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EXPLORATION ON GRASSROOTS PARTY BUILDING INNOVATION DRIVEN BY BIG DATA

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Abstract. Big data has become a disruptive factor in many fields in the digital age, including grassroots party development and political organizing. This study examines the creative use of big data to support grassroots party building initiatives with the goal of defining its effects and possibilities in promoting more effective, flexible, and responsive political systems. This study looks at how big data analytics can be incorporated into grassroots community mobilization, policy formation, and political involvement processes using a thorough analytical methodology. We investigate several case studies where the application of big data tools and methodologies has improved engagement strategies, streamlined decision-making processes, and improved communication between party leaders and voters. The RNN-LSTM algorithm's principle is discussed in this work from an Internet+ standpoint, and the objective function and regularization term are used in the Taylor expansion to maximize the algorithm's objective function. The RNN-LSTM model is then trained to identify its ideal splitting nodes, and the ten-fold cross-validation technique is used to assess the model's performance. This multifaceted research explains how big data encourages creativity in grassroots party mobilization, coalition building, voter engagement, and issue advocacy through case studies, quantitative measures, and qualitative observations. incorporating curriculum thinking's ingrained ideological science into the creation of grassroots party formation to activate curriculum thinking's nurturing function. The study ends with tactical suggestions for incorporating big data into grassroots party formation successfully, opening the door for additional data-driven approaches in governance and political processes. This study adds to the growing body of knowledge about the relationship between digital technology and political innovation, namely at the grassroots level.

Key words: Grassroots Party Building, Innovation Driven, Big Data, deep learning

1. Introduction. A greater awareness of the evolution of curriculum thinking and popular grassroots party building has resulted from the Internet era[4]. Because of the people's desire for a better life, the construction of socialism with Chinese characteristics, which is situated at a new historical point, has raised the bar for talent standards and called for the selection of superior builders and successors who possess both excellent business acumen and a strong moral code [8]. Curriculum Civics addresses the issue of "two skins" between knowledge and values education in traditional education and adapts to the practical demands of social development [16]. We actively consider the problem of "siloing" political education and curriculum thinking, realizing that ideological and political education must be covered in its whole for the purpose of creating grassroots parties[2].

The integration of curricular thinking, political education, and grassroots party formation enables these three domains to jointly take on the responsibilities of teaching, consensus building, and convergence of educational synergy [11]. The literature [18] argues that to achieve the goal of comprehensive and high-quality student growth, ideological and political education must permeate every course, including higher mathematics. This makes the study of curriculum politics and ideology conducive to the all-around development of ideas. A model for assessing the efficacy of integrated physical education ideology and politics was put forth in the literature [15]. It specified evaluation indicators like teaching content, activity planning and organization, and sports teams, and it also included data collection and evaluation analysis based on each evaluation indicator.

A Zhejiang Province City an investigation into the adoption of digital telemedicine technology in Guizhou Province's community-based medical facilities[13]. A study on the information disclose- sure method of grassroots governance in digital Transformation from the perspective of rural revitalization. Impact of Digital Grassroots Social Governance Transformation on Digital Vulnerable Groups and Reactions. Using digitalization to hide murky issues: Technology as a grassroots governance mechanism's enabler. Resolving cooperative

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issues in local government: the route of digital platform integration[19]. Examination and evaluation of the Guizhou Province's grassroots hospitals' digital construction. Organizing and developing a digital platform to address cooperative issues in local government. The existing situation and the digital transformation of grassroots social governance's optimization approach[1].

Big data has become a powerful force in today's digital landscape, drastically altering processes and boosting the effectiveness of decision-making systems across a range of industries. Its incorporation into political organizing and grassroots party growth represents a critical turn toward more responsive, intelligent, and dynamic political processes. Acknowledging the significant influence of big data, this research aims to thoroughly investigate its capacity to redefine grassroots political tactics and improve democratic participation.

Finding and communicating the revolutionary potential of big data in political systems—especially at the local level—is the main driving force behind this research. The study aims to outline the wide range of advantages that such technology can provide to political organizations looking to capitalize on and adapt to the digital revolution by looking at the creative uses of big data analytics in community mobilization, policy development, and political participation.

