CLAIMS

What is claimed is:

1. A Unified Intelligence (UI) System, comprising:

a decentralised plurality of Computing Devices, each Computing Device configured to:

receive at least a current model and a model checkpoint from a Federated Learning FL portal;

train the received current model using local data comprising alternate data from corresponding Computing Device associated with a user,

wherein the local data correspond to objects with outcome labels,

wherein availability of features of the objects with the outcome labels is in accordance with a defined configuration, and

wherein the local data of each of the plurality of Computing Devices is encrypted such that personal data privacy of each Computing Device is protected from other Computing Devices; and

generate an updated model, which is cryptographically masked, using the trained model for FL; and

a Central Server comprising the FL Portal, a Persistent Storage Device and an FL Coordinator,

wherein the FL Portal comprising application program interfaces (APIs) configured to distribute the current model to the plurality of Computing Devices in accordance with a training plan;

wherein the Persistent Storage Device is configured to store the current model, which is retrieved by the FL Coordinator, and

wherein the FL Coordinator is configured to:

transmit the current model, retrieved from the Persistent Storage Device, to the FL Portal;

generate a Global Model based on model aggregation using Stochastic Gradient Descent (SGD) method on the Updated Models, which are received from the plurality of Computing Devices for aggregation, in accordance with the defined configuration for adaptive learning,

wherein the Global Model is re-distributed amongst the plurality of Computing Devices for next training round until convergence of the Global Model is achieved;

wherein the Updated Model corresponds to an information unrelated to the features in accordance with a privacy preserving learning process; and

wherein the information comprises updated set of aggregated value of weights multiplied by the features of labeled objects, the weights and corresponding gradients, and outcome labels; and

estimate, using an Optimal Global Model corresponding to the converged Global Model, an outcome label classification of a new unlabeled object characterized by corresponding features,

wherein the estimated outcome label classification of the new unlabeled object is used to determine, by an essential service provider, new data associated with the user.

2. The UI System according to claim 1, wherein, in accordance with a first configuration that corresponds to the defined configuration for adaptive learning, the Central Server comprises a plurality of features and the outcome labels.

3. The UI System according to claim 2, wherein the Central Server is further configured to:

transmit a contribution of the features to an outcome function, and weights in combination with the outcome labels to each of the plurality of Computing Devices,

wherein a weight is a learnable parameter of a model; and

receive gradient of the weights together with contribution of device-related features to the outcome function from each of the plurality of Computing Devices,

wherein the contribution of device-related features to the outcome function is computed by each of the plurality of Computing Devices, and

wherein the gradient of the weights are derived by each of the plurality of Computing Devices.

4. The UI System according to claim 1, wherein, in accordance with a second configuration that corresponds to the defined configuration for adaptive learning, the Central Server comprises only the outcome labels.

5. The UI System according to claim 4, wherein the Central Server is further configured to:

transmit the outcome labels to each of the plurality of Computing Devices; and

receive gradient of the weights together with a contribution of device-related features to an outcome function from the plurality of Computing Devices,

wherein the contribution of device-related features to the outcome function is computed by each of the plurality of Computing Devices,

wherein the gradient of the weights are derived by each of the plurality of Computing Devices, and

wherein the gradient of the weights derived by each of the plurality of Computing Devices are sent to next Computing Devices together with the outcome labels.

6. The UI System according to claim 1, wherein the outcome label classification corresponds to a binary classification of the new unlabeled object in accordance with a custom-built logistic regression technique that uses a sigmoid function,

wherein the Optimal Global Model is a distributed and adaptive learning model.

7. The UI System according to claim 1, wherein data exchanged between the FL Portal and the FL Coordinator comprises data corresponding to the plurality of Computing Devices, the training plan, the current model, and a response generated by each of the plurality of Computing Devices.

8. The UI System according to claim 1, wherein each of the plurality of Computing Devices is further configured to fine tune the current model received from the FL Portal.

9. The UI System according to claim 1, wherein the FL Coordinator is further configured to:

read the current model and the model checkpoint from the Persistent Storage Device to transmit to the plurality of Computing Devices;

receive Updated Models from the plurality of Computing Devices for aggregation using Secure Multiparty Computation (SMPC); and

store a global checkpoint in the Persistent Storage Device.

10. The UI System according to claim 1, wherein the alternate data comprises at least social, financial, and device data stored in corresponding Computing Device associated with the user, and

wherein the social data corresponds to individual behaviour and character reliability.

