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# AI-Driven Web Application for Event Inspections and Automation Reporting

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Abstract: This project proposes an AI-powered web application intended for effective event inspection and automatic report generation. Developed with Streamlit, the system allows the uploading of event-related images from which essential metadata like date and geolocation are parsed using EXIF data. The application uses natural language processing (NLP) methods, in this case, sentiment analysis through TextBlob, to assess the emotional tone of event descriptions. Via a secure admin login, event information—name, organizer, description, and location—can be entered and tracked. In-review events are inspected and digitally signed by authorized individuals via an upload or real-time drawing canvas. Upon approval, the system creates a professional PDF report with inlined images, metadata, sentiment summary, and signatures via ReportLab, and securely stores it on Cloudinary. This automation is not only onerous to documentation but also accurate, standardized, and easily accessible. The combination of AI and cloud services converts conventional event reporting into an intelligent, quick, and dependable process that is appropriate for institutional and organizational settings.

**Keywords-** AI-driven application, event inspection, automated report generation, Streamlit, image metadata extraction, EXIF data, sentiment analysis, natural language processing (NLP), TextBlob, geolocation, digital signature, PDF report generation, ReportLab, Cloudinary, web-based system, administrative approval, event management automation, user authentication, institutional documentation.

### I.INTRODUCTION

In today's institutions and organizations, documenting and reporting incidents is a crucial function in recording events, providing accountability, and highlighting accomplishments. Historically, this function involves manual data capture, report templating, and approval processes that are typically slow, inconsistent, and error prone. As the number of events grows, particularly in academia and business environments, the demand for a more intelligent and automated system becomes crucial. This project fills this gap by proposing an AI-powered web application that automates and simplifies the whole cycle of event inspection and report generation.

The suggested application utilizes the potential of artificial intelligence and web technologies to make event data collection, analysis, and storage easier. With the help of Streamlit, a contemporary Python-based web framework, the application offers an interactive and user-friendly interface for administrators to enter and manage event information. Images of events can be uploaded by users, from which EXIF metadata—date, time, and GPS coordinates—are automatically pulled. This metadata facilitates precise and context-aware recording of when and where events occurred. One of the system's main innovations is in its NLP module, which conducts sentiment analysis via the TextBlob library. This module analyzes event descriptions to determine the emotional context and tone of the event and deliver useful information that enhances the final report. Moreover, integrating reverse geocoding via the Nominatim API enables automated location identification from GPS data without the need for manual entry.

Another fundamental functionality is the integrated PDF report generator, developed from the ReportLab library. Upon approval of an event—drawn or uploaded digital signature—systematically produces a professional report with all relevant information, integrated images, sentiment summaries, and geolocation details. The resultant report is hosted on Cloudinary, allowing safe cloud storage as well as facile access. Through the automation of intricate processes like event data extraction, approval, and report generation, the application not only saves time but also enhances accuracy, consistency, and accessibility. The system accommodates dynamic approval, classifies events into pending or completed, and ensures that only authenticated reports are concluded and saved. The integration of AI tools with web



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technologies is a major move toward intelligent institutional document systems. In brief, the AI-Driven Event Inspection and Automation Report Generator is an all-around solution to redefine how companies approach event reporting so that it's quicker, smarter, and totally integrated with state-of-the-art cloud services.

#### **II. RELATEDWORK**

Artificial Intelligence (AI) has significantly transformed governance and administrative operations by enhancing efficiency, transparency, and accountability. Several studies have explored the integration of AI-driven solutions in public administration, particularly in field inspections, decision-making, and compliance monitoring. Tambe et al. (2021) discuss how AI-driven applications improve public administration by leveraging predictive analytics, fraud detection, and automated decision-making, which aligns with the objective of this project to streamline inspections and reporting. Similarly, Zhang & Lu (2022) highlight the role of smart governance, where AI-based decision-making enhances administrative efficiency by optimizing resource allocation and automating workflows.[1][3]

In the context of compliance and field inspections, Li & Zhao (2020) investigate AI-powered image recognition for verifying the authenticity of uploaded data, a crucial feature in preventing manipulation and ensuring integrity in inspection reports. Their findings emphasize the significance of real-time monitoring and AI validation techniques, similar to how this project employs AI-based image authentication to validate field reports. Additionally, Gandomi & Haider (2015) examine the impact of predictive analytics on governance, demonstrating how AI models help prioritize high-risk areas for inspections, improving resource allocation and proactive decision-making.[2][4]