The main contribution of proposed method is given below:

1. The fundamental innovation of this work is how it optimizes decision-making processes within grassroots political organizations by applying the RNN-LSTM algorithm, which was modified from the Internet+ perspective.
2. Using ten-fold cross-validation and a Taylor expansion of the objective function with a regularization term, the study not only demonstrates significant improvements in the strategic planning and execution of political initiatives but also validates the usefulness of big data tools in improving engagement strategies and communication between party leaders and voters.
3. This study adds to the growing body of knowledge about how digital technology can support political innovation, especially at the local level, and provides new directions for the study of data-driven political engagement and organizing.

The rest of our research article is written as follows: Section 2 discusses the related work on various Grassroots Party Building, Innovation Driven, Big Data and deep learning methods. Section 3 shows the algorithm process and general working methodology of proposed work. Section 4 evaluates the implementation and results of the proposed method. Section 5 concludes the work and discusses the result evaluation.

2. Related Works. The literature [16] extends and transcends the literature on radicalism geography and party organization to provide a developmental vision of grassroots party growth. It argues that geography supports grassroots party building through three interconnected processes. The literature [3] makes the case that fostering grassroots party organization advances party organization, speeds up the development of public infrastructure and services, and enhances grassroots party organization to advance basic modernization and party construction. It also helps to foster relationships between the party and the people as well as between cadres and the people. The literature[5] demonstrates how the CCP has attempted to emphasize the delivery of goods and services at the grassroots level to broaden its sphere of influence and restore political relevance.

College and university party building, as a crucial component of party building in the new era, needs to accurately understand the laws governing party building and enhance the caliber of party building and the degree of scientization with higher standards and more proactive practicality[6]. Party construction in the new era has presented new and higher requirements for college and university party building work in the face of the ever-changing internal and external situation, higher requirements for party-building work, and the issues that persist in certain college and university party building work[7]. It is particularly crucial to actively develop a new model of systematic party-building work and encourage innovative practices.

The researcher examined how school systems homogenize via the lens of the new constitutional theory, demonstrating how schools respond to difficulties by means of coercion, imitation, and normative isomorphism. Combining competition, market failure risk, coercive accountability measures, and schooling paths regarding the gold standard, this isomorphism process offers significant insights into educational innovation[10]. The author examines how innovation and technology are affecting education, and she suggests that educational institutions and policymakers take action to address technological illiteracy and infrastructure issues to improve the environment for teaching and learning [9].

The literature [14] contends that student party branches in colleges and universities are prompted to base themselves on the current construction situation; continuously strengthen the construction of party branch committees; enhance the ideological and political leadership of students; and strictly cultivate and educate student party members to ensure the work of party branches is completed. This is because of the overall layout of the party construction work in colleges and universities as well as the realistic needs of the reform and development of colleges and universities [12, 17]. This article explores three parts to investigate how to establish the nurturing task of integrating curriculum thinking into grassroots party formation from the perspective of Internet+. The Internet+ and its accompanying algorithm are the main topics of the first section.

Big data is becoming more and more integrated into many industries, but there is still much to learn about how these technologies may be used for party development and grassroots political organization, especially when it comes to in-depth, empirically supported research. The majority of the literature that has already been written about big data in politics concentrates on its general uses, including voter behavior research and election forecasts, and pays less attention to how these technologies might especially support grassroots movements and party development. This study aims to close a number of significant gaps in the present scholarly discourse.

Comprehensive studies that demonstrate the methodical integration of big data analytics into the several aspects of grassroots party development—such as direct political involvement, policy drafting, and community mobilization—are hard to come by. The goal of this research is to give a detailed understanding of these procedures together with a well-defined approach for using big data tools in these situations.

Although there is a wealth of literature on general data analysis methods, there is a dearth of studies on the use of particular algorithms, such as RNN-LSTM, in political data analysis. This paper explores how these algorithms might be tailored to meet the particular needs and difficulties of political datasets, thereby improving their usefulness and relevance.

Current research frequently makes extensive use of either qualitative or quantitative methods. Studies that combine the two are necessary to give a comprehensive picture of the effects of big data. In order to close this gap, this study evaluates the usefulness of big data tools in grassroots politics using both qualitative and quantitative methods, including case studies and anecdotal evidence, statistical analysis, and model performance indicators.

3. Proposed Methodology. The proposed methodology for Grassroots Party Building Innovation Driven by Big Data using RNN-LSTM is used for the evaluation. Initially the data is collected from the evolution of political theory and politics incorporated into grassroots party building, as well as an examination of the nurturing style and purpose of higher education. Next the data is trained by using RNN-LSTM. In figure 3.1 shows the architecture of proposed method.

