The claims defining the invention are as follows:

1. A rehabilitation system for rehabilitating a person with a neurological condition, the system including:

exercise equipment for enabling the person to exercise;

one or more sensors for sensing information from the person during exercise; and

one or more equipment sensors for sensing information of the exercise equipment;

wherein the system further includes

a model of the exercising person on the exercise equipment, wherein the model is configured to receive the sensed information from the one or more sensors and from the one or more equipment sensors, and generate electrical stimulation and actuation assistance for the person~~.~~, and

wherein the model is further configured to generate somatosensory data to be provided to the person through extended reality.

2. A rehabilitation system as claimed in claim 1, wherein model is personalized and generates suitable electrical stimulation for the person, and avoids excessive stresses on the person which can lead to the fracturing of bones.

3. A rehabilitation system as claimed in claim 1, wherein the one or more sensors include biomechanical and/or physiological biosensors.

4. A rehabilitation system as claimed in claim 1, wherein the sensed information relates to any one or more of electromyography, inertial measurement units, heart rate, electrocardiogram, and respiration.

~~5. A rehabilitation system as claimed in claim 1, wherein he sensors further include one or more equipment sensors for sensing information of the equipment that is also provided to the model for generating the electrical stimulation.~~

~~6.~~5. A rehabilitation system as claimed in claim ~~5~~1, wherein the one or more equipment sensors include speed or torque sensors.

~~7. A rehabilitation system as claimed in claim 1, wherein the model is further configured to generate somatosensory data to be provided to the person through extended reality.~~

~~8.~~6. A rehabilitation system as claimed in claim ~~7~~1, wherein the somatosensory data ~~may be~~is further provided via visual, auditory and/or haptic feedback.

~~9.~~7. A rehabilitation system as claimed in claim ~~7~~1, wherein the model is configured to receive intention of movement data from a brain-computer interface (BCI).

~~10.~~8. A rehabilitation system as claimed in claim 7, further including a human machine interface (HMI) with the one or more sensors providing the BCI, the HMI having somatosensory feedback enabled by extended reality feedback, wherein the ~~BCI~~ extended reality feedback includes a virtual or augmented reality headset with visual, auditory and/or tactile feedback.

~~11.~~9. A rehabilitation system as claimed in claim 1, wherein the one or more sensors include wearable sensors worn by the person.

~~12.~~10. A rehabilitation system as claimed in claim 1, wherein the model is personalized and includes a neuromusculoskeletal model ~~or a digital twin~~.

11. A rehabilitation system as claimed in claim 1, wherein the model is personalized and is a digital twin of the exercising person on the exercise equipment.

~~13.~~12. A rehabilitation system as claimed in claim 1, wherein the exercise equipment includes a recumbent ergometer.

~~14.~~13. A rehabilitation system as claimed in claim 1, further including an actuator for actuating the exercise equipment.

~~15.~~14. A rehabilitation system as claimed in claim ~~14~~13, wherein the actuator includes a motor.

~~16.~~15. A rehabilitation system for rehabilitating a person with a neurological condition, the system including:

exercise equipment for enabling the person to exercise;

a human machine interface with one or more sensors for sensing information from the person during exercise, the human machine interface having somatosensory feedback enabled by extended reality feedback~~, preferably via virtual reality, tactile via haptic feedback, or auditory by ear phones;~~;

one or more equipment sensors for sensing information of the exercise equipment; and

a personalized computer model of the exercising person on the exercise equipment configured to receive the sensed information from the one or more sensors and from the one or more equipment sensors, and generate electrical stimulation, assisted by actuators, and actuation assistance for the person, wherein the personalized computer model is further configured ~~able~~ to synthesize and generate somatosensory data to be provided to the person through the extended reality feedback.

16. A rehabilitation system as claimed in claim 15, wherein the extended reality feedback includes virtual reality, tactile via haptic feedback, or auditory by ear phones.

17. A rehabilitation method for rehabilitating a person with a neurological condition, the method including:

exercising the person with exercise equipment;

sensing information from the exercising person; ~~and~~

sensing information of the exercise equipment;

receiving the sensed information from the exercising person and of the exercise equipment, and generating electrical stimulation and actuation assistance for the person using a model of the exercising person on the exercise equipment; and

generating somatosensory data for provision to the person through extended reality using the model.

18. A rehabilitation method as claimed in claim 17, ~~involving~~ including generating the electrical stimulation for the person whilst avoiding excessive stresses on the person which can lead to the fracturing of bones.

19. A rehabilitation method as claimed in claim 17, wherein the sensing ~~involves any~~ information from the exercising person includes one or more of somatosensory, visual feedback, tactile and auditory sensing.

20. A rehabilitation method as claimed in claim 17, further ~~involving~~ including actuating the exercise equipment.