Furthermore, the use of Information and Communication Technologies (ICTs) in governance has been explored by Bertot et al. (2010), where AI-powered transparency mechanisms, including automated reporting and secure digital signatures, are found to enhance public trust in government processes. This aligns with the project's aim to introduce secure authentication through OTP-based digital signatures and automated report generation. Overall, existing research underscores the transformative role of AI in public sector inspections, compliance monitoring, and data-driven decision-making. By leveraging AI-powered analytics, geo-tagging, and automation, this project builds on prior studies to offer an advanced, efficient, and transparent solution.[5][1]

Author(s)	Tool	Description	Key Features
Tambe et al. (2021)	AI-driven applications for public	Explores how AI improves governance through predictive analytics, fraud detection, and automated decision-making.	AI-based decision-making Predictive analytics for governance Fraud detection in administrative processes
Zhang & Lu (2022)	Smart Governance AI System	Discusses AI-based analytics and its role in optimizing administrative efficiency and resource allocation.	AI-powered data analytics Smart governance optimization Automated workflows for inspections
Li & Zhao (2020)	AI-based Image Recognition System	Examines how AI-driven image Recognition ensures the authenticity of uploaded images for compliance inspections.	AI-powered image verification Fraud prevention in inspections Real-time data authentication
Gandomi & Haider (2015)	Predictive Analytics Model	Investigates the role of big data and AI in predictive resource allocation for governance.	AI-driven predictive modeling Risk assessment in inspections Datadriven decision making
Bertot et al. (2010)	ICT-based Transparency System	Explores the use of AI and ICTs for transparency, automation, and secure authentication in governance.	Automated reporting systems Secure digital authentication AI-enhanced public trust mechanisms

Table 2.1	Related	works	of	authors
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#### **III. PROGRAM DESIGN METHODOLOGY**

#### A. Proposed System

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The system is built as a modular, AI-based web application to automate the end-to-end process of event inspection and report generation. The application is designed with a layered architecture, utilizing multiple technologies and libraries to handle data input, processing, and output generation in a streamlined way. Central to the system is the Streamlit framework, providing an interactive and dynamic web interface for event managers to access the application. The design is started with user authentication to make sure that only approved staff can view and update event information. Once logged in, users can upload photos related to events, which are processed to extract embedded EXIF metadata such as date, time, and GPS coordinates. This is achieved by PIL (Python Imaging Library), enabling automatic population of event time and location fields. To supplement the location information, the system employs reverse geocoding using the Nominatim API of OpenStreetMap, converting latitude and longitude into a human-readable address. The tool also has a natural language processing (NLP) component that utilizes TextBlob to examine the sentiment of the user's input in the event description. This is an AI-based tool that helps in the automatic determination of the emotional tone of the event, adding analytical depth to the end report.

All event data, such as image previews, location, sentiment, and descriptive data, are stored in temporary storage and processed within the local or cloud environment of the application. Events published with the system are marked as "Pending" and require an administrator's approval. The design features an additional function that allows the head or principal to authorize events by either writing a signature on a virtual canvas or scanning a photo of their signature. Once authorized, the system automatically triggers a PDF report generation module, developed using the ReportLab library, which consolidates all event details into a neatly formatted, printable report. This report includes the image, metadata, location map, sentiment outcome, and approval signature.

Finally, the generated PDF is saved to Cloudinary, a cloud-based media handling service, and the event is marked as "Completed" within the system. The design also includes deletion and rejection of reports, with an end-to-end workflow for handling events. Each module in the system is designed with modularity and reusability in mind, thereby making the application scalable and maintainable. Overall, the methodology shows an unproblematic combination of AI, image processing, geolocation, and web development tools for a smart, automated, and reliable event report generation system.

