the samples of the class.

5~~4~~. The computer-implemented method of any one of the preceding claims ~~1 to 4~~, wherein the condition assessment procedure of the third step is chosen in a group comprising one or more of:

- an analysis of an electromagnetic flux applied to the pipe section;
- an acoustical analysis of the pipe section;
- the extraction, and analysis in a laboratory of a sample of the pipe section;

and wherein each of the condition assessment procedure provides pipe condition scores at the same scale.

6~~5~~. The computer-implemented method of claim 4~~5~~, wherein the condition assessment procedures provide two or more pipe condition scores

corresponding to different parts of pipe sections and chosen in a group comprising:

- an inner coating condition score;
- an outer coating condition score;
- a joint condition score.

~~7~~6. The computer-implemented method of claim ~~6~~5, wherein a single pipe condition score is obtained from the two or more pipe condition scores corresponding to different parts of pipe sections, using a weighted or orthogonal sum.

~~8~~7. The computer-implemented method of any one of claims ~~5 4~~ to ~~7~~6, wherein the one or more pipe condition scores are associated with one or more reliability indexes defining a grade that indicates reliability of information collected during inspection.

~~9~~8. The computer-implemented method of any one of the preceding claims ~~1 to 8~~, wherein performing an estimation of one or more pipe condition scores for pipe sections that do not belong to the sample comprises:

- training, for a class, a supervised machine learning engine that predicts pipe condition scores based on pipe parameters using pipe sections that belongs to the sample;
- using said supervised machine learning engine to predict pipe condition scores based on pipe parameters of the pipe sections of the class that do not belong to the sample.

~~10~~9. The computer-implemented method of claim ~~9~~8, wherein said supervised machine learning engine is a random forest machine learning engine.

~~11~~10. The computer-implemented method of any one of the preceding claims ~~1 to 10~~, further comprising raising an alert for pipe sections whose pipe condition scores match an alert condition.

~~12~~11. The computer-implemented method of claim ~~11~~10, wherein each alert for a pipe section automatically triggers at least one action chosen in a group comprising a further condition assessment procedure of the pipe section, a safeguard measure, and a repair of the pipe section.

~~13~~12. A computer program product, stored on a non-transitory computer-readable medium, said computer program product comprising code instructions for executing a method according to any one of claims 1 to ~~12~~11.

~~14~~13. A device comprising a processor configured to execute a method according to any one of claims 1 to ~~12~~11.