International Journal of
Entrepreneurial Development, Education and Science Research
p-ISSN: 2360-901X | e-ISSN: 2360-9028

IJEDESR

February, 2026
Vol. 9, No. 1

The Effective and Efficient of an Automated Advert Management System Using Django and React

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Article DOI:
10.48028/iiprds/ijedesr.v9.i1.08

Abstract

The changing order of global business in this digital era has placed a lot of emphasis on creating avenues, platforms and channels through which business owners reach their targets audience. Hence, automated advertisement comes into play where the use of computer is central. The aim of the paper, however centers on developing an automated advert management system that would enables small and medium-scale business entrepreneurs manage, schedule and post their advertisements across multiple online platforms. Most of these entrepreneur's experience difficulties posting their advertisement at the right time due to busy schedules, distractions and limited technical knowledge. This, in no small measure, won't allow for wider customer reach leading to low customer engagements. These challenges necessitated the creation of a user friendly, reliable, efficient and secure platform that can upload and store digital advert contents. All this is done using software such as Python (Django) for its backend logic, React.js for its user interface, and MySQL/PostgreSQL for database collection. The end product would be an automated advert management system that could reduce manual effort, improves advert timing, and to a large extent help entrepreneur maintain consistent online presence.

Keywords:
Automated Advert Management System, Django, React, Prototype model, Small and Medium-scale Enterprises

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Background of the Study

Technologies that support advertisement and how businesses operate have been advanced. Everything has now changed as a result of these advancements. However, shopping, making payments and interacting with people on social media is now easier due to the availability of the internet. Business owners have now realized that customers' attention is drawn to their products and services that are posted on the internet. There are many ways to promote businesses, but the one done online produces better result. Automated or digital advertisement helps them showcase their products, services and brand identity across various platforms such as Facebook, Instagram, and WhatsApp etc. Some business owners, after creating their advert, fail to publish at the right time. This is a major challenge, considering the fact that consistency is key for growth. Many entrepreneurs especially those managing small or medium scale enterprises often struggle to maintain regular advertising schedules due to timing constraints, forgetfulness or lack of knowledge about peak engagement periods. Consequently, well designed advertorials are not floated leading to financial lost on the part of the business owners and at the same time not achieving the expected objective.

Computers have helped mankind achieve milestones in different spheres of human endeavors and digital advertising is not an exception. They have fostered the growth of businesses and consumer engagements by producing a platform that is scalable and robust. This system has made it easier for business owners to reach the right audience through digital channels and has changed the whole global economy (Palle, Hussain, Nagula, & Srikanth, 2023). However, before now the advertising processes were cumbersome and manual resulting in losses, inefficiency, delays and retarded growth of businesses. Today the narrative has changed owning to the in-roads and waves that researchers have made in the development of intelligent automated systems that deal with more of the lifecycle of advertisement operations with data driven processes and interactive digital platform.(Kumar & Nandal, 2024).

In this era, every automated advertising management system performs these various processes such as advertisement booking, payment, and deployment within a single digital environment. This benefits the user as he wouldn't need much technical expertise in handling advertisement processes (Mustafiz, Hriday, Oyeshe, & Khan, 2021). This system reduces the cost of operation. It also helps the system operators understand fully the workings of Django and react in ad placement operation (Singhal, 2024). On the other hand, the use of Model-template–view architecture through its operation processes improves the performance of the system. Automated advertising management systems have a common goal of optimizing the advertising workflow to ensure seamless coordination between service providers and consumers through centralized digital platforms, thereby making the advertising system smooth and cost-effective. There are many examples of automated advertising management systems being used in various contexts, such as web-based platforms that connect vendors with customers to rent advertising space on billboards and vehicles, thereby addressing the lack of a proper connecting bridge between these parties (Mustafiz, Hriday, Oyeshe, & Khan, 2021; Sagar, 2024; Yadav, 2021).

These systems seek to solve the problems of inefficiency, data redundancy, and limited accessibility that characterize traditional manual advertising workflows by leveraging the scalable backend architecture of Django and the dynamic rendering features of React (Kumar & Nandal, 2024; Serafin, 2024). It aims to provide access to centralized digital platforms that streamline the coordination of advertising workflows, thereby reducing operational overhead and improving the precision of ad placement strategies through the integration of scalable backend architecture and responsive frontend components (Deekonda, Mahesh, & Vennu, 2025; Garg, Chopra, Kumar, & Aggarwal, 2023).While there has been a sustained research effort in the application of automated technologies to advertisement over the years with some notable success stories, challenges persist regarding the seamless integration of disparate technologies to achieve real-time synchronization.

Moreover, the automated system operations have their attendant challenges. Firstly, operating these systems involves high level of technical input which can only be done by few individuals. In order words, it is not an easy venture. Secondly, the cost of managing and maintaining these systems is on the high side which may not be afforded by small and medium scale entrepreneur. (Cabañero, 2023; Neves & Pereira, 2025).

The focus of this study is to put in place a functional and scalable platform that would enable system operators maximize the potentials in automated advert systems using Django and React. Django and React, when applied and used to the fullest supports the development of practicable platforms that can help small and medium scale business owners manage their advertising activities effectively (Ahuja, 2021; Mustafiz, Hriday, Oyeshe, & Khan, 2021).

Objectives of the Study

Main objective

The main aim of this research is to design and develop an efficient automated advert management system that enables small and medium scale business owners to organize, schedule, manage and automatically distribute advertising content across multiple digital platforms.

