

CLAIMS

1. A processor-implemented method for detection of Mild Cognitive Impairment(MCI) in a subject, comprising:

receiving sensor data from a plurality of sensors, wherein the received sensor data indicates Activities of Daily Living (ADL) pertaining to a subject for a specific time interval (302);

substituting, by using Long Short-Term Memory (LSTM), corrupt sensor data in the received sensor data with correct sensor data to generate corrected sensor data, wherein the corrupt sensor data is substituted with the correct sensor data based on a learning pattern and historical data stored in a database (304) ;

generating a semantic vector representation of the corrected sensor data, wherein the semantic vector representation comprises a plurality of sub-vectors, wherein each of the plurality of sub-vectors comprise of a subset of the corrected sensor data of a pre-determined time interval (306) ;

optimizing, by using an autoencoder, size of the semantic vector representation of the corrected sensor data to generate an optimized vector data (308), wherein said optimizing is performed to reduce dimensions of the corrected sensor data;

estimating a dynamic threshold parameter ($\emptyset$) based on one or more similarity values obtained from a comparison of (i) the optimized vector data for the time interval with (ii) an adjacent optimized vector data comprising corresponding corrected sensor data stored in a database (310);

performing a comparison of the one or more similarities values with the dynamic threshold parameter (312); and

detecting, based on the comparison, one or more abnormalities indicative of behavior deviation of the subject (314).

2. The processor implemented method as claimed in claim 1, wherein the step of optimizing, by using the autoencoder, and the size of the semantic vector representation of the corrected sensor data to generate an optimized vector data comprises: applying a dimension reduction based window sizing technique on the semantic vector representation of the corrected sensor

data.

3. The processor implemented method as claimed in claim 1, further comprising upon detecting behavior deviation of the subject, analyzing the semantic vector representation corresponding to the optimized vector data and performing a comparison of the analyzed semantic vector representation with a previous adjacent semantic vector representation; and storing a start time and an end time specific to the behavior deviation of the subject in the database.
4. The processor implemented method as claimed in claim 3, further comprising analyzing one or more corresponding sub-vectors based on the start time and the end time specific to the behavior deviation of the subject; and tagging the analyzed one or more corresponding sub-vectors as one or more abnormal vectors.
5. The processor implemented method as claimed in claim 4, further comprising detecting one or more random activities between the start time and the end time; and generating a flag indicative of an abnormal behavior when duration of the one or more repeated random activities is less than or greater than an actual duration of a corresponding particular activity.
6. The processor implemented method as claimed in claim 1, further comprising performing a Principal Component Analysis (PCA) on the behavior deviation of the subject detected for the specific time interval to obtain a set of eigen vectors based on a variance for the behavior deviation; and computing a personal variation index based on the set of eigen vectors.
7. The processor implemented method as claimed in claim 6, further comprising performing a comparison of the personal variation index with a pre-defined threshold; and flagging behavior of the subject as an abnormal behavior based on the comparison.
8. A system (100), comprising:
a memory storing instructions(102) and a centralized database(110);
one or more communication interfaces(106); and

one or more hardware processors (104) coupled to the memory via the one or more communication interfaces, wherein the one or more hardware processors are configured by instructions to:

receive sensor data from a plurality of sensors, wherein the received sensor data indicates Activities of Daily Living (ADL) pertaining to a subject for a specific time interval;

substitute, by using Long Short-Term Memory (LSTM), corrupt sensor data in the received sensor data with correct sensor data to generate corrected sensor data in pre-processing module (202), wherein the corrupt sensor data is substituted with the correct sensor data based on a learning pattern and historical data stored in a database;

generate a semantic vector representation of the corrected sensor data, wherein the semantic vector representation comprises a plurality of sub-vectors, wherein each of the plurality of sub-vectors comprise of a subset of the corrected sensor data of a pre-determined time interval;

optimize, by an autoencoder, size of the semantic vector representation of the corrected sensor data to generate an optimized vector data, wherein the autoencoder is configured to reduce dimensions of the corrected sensor data;

estimate a dynamic threshold parameter ($\emptyset$) based on one or more similarity values obtained from a comparison of (i) the optimized vector data for the time interval with (ii) an adjacent optimized vector data comprising corresponding corrected sensor data stored in the database in optimizing module (204);

perform a comparison of the one or more similarities values with the dynamic threshold parameter;

detect, based on the comparison, one or more abnormalities indicative of behavior deviation of the subject; and

detect one or more abnormalities in the deviated compressed vector data by comparing the deviated compressed vector data with one or more reference vectors.

9. The system as claimed in claim 8, wherein the step to optimize the size of the semantic vector representation of the corrected sensor data is optimized to generate the optimized vector data by applying a dimension reduction based window sizing technique on the semantic vector representation of the corrected sensor data.

10. The system as claimed in claim 8, wherein the one or more hardware processors are further configured to, analyze, upon detecting behavior deviation of the subject, the semantic vector representation corresponding to the optimized vector data and perform a comparison of the analyzed semantic vector representation with a previous adjacent semantic vector representation, and store a start time and an end time specific to the behavior deviation of the subject in the database.
11. The system as claimed in claim 10, wherein the one or more hardware processors are further configured to analyze one or more corresponding sub-vectors based on the start time and the end time specific to the behavior deviation of the subject; and tag the analyzed one or more corresponding sub-vectors as one or more abnormal vectors performed.
12. The system as claimed in claim 11, wherein the one or more hardware processors are further configured to detect one or more random activities between the start time and the end time; and generate a flag indicative of an abnormal behavior when duration of the one or more repeated random activities is less than or greater than an actual duration of a corresponding particular activity.
13. The system as claimed in claim 8, wherein the one or more hardware processors are further configured to perform a Principal Component Analysis (PCA) on the behavior deviation of the subject detected for the specific time interval to obtain a set of eigen vectors based on a variance for the behavior deviation; and compute a personal variation index based on the set of eigen vectors.
14. The system as claimed in claim 13, wherein the one or more hardware processors are further configured to perform a comparison of the personal variation index with a pre-defined threshold; and flag behavior of the subject as an abnormal behavior based on the comparison.
15. A computer program to execute a method for detection of Mild Cognitive Impairment(MCI) in a subject , the method comprising:

receiving sensor data from a plurality of sensors, wherein the received sensor data indicates Activities of Daily Living (ADL) pertaining to a subject for a specific time interval (302);

substituting, by using Long Short-Term Memory (LSTM), corrupt sensor data in the received sensor data with correct sensor data to generate corrected sensor data, wherein the corrupt sensor data is substituted with the correct sensor data based on a learning pattern and historical data stored in a database (304) ;

generating a semantic vector representation of the corrected sensor data, wherein the semantic vector representation comprises a plurality of sub-vectors, wherein each of the plurality of sub-vectors comprise of a subset of the corrected sensor data of a pre-determined time interval (306) ;

optimizing, by using an autoencoder, size of the semantic vector representation of the corrected sensor data to generate an optimized vector data (308), wherein said optimizing is performed to reduce dimensions of the corrected sensor data;

estimating a dynamic threshold parameter ($\emptyset$) based on one or more similarity values obtained from a comparison of (i) the optimized vector data for the time interval with (ii) an adjacent optimized vector data comprising corresponding corrected sensor data stored in a database (310);

performing a comparison of the one or more similarities values with the dynamic threshold parameter (312); and

detecting, based on the comparison, one or more abnormalities indicative of behavior deviation of the subject (314).