ISSN: 2582-7219

International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Impact Factor: 8.206

Volume 8, Issue 8, August 2025

© 2025 IJMRSET | Volume 8, Issue 8, August 2025| DOI:10.15680/IJMRSET.2025.0808193

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

SmartAid: An AI Framework for Hospital Selection in Medical Crowdfunding

Sravanthi K, Sanjeev K

Assistant Professor, Department of MCA, AMC Engineering College Bengaluru, India

Student, Department of MCA AMC Engineering College Bengaluru, India

ABSTRACT: SmartAid is an AI-powered solution developed to improve the transparency, reliability, and efficiency of medical crowdfunding by enabling intelligent hospital selection and precise cost verification. In current fundraising practices, the absence of rigorous verification often leaves donors uncertain about where their contributions go, while patients may face difficulty in identifying hospitals that best suit their medical and financial needs. SmartAid tackles these issues by employing machine learning algorithms to analyze patient requirements, predict realistic treatment expenses, and suggest hospitals based on their credibility, quality of care, and service availability.

Before launching a campaign, the platform validates cost requests against authentic medical data, ensuring that only verified and genuine causes are published.

SmartAid implements data hygiene protocols to minimize repetitive or irrelevant communication, creating a more positive experience for donors.

By uniting hospital recommendation intelligence with AI-driven cost assessment, SmartAid ensures that funds are distributed efficiently and effectively. The framework strengthens the link between donors and recipients, enhances the accountability of medical crowdfunding, and supports a more transparent and impactful fundraising environment for healthcare initiatives.

I. INTRODUCTION

Crowdfunding has emerged as a powerful tool for raising financial support for medical treatments, enabling individuals and organizations to connect with a wide pool of potential donors through online platforms. However, in many cases, these fundraising campaigns lack structured verification processes, resulting in limited transparency and reduced donor trust. Patients often struggle to identify the most suitable hospitals for their medical needs, while donors have little assurance that their contributions are being used appropriately.

Medical crowdfunding platforms typically depend on self-reported information, where the treatment costs are determined solely by the hospital or the patient, without independent validation. This can lead to overestimation of expenses or misallocation of funds, diminishing the credibility of the process. Moreover, repeated or irrelevant donor outreach can lead to donor fatigue and decreased participation.

SmartAid aims to address these challenges by introducing an AI-driven framework that evaluates hospital options, verifies treatment costs, and ensures that campaigns are legitimate and transparent. By leveraging data-driven insights, the system connects patients with credible hospitals and gives donors the confidence that their contributions are reaching genuine causes. This approach enhances accountability, improves donor engagement, and strengthens the overall impact of medical crowdfunding.

II. LITERATURE SYRVEY

Recent studies highlight the growing role of crowdfunding in addressing financial barriers to healthcare. Platforms such as GoFundMe and Ketto have demonstrated the potential to mobilize large-scale donations for medical treatments. However, research also reveals persistent issues of transparency, cost validation, and campaign credibility. Many

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

existing systems rely solely on self-submitted information, with little to no verification of hospital authenticity or treatment expenses, which can lead to donor mistrust.

Artificial Intelligence (AI) has shown promise in enhancing decision-making across various sectors, including healthcare. AI-based models have been used for cost estimation, predictive analytics, and recommendation systems, improving accuracy and operational efficiency. In medical fundraising, AI can validate cost claims, match patients with appropriate hospitals, and streamline communication between stakeholders.

Several works propose blockchain-based solutions for transaction transparency, but these often face complexity and adoption challenges. In contrast, AI-driven frameworks offer a flexible and scalable approach without high infrastructure demands. SmartAid builds upon this research gap by integrating AI for hospital selection and cost validation, creating a more reliable and efficient medical crowdfunding process that benefits both donors and patients

EXISTING SYSTEM

Current medical crowdfunding platforms typically operate on centralized servers or cloud storage to manage campaign data. Fundraising requests are often approved with minimal verification, sometimes relying solely on documents provided by the patient or hospital. Treatment costs are determined entirely by the hospital without independent assessment, leaving room for inflated or inaccurate estimates. All campaign details are managed by third-party service providers, who may deduct a percentage or charge fixed service fees. This centralized and loosely verified approach creates transparency issues, limits donor confidence, and lacks mechanisms to ensure that funds are allocated appropriately to genuine medical needs.