3.1. Data Collection. Obtain primary sources and historical documents that trace the development of political beliefs and their use in grass-roots movements. Possible sources include old periodicals, historical groups, and libraries. Get information on how political theories have been incorporated into higher education courses across time by consulting university archives, course catalogs, and syllabi. Perform qualitative data collection by means of interviews with political scientists, educators, and party organizers regarding the perceived influence and efficacy of political education within grassroots movements. Give examples of how political ideologies that were introduced in classrooms have impacted grassroots movements. These can offer comprehensive insights on how educational theories are really use in the real world. Analyze survey data using statistical techniques, searching for patterns, correlations, and trends that will help you measure the influence of political education on grassroots initiatives.

3.2. RNN. We use recurrent neural networks (RNNs) as the foundation for attention-based deep neural networks. An expansion of the traditional feed-forward neural network is a recurrent neural network. Models of long short-term memory (LSTM) are also built using RNN design. They enhance the learning capacity for long-time sequencing information and address the gradient-related weaknesses of RNNs. The distinction is that there are four layers communicating in a particular way rather than just one neural network layer. An input gate, an output gate, a forget gate, and a cell make up an LSTM unit. The newly added memory cell can maintain its state for extended periods of time, and the three gates control the information that enters and

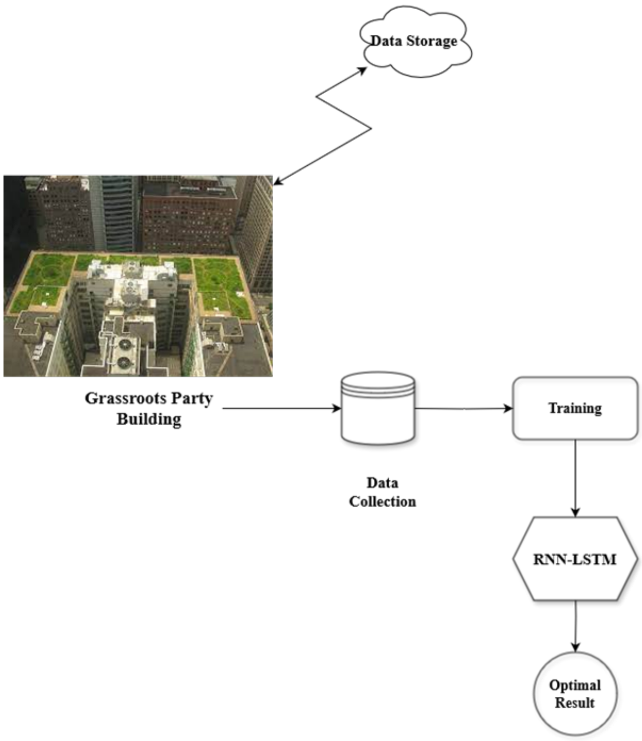

Fig. 3.1: Architecture of Proposed Method

leaves the cell:

$$X = [h_{t-1}, x_t] \tag{3.1}$$

$$f_t = \sigma(W_f.X + b_f) \tag{3.2}$$

$$i_t = \sigma(W_i.X + b_i) \tag{3.3}$$

$$o_t = \sigma(W_o.X + b_o) \tag{3.4}$$

$$c_t = f_t \Theta c_{t-1} + i_t \Theta \tanh(W_c.X + b_c) \tag{3.5}$$

$$h_t = o_t \Theta anh(c_t) \tag{3.6}$$

A variant of LSTMs known as gated recurrent units (GRUs) became available. They produce a simpler model than LSTMs by adding a gating mechanism, combining the ”forget” and ”input” gates into a signal update gate, and making a few minor modifications.

$$z_t = \sigma(W_z.X + b_z) \tag{3.7}$$

$$r_t = \sigma(W_r.X + b_r) \tag{3.8}$$

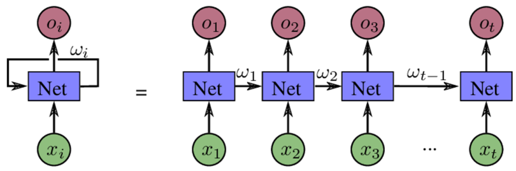

Fig. 3.2: Structure of RNN

$$h_t = \tanh(W_h.(r_t \Theta X)) \tag{3.9}$$

$$h_t = (1 - z_t)\,\Theta h_{t-1} + z_t \Theta h_t \tag{3.10}$$

A deep recurrent neural network differs from a recurrent neural network primarily in that it consists of several layers of separate recurrent networks stacked on top of one another. The issue that, although RNNs are capable of depth, this concept isn't going to entail a hierarchical analysis of the information is what gave rise to the concept for the current implementation. Each element and sentence can be seen in the same space by using the same algorithm applied recursively to determine the contributions of children to their parents and the identical computation to provide an output response. Compared to traditionally arranging deep learners, this technique differs in that each hidden layer theoretically lies in a distinct representation time and may be more the summary depiction of the input data than the layer before it. This hierarchy among hidden representations is a significant advantage of depth.

