

accurately describe the attributes of existing wells or new wells with the same geography.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] The present disclosure is described below with references to the accompanying drawings in which like elements are referenced with like reference numerals, and in which:

[0006] **FIG. 1** is a flow diagram illustrating one embodiment of a method for implementing the present disclosure.

[0007] **FIG. 2** is a display illustrating an exemplary format for multiple attributes of the historical data input in step 104 of **FIG. 1**.

[0008] **FIG. 3** is a display illustrating an exemplary format for the historical data segmented in step 106 of **FIG. 1**.

[0009] **FIG. 4** is a display illustrating exemplary techniques for extracting one or more features representative of each respective historical data segment in step 110 of **FIG. 1**.

[0010] **FIG. 5** is a display illustrating an exemplary coarse layer model and fine layer model defined in step 112 of **FIG. 1**.

[0011] **FIG. 6** is a display illustrating an exemplary graphical user interface for monitoring the risk predicted in step 120 of **FIG. 1** and managing the drilling operations for each uncompleted well.

[0012] **FIG. 7** is a block diagram illustrating one embodiment of a computer system for implementing the present disclosure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] The present disclosure therefore, overcomes one or more deficiencies in the prior art by providing systems and methods for real-time risk prediction during drilling operations using real-time data from an uncompleted well, a trained coarse layer model and a trained fine

accurately describe the attributes of existing wells or new wells with the same geography.

[0004a] According to an aspect, a method for managing a predetermined risk during drilling operations of a well, which comprises: providing a graphical user interface for displaying i) each prediction of the predetermined risk in one of a plurality of risk zones, each risk zone being associated with a predetermined incremental time and level of risk, at a predetermined warning interval during the drilling operations; and ii) a predetermined suggestion for modifying the drilling operations based on one of the predictions of the predetermined risk; monitoring each prediction of the predetermined risk at the predetermined warning interval during the drilling operations using the graphical user interface and a computer processor; and managing the predetermined risk during the drilling operations by using the predetermined suggestion to modify the drilling operations and lower the level of risk for another one of the predictions of the predetermined risk in one of the plurality of risk zones during the drilling operations.

[0004b] According to another aspect, a non-transitory program carrier device tangibly carrying computer executable instructions for managing a predetermined risk during drilling operations of a well, the instructions being executable to implement: providing a graphical user interface for displaying i) each prediction of the predetermined risk in one of a plurality of risk zones, each risk zone being associated with a predetermined incremental time and level of risk, at a predetermined warning interval during the drilling operations; and ii) a predetermined suggestion for modifying the drilling operations based on one of the predictions of the predetermined risk; monitoring each prediction of the predetermined risk at the predetermined warning interval during the drilling operations using the graphical user interface; and managing the predetermined risk during the drilling operations by using the predetermined suggestion to modify the drilling operations and lower the level of risk for another one of the predictions of the

predetermined risk in one of the plurality of risk zones during the drilling operations.

[0004c] According to yet another aspect, a non-transitory program carrier device tangibly carrying a data structure, the data structure, comprising: a first data field comprising a risk zone window for displaying each prediction of a predetermined risk for a well in one of a plurality of risk zones, each risk zone being associated with a predetermined incremental time and level of risk, at a predetermined warning interval during drilling operations of the well; and a second data field comprising a drilling operations window for displaying a predetermined suggestion for modifying the drilling operations based on one of the predictions of the predetermined risk.

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[0011] **FIG. 6** is a display illustrating an exemplary graphical user interface for monitoring the risk predicted in step 120 of **FIG. 1** and managing the drilling operations for each

uncompleted well.

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