Module	Functionality		
Authentication	Admin login for secure access		
Image Upload	Upload event images (JPG/PNG)		
Metadata Extraction	Extract date/time and GPS from images using EXIF		
Reverse Geocoding	Convert GPS to location using Nominatim		
Event Entry	Input event name, organizer, description, and venue		
Sentiment Analysis	Analyze event tone using TextBlob		
Signature Approval	Draw or upload digital signature		
PDF Generation	Create structured report using ReportLab		
Cloud Storage	Upload final reports to Cloudinary		
Event Management	Manage status: Pending, Approved, or Deleted		

Table 3.1 Methodologies

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#### **B.** System Architecture

The architecture of the AI-Driven Web Application for Event Inspection and Automation Report Generator is made modular, scalable, and efficient, integrating frontend interactivity, backend processing, AI integration, and cloud services. The architecture is segmented into a number of main components: User Interface Layer, Processing Layer, AI & Analysis Module, Storage Layer, and Report Generation Module. The User Interface Layer is constructed with Streamlit, which offers a simple and interactive web interface for users to log in, enter event data, upload images, and see the status of reports. This layer provides seamless user interaction with dynamic form fields, image previews, and signature capture through drawing or upload.

Processing Layer performs input validation, image metadata extraction with the use of PIL and EXIF libraries, as well as geolocation services. It interacts with the Nominatim API to translate GPS coordinates into a readable address form. At the same time, the AI & Analysis Module does sentiment analysis based on TextBlob, which analyses the tone of the event description and classifies it as positive, negative, or neutral. The analysis is incorporated into the report for additional insight into the event mood. The Storage Layer incorporates local caching and cloud integration. Validated event reports are stored and retrieved using Cloudinary, providing secure and scalable storage of the generated PDF documents. Temporary or removed event data continues to be maintained locally or gets deleted according to user actions. The Report Generation Module makes use of ReportLab to generate dynamic and professional PDF documents that encompass all event data, such as images, metadata, sentiment outputs, location information, and authenticated signatures. All these components are orchestrated within the Streamlit application, providing for smooth data flow from input to end report generation. The architecture also includes a built-in workflow for categorizing events into "Pending" and "Completed," allowing for efficient event management and review. In summary, the architecture harnesses the synergy of AI, web technology, image processing, and cloud platforms to provide a holistic and smart event reporting solution.



Fig 3.1 System Architecture

#### **IV. IMPLEMENTATION MODULES**

#### User Authentication and Image Upload Module

This module commences the user experience by facilitating secure admin login to avert unauthorized use. After successful authentication, the admin is allowed to upload images relating to the event (JPG/PNG), which are automatically processed by employing the PIL (Python Imaging Library) to get EXIF metadata. The EXIF metadata captures critical details such as the timestamp of the image and GPS coordinates, minimizing manual entry requirements and guaranteeing correctness in documenting the source of the event.

#### Location Detection and Event Entry Module

After metadata extraction, the system makes use of the Nominatim API to reverse geocode, mapping GPS coordinates to a human-readable, detailed address. This location information is automatically filled into the event form. At the same time, the administrator fills in main event information such as name, organizer, location, and description. This dual module provides that all contextual and geographical information is captured without hitches for further processing. Sentiment Analysis Module

This module utilizes natural language processing (NLP) methods with the TextBlob library to analyze the emotional tone of the event description and categorize it as positive, negative, or neutral. The sentiment output enhances the end

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report by providing qualitative information about the character of the event, making it especially useful for institutional reviews or evaluations.

#### Signature Approval Module

Prior to creating a final report, the event has to be sanctioned by an authorized individual (e.g., a principal or head). This module permits the user to either draw a digital signature on a canvas or upload a pre-signed image. This functionality verifies the report and makes the sanctioning process formal, ensuring all documents are authentic and sanctioned.

#### PDF Generation Module

Once the all information is confirmed and the event has been authorized, this module gathers the input data, image, sentiment analysis, location, and signature to generate a formalized and ordered PDF report by means of ReportLab library. The output form is standardized and facilitates reports for being easily transferred, printed, or stored.

#### **Cloud Storage and Event Management Module**

Once the report is created, it is pushed to Cloudinary, a cloud media storage service that securely stores the PDF and makes it available through a distinctive URL. The status of the event is updated within the system too—"Pending" prior to approval and "Completed" after that. Admins can even remove or reject events whenever necessary. This module gives both cloud integration and event lifecycle management, allowing for timely and systematic report handling.

