CLAIMS

1. A computer-implemented method for obtaining personalized parameters for transcranial stimulation, comprising:

receiving baseline data about a test subject (S1), the baseline data comprising information about the test subject acquired prior to transcranial stimulation applied to the test subject; and

using a Gaussian process model of performance of one or more training subjects to obtain personalized parameters for transcranial stimulation for the test subject based on the received baseline data (S2), wherein:

the Gaussian process jointly models subject performance during and/or after transcranial stimulation as a function of both

i) parameters defining the transcranial stimulation; and

ii) baseline data for the one or more training subjects.

2. The method of claim 1, wherein the baseline data represents a performance without influence from transcranial stimulation.

3. The method of claim 1 or 2, wherein the obtaining of the personalized parameters (S2) further comprises:

obtaining test data representing performances of the test subject during and/or after application of transcranial stimulation with multiple respective combinations of parameters;

refining the Gaussian process model using the obtained test data; and

using the refined Gaussian process model to obtain the personalized parameters.

4. The method of claim 3, wherein the Gaussian process model is refined in an iterative Bayesian optimization process that in each step chooses to sample next where a combination of parameters for stimulation optimizes an acquisition function.

5. The method of claim 4, wherein the acquisition function is configured to be computationally cheaper to optimize than an objective function of the Gaussian process model and wherein the acquisition function optionally comprises one or more of the following: the Gaussian process upper confidence bound; and the expected improvement.

6. The method of any preceding claim, further comprising training a Gaussian process model to provide the Gaussian process model used to obtain the personalized parameters.

7. The method of claim 6, wherein the training of the Gaussian process model comprises using training data representing performances of each of multiple training subjects during and/or after application of transcranial stimulation with multiple respective combinations of parameters for each training subject.

8. The method of claim 7, wherein the Gaussian process model is trained in an iterative Bayesian optimization process that in each step chooses to sample next where a combination of parameters for stimulation optimizes an acquisition function.

9. The method of claim 8, wherein the acquisition function is configured to be computationally cheaper to optimize than an objective function of the Gaussian process model and wherein the acquisition function optionally comprises one or more of the following: the Gaussian process upper confidence bound; and the expected improvement.

10. The method of any preceding claim, wherein:

the transcranial stimulation comprises any one or more of the following: transcranial alternating current stimulation; transcranial random noise stimulation; transcranial direct current stimulation; transcranial magnetic stimulation; transcranial focused ultrasound; and transcranial light stimulation; and/or

the parameters for transcranial stimulation comprise one or more of the following: frequency, frequencies, current, phase, duration, dose, and brain region.

11. The method of any preceding claim, wherein:

the performances are represented by one or more of the following: accuracy; reaction time; test score; and subjective reporting; and/or

the performances are represented by a drift rate value obtained by applying a diffusion decision model to the results of tests performed by the respective subject.

12. A data processing apparatus comprising a processor configured to perform the method of any preceding claim.

13. A computer program comprising instructions which, when the program is executed by a computer, cause the computer to carry out the method of any of claims 1-11.

14. A computer-readable data carrier having stored thereon the computer program of claim 13.

15. A transcranial stimulation system, comprising:

a stimulation unit configured to provide transcranial stimulation to a subject; and

a data processing apparatus configured to control operating parameters of the stimulation unit to define parameters of the transcranial stimulation, wherein:

the data processing apparatus is configured to perform the method of any of claims 1-11 to obtain personalized parameters for the subject and control the operating parameters of the stimulation unit based on the obtained personalized parameters.