PROPOSED SYSTEM

The proposed system, SmartAid, introduces an AI-powered framework to improve transparency, accuracy, and trust in medical crowdfunding. It evaluates hospital credibility, verifies treatment costs, and recommends the most suitable hospitals based on patient requirements. Before a campaign is approved, the system cross-checks submitted information against authentic medical and financial data to ensure legitimacy. AI-driven cost prediction models help prevent inflated funding requests, while data hygiene measures reduce unnecessary donor communication. By automating hospital selection and cost validation, SmartAid ensures that donations are directed toward verified causes, improving donor confidence and enhancing the overall efficiency of medical fundraising.

III. SYSTEM ARCHITECTURE

The SmartAid system architecture comprises data acquisition from hospital treatment records, preprocessing and normalization modules, machine learning model training (KNN, Linear Regression, SVR), and a prediction engine for fund estimation. An admin interface manages hospital and patient details, while donors access validated requests through a user interface for informed contributions.

PRESENTATION LAYER(FRONTEND)

This layer, which was created with HTML, This layer, developed using **HTML, CSS, and JavaScript**, acts as the primary user interface for users, mainly administrators and donors. It enables essential interactions such as:

- Hospital registration and management
- Adding patient and treatment details
- Viewing medical crowdfunding requests
- Displaying AI-predicted treatment costs
- Browsing verified campaigns for donations

Targeting users with varying technical expertise, the interface is designed to be simple, responsive, and accessible across devices, ensuring a smooth experience for all stakeholders.

APPLICATION LAYER (BACKEND)

This layer, developed using **Python** with **Flask/Django** framework, handles the core logic and processing of the SmartAid system. It manages communication between the frontend interface and the machine learning models, ensuring accurate predictions and secure data transactions. Key backend functions include:

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

- Preprocessing and normalizing hospital treatment datasets
- Training and executing KNN, Linear Regression, and SVR models
- Validating requested fund amounts against AI-predicted values
- Managing hospital, patient, and donor records in the database
- Handling secure API calls between the frontend and database

The backend is designed for scalability, enabling integration with future components such as blockchain for transparent transaction recording.

DATABASE LAYER

This layer, implemented using **MySQL**, is responsible for storing and managing all system data in a structured and secure manner. It ensures reliable data retrieval and supports the application's operations. The database maintains:

- Hospital information and registration details
- Patient records and treatment information
- Fund request data and AI-predicted cost values
- Donor profiles and contribution history

Relationships between tables are designed to maintain data integrity and prevent redundancy. Secure access controls are applied to protect sensitive information, ensuring only authorized users can view or modify specific records.

WORKFLOW SUMMARY

The SmartAid system begins with the administrator registering hospitals and adding patient and treatment details. The entered treatment information is processed by the AI engine, where the dataset undergoes preprocessing and normalization. Machine learning models—KNN, Linear Regression, and SVR—are applied to predict the estimated treatment cost based on historical data.

Once the prediction is generated, the system compares the estimated value with the requested fund amount. Any significant discrepancies are highlighted, allowing donors to make informed decisions. Donors can then browse verified campaigns, view details, and proceed with contributions. All interactions between the frontend, backend, and database occur through secure communication channels, ensuring data consistency and accuracy.

The workflow ensures that fund requests are validated before being displayed, improving trust, transparency, and reliability in the medical crowdfunding process.