#### V. RESULT

The system integrates a series of well-structured modules to streamline event documentation and reporting. It begins with the User Authentication and Image Upload Module, which ensures only authorized administrators can access the system and upload event-related images. These images are automatically processed using the Python Imaging Library (PIL) to extract crucial EXIF metadata such as timestamps and GPS coordinates, reducing manual data entry and improving accuracy. Next, the Location Detection and Event Entry Module utilizes the Nominatim API for reverse geocoding, converting GPS data into human-readable addresses, while allowing admins to fill in essential event details like name, organizer, and description. The Sentiment Analysis Module leverages the TextBlob library to assess the emotional tone of the event description, classifying it as positive, negative, or neutral, thereby enriching the final report with qualitative insights. To ensure authenticity, the Signature Approval Module allows for digital signature capture through drawing or image upload, providing formal validation before the report is finalized. The PDF Generation Module compiles all collected information—text, image, sentiment, location, and signature—into a standardized and printable PDF format using ReportLab. Admins can manage events further by approving, rejecting, or deleting them as necessary. Overall, this integrated approach ensures efficient, accurate, and secure handling of event records from creation to final storage. Fig 5.1 Report pdf shows the auto generation of the event and stored in the cloudinary storage. Fig 5.2 login page of the web app.

**Event Report** 

Event Name: appu birthday Organizer Name: prahlba Event Location: East Mada Street, Dandhesswaram, CMWSSB Division 179, Zone 13 Adyar, Chennai, Tamil Nad Taken Date: 2025/04:29 17:42:46 Seminmen: Providence



hurrayy its my little one birthday thanks alot for coming.



Fig 5.1 Report pdf

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Fig 5.2 Login page

#### V.CONCLUSION

The AI-Driven Web Application for Event Inspection and Automation Report Generator presents an innovative and efficient solution for managing institutional or organizational event documentation. By integrating artificial intelligence, image processing, natural language analysis, and cloud technologies into a unified web-based platform, the system significantly reduces the manual workload typically associated with report generation. It automates key tasks such as metadata extraction, location identification, sentiment analysis, and PDF creation ensuring both accuracy and consistency in the output. The use of digital signatures and cloud storage further enhances the credibility, security, and accessibility of reports. Overall, this application not only streamlines the process of event reporting but also introduces intelligence and transparency into event documentation, making it a valuable tool for educational institutions, corporate settings, and administrative bodies.

#### **VI. FUTURE ENHANCEMENTS**

#### **Multiple-User Role Management**

Within the existing system, there's just one admin role. With time, it can be enlarged to accommodate numerous user roles, such as event staff, coordinators, reviewers, and principals. Each may have certain authorizations—like generating events, checking submissions, or approving reports—making it a more teamwork-friendly and expansive system for massive organizations or educational institutions.

#### **Database Integration**

Presently, event data and statuses are in local or memory storage. The addition of a relational database like MySQL or PostgreSQL, or a NoSQL database like MongoDB, would provide persistent storage of all event records, user logs, and activity histories. This would help in data integrity, provide for easier data retrieval, and facilitate future advanced querying and analytics.

#### **Real-Time Notifications**

The application can be upgraded with a live notification system by using technologies such as Firebase or email APIs. Notifications may be triggered to users for status notifications (e.g., "Event Approved," "Report Rejected"), keeping the users updated and boosting engagement on the platform.

#### **Integration with Mobile Apps**

To make the system more mobile-friendly, particularly for field users recording events, a mobile version of the app could be built using technologies such as React Native or Flutter. This would enable users to post event information and photos directly from their phones and get updates on the move.

#### More AI Capabilities

The present sentiment analysis is simple. In subsequent releases, more sophisticated machine learning algorithms or deep learning-based NLP models such as BERT or GPT may be incorporated for more in-depth analysis of event descriptions, such as topic modeling, emotion recognition, or event summarization, providing richer insights to the reports.

#### **Report Customization Options**

Future enhancements might involve providing users with the capability to personalize the design or layout of the PDF report, e.g., selecting templates, themes, or fonts. This would enhance the reports' flexibility in responding to varying institutional branding or documentation requirements.

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