Additionally, we used the Adam optimizer, which is renowned for its solid performance on a variety of tasks, as part of our optimization approach to modify the settings of our model during training. Adam precisely calculates and modifies learning rates based on feature sets. Unlike other approaches, it uses speed in addition to storing a declining mean of previous gradients to calculate current gradients. The Adam algorithm has a healthy rate of learning that does not disappear, quick integration, and minimal variation. The experimental investigation provides a detailed presentation of the training procedure's variables. In figure 3.2 shows the structure of the Recurrent Neural Network.

3.3. Long Short-Term Memory (LSTM). An LSTM is a type of artificial neural network designed to process sequential data, such as text, audio, or time series. It is highly beneficial when information undergoes processing with persistent dependencies, i.e., when the result at a particular time step depends on data from previous time stages. For LSTM networks to be able to remember this information for a long time, they use memory cells, forget gates, input gates, and output gates. The gates let a network store and retrieve data based on requests by controlling the data that enters and exits the storage cells. LSTMs are widely used for tasks including speech recognition, language translation, and stock price predictions. The constituents of an LSTM network comprise.

Data entry into the memory cell is managed by the input gate.

$$input = \sigma(Wi^{*}\,[ht - 1, xt] + bi) \tag{3.11}$$

The forget gate regulates the data flow that leaves the memory cell.

$$forget = \sigma(Wf^{*}\,[ht - 1, xt] + bf) \tag{3.12}$$

The output gate regulates how the memory cell's output is sent to the remaining components of the network.

$$output = \sigma(Wo^{*}\,[ht - 1, xt] + bo) \tag{3.13}$$

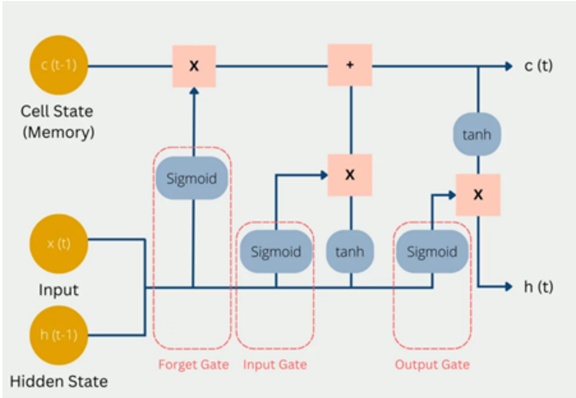

Fig. 3.3: Structure of LSTM network

The memory cell is where the information is stored.

$$memory = ft^{*}ct - 1 + it^{*}\tanh(Wc^{*}\,[ht - 1, xt] + bc) \tag{3.14}$$

The LSTM unit's output is utilized to generate predictions or transfer data to the following LSTM unit.

$$hidden = ot^{*}\tanh(ct) \tag{3.15}$$

In figure 3.3 shows the structure of LSTM network used for the prediction of industrial data.

Long-term memory retention is a key feature of LSTM units, which is advantageous for applications where prediction accuracy depends on prior knowledge. Standard RNNs are hampered by the vanishing gradient problem, whereas LSTMs are able to capture long-term dependencies in the data thanks to this memory feature. Because LSTMs can store historical data points and dynamically alter their internal state based on historical inputs, they are naturally well-suited for time series prediction. Because of this, they are perfect for applications like weather forecasting, stock market prediction, and any other situation where past trends have a substantial impact on future results.

4. Result Analysis. The generalization error of the learner is typically tested experimentally to assess a model; however, in a real-world experimental situation, other factors such as detection accuracy, time overhead, and performance overhead must also be considered. To help ensure stability and fidelity of test findings and assess the learner's capacity to discriminate between fresh samples, the training and test sets should be split and the test set should be mutually exclusive with the training set to the greatest extent feasible.

