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(71)**Name of Applicant :**
1)KALINGA UNIVERSITY RAIPUR
Address of Applicant :NAYA RAIPUR, CHHATTISGARH 492101, INDIA Raipur ---------- ----------
Name of Applicant : NA
Address of Applicant : NA
(72)**Name of Inventor :**
1)MR. BEYANT SINGH
Address of Applicant :ASSISTANT PROFESSOR, DEPARTMENT OF PHARMACY, KALINGA UNIVERSITY RAIPUR, NAYA RAIPUR, CHHATTISGARH, INDIA, PIN 492101 Raipur ---------- ----------
2)MR. AKASH PATEL
Address of Applicant :ASSISTANT PROFESSOR, DEPARTMENT OF PHARMACY, KALINGA UNIVERSITY RAIPUR, NAYA RAIPUR, CHHATTISGARH, INDIA, PIN 492101 Raipur ---------- ----------

(57) Abstract :
Disclosed herein is an AI-powered method (100) for detecting post-market drug safety signals, comprising collecting multi-modal data related to drug safety from diverse sources, including spontaneous reporting systems, electronic health records, scientific literature, and social media. The method (100) also involves preprocessing and integrating the collected data using advanced natural language processing and data fusion techniques that handle heterogeneous and unstructured datasets. The method (100) also involves constructing a dynamic knowledge graph that represents complex relationships between drugs, adverse events, and patient characteristics. The method (100) also involves applying a multi-task deep learning model to the integrated data and knowledge graph to predict potential safety signals. The method (100) also involves utilizing advanced text mining and sentiment analysis techniques to extract relevant information from unstructured text data. The method (100) also involves implementing explainable AI techniques to provide interpretable insights into the predicted safety signals. The method (100) also involves employing causal inference models to distinguish between genuine safety signals and spurious correlations. The method (100) also involves utilizing a federated learning framework to enable collaborative learning across multiple institutions while preserving data privacy. The method (100) also involves generating a prioritized list of potential safety signals with associated confidence scores and supporting evidence. The method (100) also involves outputting the results through an interactive visualization interface for expert review and decision support.

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