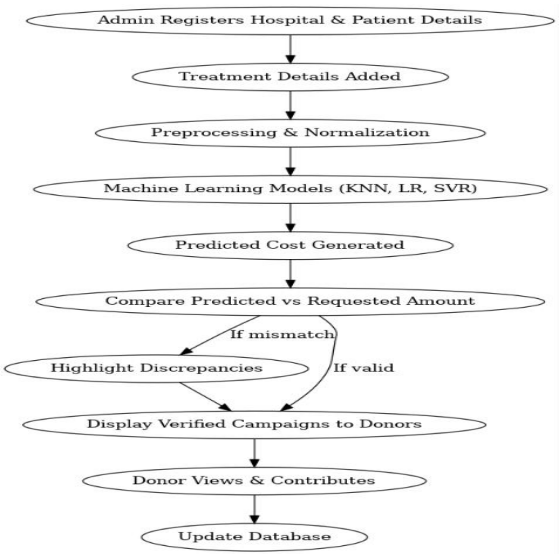

Fig 3.1 System Architecture

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

IV. METHODOLOGY

The methodology for developing the SmartAid system involves a systematic process to ensure accurate and reliable treatment cost predictions. The process begins with collecting historical hospital treatment datasets containing details such as treatment type, hospital information, and associated costs. This data is then preprocessed by cleaning inconsistencies, handling missing values, and applying normalization to standardize numerical features. Three machine learning algorithms—K-Nearest Neighbors (KNN), Linear Regression, and Support Vector Regression (SVR)—are selected for model training, where the dataset is split into training and testing subsets to identify patterns between input features and treatment costs. Once trained, the models generate predictions for new cases, which are compared with the requested fund amounts to detect discrepancies. The prediction module is integrated into the application backend, allowing real-time results to be displayed through the frontend interface. Finally, the system undergoes unit, integration, and performance testing to verify functionality, accuracy, and usability before deployment, ensuring that the AI-driven framework effectively supports transparent and trustworthy medical crowdfunding.

V. DESIGN AND IMPLEMENTATION

The SmartAid system is designed to address the lack of transparency and cost validation in medical crowdfunding platforms. The architecture follows a layered approach, separating the application into the presentation layer, application layer, and database layer. This modular design ensures that each layer handles a specific set of responsibilities, making the system easier to maintain, scale, and enhance in the future.

The **Presentation Layer** is the system's primary user interface, developed using HTML, CSS, and JavaScript. It is designed to be responsive, intuitive, and easy to use for both administrators and donors. Administrators can log in securely to register hospitals, add patient details, and enter treatment information. Donors can view active fundraising campaigns, access details about the hospital and patient, and see AI-predicted treatment costs before making a donation. The layout prioritizes clarity and accessibility, ensuring that users with varying technical skills can navigate the platform effortlessly.

The **Application Layer** is implemented in Python, using a web framework such as Flask or Django. This layer contains the system's core business logic and integrates the machine learning models responsible for predicting treatment costs. The process begins with dataset preprocessing, where raw hospital treatment data is cleaned to remove inconsistencies, missing values are handled, and irrelevant fields are filtered out. Normalization techniques are applied to ensure that all numerical values are scaled uniformly, improving the efficiency of the prediction algorithms.

Three machine learning algorithms are implemented—K-Nearest Neighbors (KNN), Linear Regression, and Support Vector Regression (SVR). These algorithms are selected for their ability to handle different data patterns and provide accurate predictions for continuous values such as treatment costs. The dataset is divided into training and testing subsets, allowing the models to learn from historical patterns while being evaluated on unseen data. Each model's performance is assessed using metrics such as Mean Squared Error (MSE) and R^2 score, ensuring that the best-performing model can be prioritized for predictions.

The **Database Layer**, developed in MySQL, stores all system data in a structured and secure manner. This includes hospital details, patient records, treatment information, donor profiles, fundraising requests, and AI-predicted cost values. The database schema is designed with relational integrity in mind, using primary and foreign keys to link related data. Role-based access control is implemented to ensure that only authorized users can modify or view sensitive information.

The **Implementation Workflow** begins when an administrator enters hospital and treatment details into the system. The backend processes this data through the trained machine learning model, generating a predicted treatment cost. This predicted value is then compared to the requested fund amount. If the difference between these values exceeds a predefined threshold, the system highlights the discrepancy, prompting further review. Verified requests are displayed on the donor's interface, ensuring that contributors can make informed decisions.

Secure API calls connect the presentation layer to the application and database layers, enabling real-time updates and smooth communication between components. Testing is performed at multiple stages, including unit testing for

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

individual modules, integration testing for combined components, and system testing for the complete workflow. The system's performance is also evaluated to ensure quick response times and reliable predictions.

While the current implementation focuses on the AI-driven cost prediction and validation, the design allows for future integration of blockchain technology to record transactions securely and transparently. This would further enhance donor trust and platform credibility. The modular design and clear separation of responsibilities ensure that such enhancements can be integrated without disrupting the core functionality of the system.

VI. OUTCOME OF RESEARCH

The SmartAid project successfully demonstrates the potential of artificial intelligence in enhancing transparency and trust in medical crowdfunding. By applying machine learning algorithms such as K-Nearest Neighbors (KNN), Linear Regression, and Support Vector Regression (SVR), the system is able to predict treatment costs with a high degree of accuracy. This predictive capability allows for effective validation of requested fund amounts, reducing the possibility of inflated or inaccurate claims.