It looks like a bar chart in the image you sent shows performance measures for each of the ten trials, Exp1 through Exp10. Accuracy (Bars in Yellow): calculates the percentage of real results—both true positives and true negatives—among all cases that were looked at. Precision (Blue Bars): Shows the percentage of actual positive outcomes among all positive cases that the algorithm was able to identify. Recall (Red Bars): Indicates the percentage of real positive outcomes that are true positives, demonstrating the model's capacity to identify all pertinent cases. F1-score (Purple Bars): A single metric that balances accuracy and recall is the harmonic mean of precision and recall.

The graph indicates that the metrics are largely consistent between the experiments, indicating that the model or system under test is operating steadily. Visually speaking, recall (Red) and F1-score (Purple) tend to be lower than accuracy (Yellow) and precision (Blue) in the majority of tests. This pattern may indicate that, despite the model's high precision in properly predicting positive cases, its recall in catching a large percentage of all potential positive cases may be lower, which could have an impact on the F1-score. It is possible that some of the observed variability is the result of variations in the data sets, settings, or environmental circumstances of each experiment. In domains like machine learning, where these metrics are essential for comprehending and

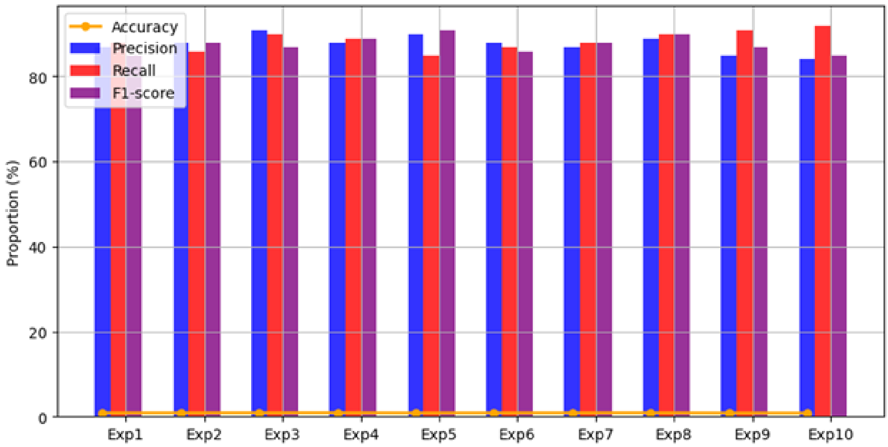

Fig. 4.1: Evaluation of various performance metrics

enhancing model behavior, the visualization helps assess how well a model or system is performing. Finding experiments that perform worse on some measures may point to areas that might be optimized. For example, if the F1-score is not optimal, strategies to balance recall and precision could be used. In figure 4.1 shows the result of various performance metrics.

The bar and line chart in the image you gave shows survey results on distinct motivational and ideological characteristics based on varying degrees of agreement. Responses are divided into four levels by it: ”Very agree,” ”More agree,” ”General agree,” as well as ”Disagree.” Determine the correct three views (Red Bars): This probably means to match up with the three main viewpoints or beliefs that the surveying body deems to be accurate. Hold fast to your beliefs and ideals (Green Bars): evaluates the respondents’ commitment to their political or personal convictions. Boost political literacy (Blue Bars): Shows if respondents agree with statements regarding improving their knowledge of politics. Enhance Learning Motivation (Purple Bars): Indicates the degree to which participants concur that they can or have enhanced their learning motivation.

High Agreement on Core viewpoints: ”Be firm in your ideals and convictions” and ”Establish the correct three views” are two statements that typically obtain greater levels of agreement, particularly in the ”Very agree” and ”More agree” categories. Decline in Agreement for Increasing Political Literacy and Learning Motivation: From ”More agree” to ”General agree” and ”Disagree,” there is a discernible decline in agreement on enhancing political literacy and learning motivation. Overall Decline in Mean Values: As the degree of agreement declines, the mean value clearly indicates a downward trend, indicating that, overall, respondents are less in agreement with or supportive of the survey statements as they become more neutral or negative. In figure 4.2 shows the result of Analysis of learning initiatives and the function of education.

The picture you gave shows data on various political and educational traits broken down into five groups using a grouped bar chart. Three educational initiatives are used to measure each category: ”Educate all staff,” ”Whole process education,” and ”All-round education.” Red Bars (Educate all staff): Most likely denotes a fundamental strategy meant to give all staff members a basic education in politics. The concept of ”Blue Bars” (whole process education) advocates for a more thorough and ongoing educational program that covers all facets and phases of political participation. A holistic educational strategy that incorporates different facets of political education and personal development is implied by Light Blue Bars (all-round education).

