premise of the invention that an increase in the proportion of anomalies to repeated patterns is an indicator or predictor of the onset of a neurological event such as an epileptic seizure.

A relative increase in the number of ~~repeated patterns~~ anomalies is a direct indicator of the onset of a neurological episode and is useful information to allow the device to perform an episode prediction function. The likelihood of the onset of a neurological episode increases as the number of ~~repeated patterns~~ anomalies increases.

Aspects of the invention deal with one of the bottlenecks of analysis of epileptic seizure activity. An aspect of the invention allows the ability to work with consistent data which is well annotated and databased to establish a framework for future work and storage of results into the same framework. The system shown at figure 5 provides this framework.

Figure 5 shows data acquisition, user interface and processing blocks. In theory each of these components could be placed in a different technological implementation, such as the acquisition being an implantable neural monitoring or predicting device, the user interface being on a mobile phone or PC and the processing units being a web-accessed cloud (such as the Amazon Elastic Compute Cloud). The distribution of these elements will vary depending upon the signal processing requirements (computational complexity) and application space.

Pattern analysis of historical data yields sets of parameters concerning the patterns. Predictions or decisions on whether a neural event is upcoming can be taken by comparing in either relative or absolute terms real-time patterns with stored parameters, pre-determined patterns and thresholds. The monitoring or predicting device provides an output indicative of whether a

Claims

1. A monitoring or predicting system (1) to detect the onset of a neurological episode, the system comprising:

a neurological electrical input (2), the input being a digital representation of a neurologically derived signal;

a converter (3) adapted to convert the digital signal into a digital data string;

a pattern analyser (4) adapted to identify recurring patterns in the digital data string; and

a monitor (5) adapted to measure a pattern-derived parameter related to one or more of:

a count of said recurring patterns in the digital data string;

a proportion of said recurring patterns in the digital data string;

a rate of change of a count of said recurring patterns in the digital data string; and

a rate of change of a proportion of said recurring patterns in the digital data string,

wherein an output from the monitor (5) gives an indication of the onset or occasion of a neuronal activity in dependence on the pattern-derived parameter.

~~2. A system according to claim 1, wherein the pattern-derived parameter is related to a count or a proportion of recurring patterns in the digital data string.~~

~~3. A data acquisition and analysis system comprising:~~

~~a neurological electrical input comprising a digital representation of a neurologically derived signal;~~

~~a converter to convert the digital signal into a digital data string;~~

~~a pattern analyser to identify recurring patterns in the digital data string; and~~

~~a monitor to measure a pattern-derived parameter related to a count or a proportion of recurring patterns in the digital data string, wherein an output from the monitor gives an indication of the onset or occasion of a neuronal activity in dependence on the pattern-derived parameter.~~

~~4~~2. ~~A~~ The system ~~according to any preceding~~ of claim 1, wherein the digital data string is a character data string, a binary data string or a hexadecimal data string.

~~5~~3. ~~A~~ The system ~~according to~~ of any preceding claim, wherein the system further comprises a neural stimuli generator for stimulating a part of a brain.

4. The system of any preceding claim, wherein the neurological electrical input (2) is provided by electrodes (10) and is located on headgear; and

the other modules of the system are all located on the headgear; or

one or more of the other modules is remote from the headgear and connected thereto by a wired or wireless connection.

5. The system of any preceding claim, wherein the output of the monitoring or predicting system is a wired output, a wireless output, a Bluetooth output, an optical output, or an audio output.

6. A method of detecting the onset of a neurological episode comprising:

receiving a neurological electrical input comprising a digital representation of a neurologically derived signal;

converting the digital signal into a digital data string;

identifying recurring patterns in the digital data string;

monitoring a pattern-derived parameter related to one or more of:

a count ~~or a proportion~~ of said recurring patterns in the digital data string;

a proportion of said recurring patterns in the digital data string;

a rate of change of a count of said recurring patterns in the digital data string; and

a rate of change of a proportion of said recurring patterns in the digital data string; and

providing an output giving an indication of the onset or occasion of a neuronal activity in dependence on the pattern-derived parameter.

7. The method of claim 6, further comprising:

weighting the digital signal when converting the digital signal into a digital data string.

8. The method of claim 6 or 7, further comprising:

sampling the digital data string with a bit length of 6, 7, 8, 9 or 10 bits.

9. The method of any of claims 6 to 8, further comprising:

~~monitoring the rate of change of the pattern-derived parameter.~~

reacting to a profile of a particular pattern-derived parameter.

10. The method of any of claims 6 to 9, further comprising:

counting significant recurring patterns.

11. The method of any of claims 6 to 10, further comprising:

excluding patterns in the data string that are identified as null signals from the significant recurring pattern count.

12. The method of any of claims 6 to 11, further comprising:

detecting or identifying the type of neurological episode.

13. The method of any of claims 6 to 12, wherein the output giving an indication of the onset or occasion of a neuronal activity is determined based on either:

analysing internally stored historical ratios of pattern counts; or

processing by a monitoring device and comparing with a predetermined threshold.

14. The method of claim 13, wherein the predetermined threshold is learned from the user profile using known heuristics, neural network and/or artificial intelligence techniques, or determined by the total number of significant patterns and/or a percentage of significant patterns found.

15. The method of any of claims ~~5~~ 6 to 14, further comprising:

~~stimulating a part of a brain using a neural stimuli generator.~~

plotting the digital data on a graph.