The developed system provides a user-friendly platform where administrators can efficiently register hospitals, input patient details, and add treatment information. Donors, in turn, are presented with verified campaigns where the requested amounts are cross-checked against AI-generated predictions, enabling them to make more informed decisions. The backend processing ensures smooth interaction between the user interface, the database, and the prediction models, while the database securely stores all relevant records.

Testing results confirm that the system performs reliably under various scenarios, with accurate predictions and responsive performance. The research demonstrates that integrating AI into crowdfunding platforms can significantly improve operational efficiency, donor confidence, and overall platform credibility. Additionally, the architecture is designed to accommodate future enhancements, such as blockchain integration, for complete transaction transparency. This outcome validates the feasibility of using AI-driven frameworks to improve accountability in the fundraising ecosystem.

VII. RESULT AND DISCUSSION

The implementation of the SmartAid system involved training and testing three machine learning algorithms—K-Nearest Neighbors (KNN), Linear Regression, and Support Vector Regression (SVR)—on hospital treatment datasets to predict medical expenses. Each model was evaluated using performance metrics such as Mean Squared Error (MSE) and the coefficient of determination (R^2 score). The results showed that all three algorithms could generate reasonable predictions, but their performance varied depending on the dataset characteristics.

KNN provided accurate predictions for cases with closely related historical data, benefiting from its instance-based learning approach. However, its performance decreased slightly when the dataset contained sparse or highly varied entries. Linear Regression produced consistent results for datasets with strong linear relationships between treatment features and costs, making it a reliable choice for straightforward prediction scenarios. SVR demonstrated robustness in handling both linear and non-linear patterns, often outperforming the other models when the dataset contained complex relationships.

The integration of these models into the backend allowed real-time cost predictions, which were compared against requested fundraising amounts. Discrepancies beyond a set threshold were flagged, enabling donors to identify potentially inflated requests. User testing confirmed that the system improved decision-making by providing transparent and data-backed cost estimations.

Overall, the results validate the feasibility of using AI-driven models to enhance trust and accuracy in medical crowdfunding platforms.

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

VIII. CONCLUSION

The SmartAid system demonstrates how artificial intelligence can be effectively applied to improve transparency, trust, and efficiency in medical crowdfunding. By leveraging machine learning algorithms such as K-Nearest Neighbors (KNN), Linear Regression, and Support Vector Regression (SVR), the system accurately predicts treatment costs based on historical hospital data. This prediction capability enables the validation of requested fund amounts, helping donors make informed decisions and reducing the risk of inflated or fraudulent claims.

The layered architecture ensures smooth interaction between the user interface, backend processing, and database management, resulting in a reliable and user-friendly platform for both administrators and donors. Testing results confirm the system's accuracy, responsiveness, and stability under different operational scenarios.

While the current implementation focuses on AI-driven cost prediction, the design is scalable and can integrate future enhancements, such as blockchain-based transaction tracking, to further strengthen transparency and accountability. The research outcomes indicate that incorporating AI frameworks into crowdfunding platforms can significantly improve donor confidence and overall platform credibility.

In conclusion, SmartAid lays a strong foundation for technology-assisted medical fundraising, offering a practical solution that combines data-driven decision-making with the potential for future advancements in security and transparency.

REFERENCES

1. Géron, A. (2019). *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow*. O'Reilly Media.
2. Raschka, S., & Mirjalili, V. (2020). *Python Machine Learning*. Packt Publishing.
3. Han, J., Kamber, M., & Pei, J. (2011). *Data Mining: Concepts and Techniques*. Morgan Kaufmann.
4. Cortes, C., & Vapnik, V. (1995). Support-Vector Networks. *Machine Learning*, 20(3), 273–297.
5. Peterson, L. E. (2009). K-nearest neighbor. *Scholarpedia*, 4(2), 1883.
6. Kuhn, M., & Johnson, K. (2013). *Applied Predictive Modeling*. Springer.
7. Suthaharan, S. (2016). *Machine Learning Models and Algorithms for Big Data Classification*. Springer.
8. Friedman, J., Hastie, T., & Tibshirani, R. (2001). *The Elements of Statistical Learning*. Springer.
9. Russell, S., & Norvig, P. (2010). *Artificial Intelligence: A Modern Approach*. Pearson.
10. Witten, I. H., Frank, E., & Hall, M. A. (2011). *Data Mining: Practical Machine Learning Tools and Techniques*. Morgan Kaufmann.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com