Specific objectives

The Specific Objectives of this study are to:

1. Develop a user- friendly platform that will allow business owners to upload and store digital advertising materials such as images, videos, texts.
2. Design a structured database system that is capable of securely storing user information and scheduled content for advertisement.
3. Implement an automated scheduling mechanism that will make advertisements published at the exact date and time specified.
4. Integrate social media API'S such as Facebook and Instagram to enable multi-platform advertisement materials distribution.
5. Assess the effectiveness of the system in improving advertisement timing, frequent posting and user satisfaction through practical testing of the system.

Significance of the Study

Consistent advertising is very important for business promotion and growth. Maintaining regular advertising schedules is what many entrepreneurs struggle with. This system will help them in organizing, scheduling and publishing their advert more efficiently and maintained a strong online presence

Methodology

A Prototype Model of the System Development Life Cycle (SDLC) was adopted. This prototype approach was selected because it allows iterative platform development in which developers are allowed to quickly design a working version of the system, that is refined regularly based on the user feedback.

Prototype Model (SDLC) development stages

1. Requirement Gathering

This first stage is more of identifying the main requirements of the system. The needs of small business owners and content managers were studied. It was discovered that many users struggle with posting adverts on time and managing digital content manually. The analysis revealed the need for features such as secure user authentication, management tools for content, Advertisement scheduling, automatic posting mechanisms and proper access control.

2. Preliminary System Design

Following the requirement that have been identified, an initial design of the system was developed. This design will be included: user interface layout, Simple flow of how users will upload, schedule, and deliver advertisement material and preliminary database structure which is necessary for advertisement management and scheduling functionalities.

The design was not final; it was just enough to show how the system would work.

3. The Construction of the Prototype

A functional prototype of the system was then developed to demonstrate the main features.

The prototype includes a login module, authentication, Content upload feature, scheduling functionality, and a basic dashboard for user. The goal was to create a functional but simple version of the system to demonstrate its main features.

4. User Testing and Evaluation

The prototype was then tested by users to see how it worked by interacting with the system in order to provide feedback on: Ease of use, Speed of operations, Missing features, errors and difficulties. Their responses helped to identify the weaknesses of the system and areas that required improvement.

5. System Refinement and Improvement

Based on the feedback received, the system was improved. Corrections and

enhancements were made, such as: Improving the user interface, fixing errors found during testing, enhancing security features, Optimizing performance. This process of testing and improvement was repeated until the system met user expectations.

6. Final Implementation

After several refinements, the final version of the system was developed. All major features were completed, including: Secure login system, Content storage and management, Advert scheduling and delivery, Role-based access control. The system was then prepared for full use.

7. Testing and Deployment

Finally, the completed system was thoroughly tested to ensure, all functions work correctly, data is stored and retrieved properly, unauthorized users are blocked, the system performed efficiently. Once testing was successful, the system was ready for deployment and real-world system is presented through several diagrams that describe its functionality and structure.

The system architecture will adopt a three-tier architecture

i. Presentation Layer (React JS)
ii. Application Layer (Django)
iii. Database Layer/dashboard (MySQL)

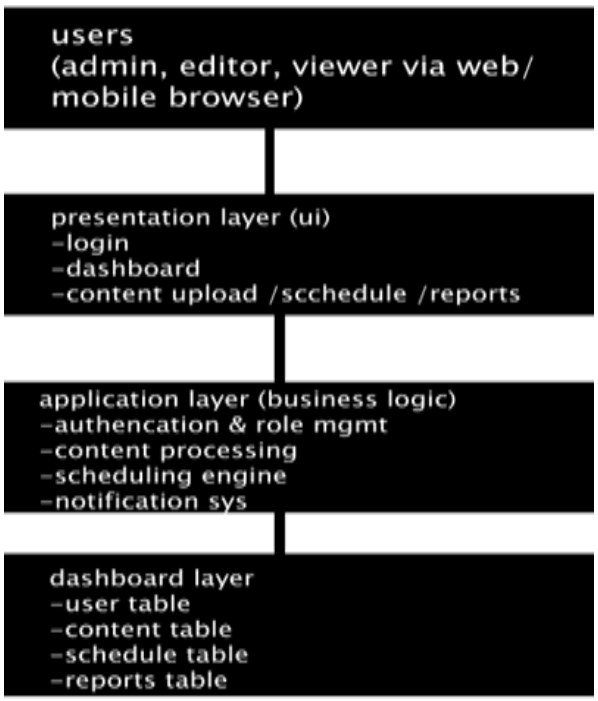

Figure 1: Architecture diagram

The figure 1 above describe the three-tier architecture of the system. As shown in figure 1: The presentation layer which is the frontend is developed using React.js. It is a user interface designed for administrators, content managers ad users. The application layer in the figure 1 is the backend, developed with Django and designed to handled permissions, content management and business logic handling scheduling. Then, the database/dashboard layer is implemented using MySQL/PostgreSQL which is for centralized repository for all content, logos and user details.

Findings

The architectural choice with a database and query to develop automated advert management system that will reduces manual effort, improves advert timing, and helps business owners maintain a consistent online presence.

Conclusion

Automated advert management system is not new but there is still problem. This system created in this study will help provide practical solution to organizations and individuals that depend on timely and secure advertising content distribution. For continuation of this work, Incorporation of artificial intelligence (AI) for smart search and recommendations and Extension of the system to support live streaming and real-time collaboration are some research issues to look into which can open new perspectives. With no visual usable practical results, automated advert management system provides an efficient framework for secure digital content management, with emphasis on usability and role-based access control.

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