11. A Unified Intelligence (UI) Method, comprising:

retrieving, by one or more processors in a Central Server, a current model and a model checkpoint from a Persistent Storage Device for a plurality of Computing Devices in a FL network;

distributing, by the one or more processors, the current model and the model checkpoint to a plurality of Computing Devices in accordance with a training plan;

receiving, by the one or more processors, updated and cryptographically masked models from the plurality of Computing Devices trained based on the received current model,

wherein the Updated Models are received for aggregation;

wherein the Updated Models corresponds to an information unrelated to the features in accordance with a privacy preserving learning process;

wherein the information comprises updated set of aggregated value of weights multiplied by the features of labeled objects, the weights and corresponding gradients, and outcome labels;

wherein the current model is trained by each of the plurality of Computing Devices using local data comprising alternate data from corresponding Computing Device associated with a user,

wherein the local data correspond to objects with outcome labels,

wherein availability of features of the objects with the outcome labels is in accordance with a defined configuration,

wherein the local data of each of the plurality of Computing Devices is encrypted such that personal data privacy of each Computing Device is protected from other Computing Devices;

generating, by the one or more processors, a Global Model based on model aggregation using SGD method on the Updated Models, which are received from the plurality of Computing Devices for aggregation, in accordance with the defined configuration for adaptive learning,

wherein the Global Model is re-distributed amongst the plurality of Computing Devices for next training round until convergence of the Global Model is achieved; and

estimating, by the one or more processors, using an Optimal Global Model corresponding to converged Global Model, an outcome label classification of a new unlabeled object characterized by corresponding features,

wherein the estimated outcome label classification of the new unlabeled object is used to determine, by an essential service provider, new data associated with the user.

12. The UI Method according to claim 11, wherein, in accordance with a first configuration that corresponds to the defined configuration for adaptive learning, the Central Server comprises a plurality of features and the outcome labels.

13. The UI Method according to claim 12, wherein the Method further comprising:

transmitting, by the one or more processors, a contribution of the features to an outcome function, and weights in combination with the outcome labels to each of the plurality of Computing Devices; and

receiving, by the one or more processors, gradient of the weights together with contribution of device-related features to the outcome function from each of the plurality of Computing Devices,

wherein the contribution of device-related features to the outcome function is computed by each of the plurality of Computing Devices, and

wherein the gradient of the weights are derived by each of the plurality of Computing Devices.

14. The UI Method according to claim 11, wherein, in accordance with a second configuration that corresponds to the defined configuration for adaptive learning, the Central Server comprises only the outcome labels.

15. The UI Method according to claim 14, wherein the Method further comprising:

transmitting, by the one or more processors, the outcome labels to each of the plurality of Computing Devices; and

receiving, by the one or more processors, gradient of the weights together with a contribution of device-related features to an outcome function from the plurality of Computing Devices,

wherein the contribution of device-related features to the outcome function is computed by each of the plurality of Computing Devices,

wherein the gradient of the weights are derived by each of the plurality of Computing Devices, and

wherein the gradient of the weights derived by each of the plurality of Computing Devices are sent to next Computing Devices together with the outcome labels.

16. The UI Method according to claim 11, wherein the outcome label classification corresponds to a binary classification of the new unlabeled object in accordance with a custom-built logical regression technique that uses a sigmoid function,

wherein the Optimal Global Model is a distributed and adaptive learning model.

17. The UI Method according to claim 11, wherein the alternate data comprises at least social, financial, and device data stored in corresponding Computing Device associated with the user, and

wherein the social data corresponds to individual behaviour and character reliability.

18. A non-transitory computer readable medium, having stored thereon, computer executable code, which when executed by a processor, cause the processor to execute operations, the operations comprising:

retrieving, by one or more processors in a Central Server, a current model and a model checkpoint from a Persistent Storage Device for a plurality of Computing Devices in a FL network;

distributing, by the one or more processors, the current model and the model checkpoint to a plurality of Computing Devices in accordance with a training plan;

receiving, by the one or more processors, updated and cryptographically masked models from the plurality of Computing Devices trained based on the received current model,

wherein the Updated Models are received for aggregation;

wherein the Updated Models corresponds to an information unrelated to the features in accordance with a privacy preserving learning process;

wherein the information comprises updated set of aggregated value of weights multiplied by the features of labeled objects, the weights and corresponding gradients, and outcome labels;~~,~~

wherein the current model is trained by each of the plurality of Computing Devices using local data comprising alternate data from corresponding Computing Device associated with a user,

wherein the local data correspond to objects with outcome labels,

wherein availability of features of the objects with the outcome labels is in accordance with a defined configuration,

wherein the local data of each of the plurality of Computing Devices is encrypted such that personal data privacy of each Computing Device is protected from other Computing Devices;

generating a Global Model based on model aggregation using SGD method on the Updated Models, which are received from the plurality of Computing Devices for aggregation, in accordance with the defined configuration for adaptive learning,

wherein the Global Model is re-distributed amongst the plurality of Computing Devices for next training round until convergence of the Global Model is achieved; and

estimating, using an Optimal Global Model corresponding to converged Global Model, an outcome label classification of a new unlabeled object characterized by corresponding features,

wherein the estimated outcome label classification of the new unlabeled object is used to determine, by an essential service provider, new data associated with the user.