CLAIMS

1. A computer-implemented method comprising:

receiving at a machine learning (“ML”) model one or more datasets comprising values representing magnitude and phase of impedance or changes thereof at a probe used in a magnetic induction tomography-based process for probing a space;

processing of the values by the ML model to generate or update information indicative of or a prediction for presence, identity and/or at least one characteristic of an object in the space and/or an operational instruction.

2. The method of claim 1, wherein the one or more datasets are received at an input layer of the ML model.

3. The method of claim 2, where the one or more datasets comprise a plurality of the datasets, values in each dataset relating to impedance at one of a plurality of probing devices of the probe.

4. The method of claim 3, wherein the probing devices are in fixed relative positions, and each dataset uniquely identifies the probing device to which its values relate.

5. The method of claim 3 or claim 4, wherein each dataset comprises a plurality of values representative of a plurality of values for magnitude and corresponding values for phase for impedance of the respective probing device.

6. The method of any one of claims 3 to 5, where the receiving comprises receiving the datasets sequentially from each of the probing devices, wherein the processing comprises processing each received data set and updating the information or prediction based on the respective dataset, and/or wherein each dataset includes information indicative of sampling time of the values in the dataset.

7. The method of any one of claims 3 to 6, wherein the ML model comprises a trained deep learning model, wherein the receiving comprises receiving the datasets at an input layer of the deep learning model.

8. The method of claim 7, wherein the deep learning model comprises first and second portions, wherein the processing comprises:

processing each dataset by the first portion to generate a data structure for the space or an object in the space; and processing the data structure to generate or update the information or prediction.

9. The method of claim 8, wherein the first portion includes a neural network sub-model, wherein the processing of each dataset by the first portion comprises processing of each dataset by the neural network sub-model, optionally wherein the neural network sub-model comprises a convolutional neural network (“CNN”), wherein the processing of each dataset by the first portion comprises processing of each dataset by the CNN.

10. The method of any one of claims 7 to 9, wherein the second portion is a classification sub-model, wherein the processing of the data structure by the classification sub-model includes processing the data structure to provide the information, wherein the information is indicative of or a prediction of at least one class.

11. The method of any one of the preceding claims, wherein the information or prediction is indicative of and/or based on inference by the ML model of relative position, shape, size, conductivity, permittivity and/or permeability of the object.

12. The method of claim 11, at an object detection system of a wireless electric vehicle charging system, optionally wherein the operational instruction is at least one of:

a control instruction for power supply to the WPT coil;

alignment instruction for communication to the driver.

13. The method of claim 12, further comprising:

determining, based on the information or prediction for presence, identity and/or at least one characteristic, the operational instruction.

14. The method of claim 13, wherein the object is charging coils of a WPT receiver, optionally wherein the identity or at least one characteristic is type of the charging coils

of the WPT receiver, and/or wherein the identity or at least one characteristic is that charging coils of the WPT receiver are misaligned with coils of the transmitter by greater than a threshold distance for charging to be permitted in a forward or backwards and/or left or right direction.

15. Apparatus comprising:

a probe;

a computing component comprising processing means and a memory storing computer program code, wherein the processing means and the memory with the code are configured to perform the method of any one of claims 1 to 14, wherein the datasets are from signals generated at the probe.

16. An object detection system, wherein the object detection system comprises the apparatus of claim 15.

17. A wireless electric vehicle charging system comprising the object detection system of claim 16.

18. A computer program product comprising computer program code which, when executed by a computer, is configured to cause the computer to carry out the method of any one of claims 1 to 14.