The ratios change dramatically amongst the various categories and educational programs. For example, the ”Educate all staff” initiative’s relatively high shares for ”Knowledge of Politics” and ”Political Participation” indicate that basic political knowledge is effectively disseminated, and involvement is encouraged. Particularly under ”All-round education,” ”Sense of Political Efficacy” and ”Sense of Political Responsibility” have lower proportions, suggesting possible areas where educational efforts might be less successful or require improvement. When comparing the three projects, ”Educate all staff” typically has larger proportions, which could mean that

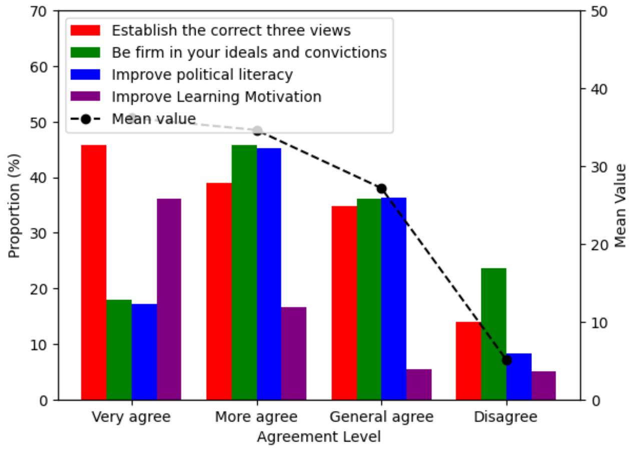

Fig. 4.2: Analysis of learning initiatives and the function of education

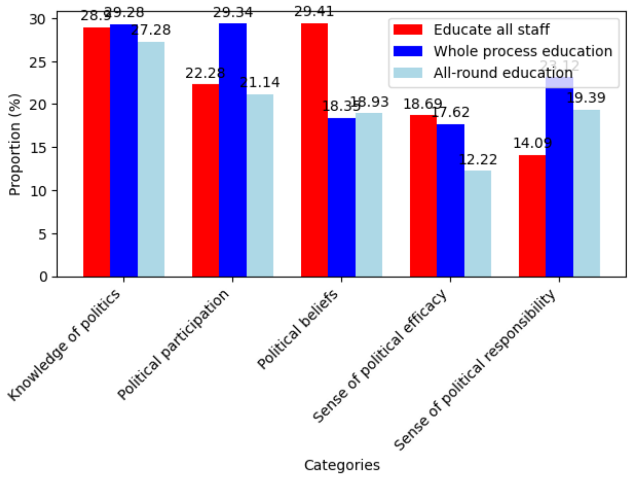

Fig. 4.3: The three-pronged educational paradigm, which combines politics, philosophy, and grassroots party formation

a simple, all-inclusive educational strategy works better in some situations, such as increasing involvement and knowledge. In figure 4.3 shows the result of The three-pronged educational paradigm, which combines politics, philosophy, and grassroots party formation.

5. Conclusion. In terms of comprehending and applying data-driven tactics inside political grassroots movements, the research on "Exploration on Grassroots Party Building Innovation Driven by Big Data and RNN-LSTM" is a major advancement. This study has carefully described how big data can significantly improve the efficacy and responsiveness of grassroots party building initiatives when combined with cutting-edge machine learning techniques like Recurrent Neural Networks and Long Short-Term Memory (RNN-LSTM) algorithms. The discovery of significant patterns and trends in voter behavior and emotion was made possible by the deployment of RNN-LSTM models to large data sets. This has made it easier to implement more focused and significant engagement tactics, which has raised activism and participant involvement in grassroots movements. Big data and RNN-LSTM integration into grassroots party construction not only changes the way political organizations interact with their constituents but also changes the field of political strategy and communication. The information gleaned from this study will be extremely important as political groups continue to navigate a world that is becoming more and more data driven. The study's suggestions for resolving issues with data privacy, technological complexity, and guaranteeing ongoing advancements in data handling capacities highlight the necessity of a flexible and comprehensive strategy for innovation in political grassroots movements.

Future studies could investigate the incorporation of sophisticated machine learning models, like Transformer models or GPT-3 for natural language processing, which could provide enhanced precision and comprehension of context in political communication analysis. Creating models that can analyze and respond to data in real-time may be essential for campaign plans that are dynamic and enable quick adjustments depending on engagement metrics and real-time voter input.

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