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IT Lab Mini Project Report on

PostIT: Department E-newsletter Management System

**SUBMITTED
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Abstract

This report details the development of a user-friendly web application specifically designed to streamline the management of department e-newsletters. Traditional methods, like email blasts and static web pages, often struggle with organization and user engagement. This innovative platform tackles these issues by providing a centralized hub for creating and publishing department news.

Introducing PostIT! This application empowers users to categorize news articles within designated "PostBoxes." This functionality mirrors concepts like subreddits or channels, fostering improved organization and allowing for targeted communication within the department. Additionally, the platform offers user interaction with the news content, with the level of interaction dependent on user group permissions. Built using the Django web framework, the application prioritizes a user-friendly interface, ultimately promoting efficient communication and improved organization of department news.

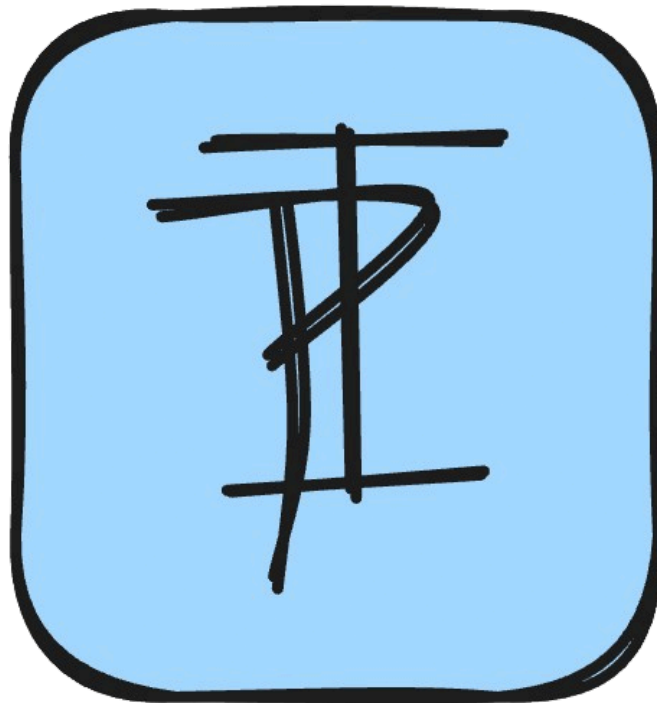


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1. Introduction

1.1 Project Overview

This report comprehensively analyzes PostIT, a web application designed to revolutionize content sharing and organization within online communities. PostIT leverages the robust Django web framework, renowned for its ability to streamline development processes and produce clean, well-structured code. This strong framework empowers developers to create feature-rich applications efficiently, ensuring PostIT's functionality and maintainability in the long run.

1.2 Problem Statement and Objectives

Traditional content-sharing methods, such as email blasts and static web pages, often struggle with two fundamental limitations: organization and user engagement.

- **Organizational Challenges:** Locating specific information within a barrage of emails or an unstructured webpage can be daunting. This lack of organization leads to frustration and wasted time for users.
- **Limited User Engagement:** Static web pages and email blasts often fail to capture user attention. The one-way communication style doesn't foster interaction, decreasing user interest and ineffective communication.

PostIT tackles these challenges head-on by offering a centralized platform specifically designed to address the shortcomings of traditional methods.

The primary objectives of PostIT are:

- **Enhanced Organization:** PostIT introduces the concept of "PostBoxes," which act as designated categories for content. This structure allows users to organize information logically, making finding specific content easier and navigating the platform efficiently. Imagine PostBoxes as specialized channels or subreddits, fostering a well-defined information architecture.
- **Increased User Engagement:** PostIT goes beyond simply presenting content. It aims to foster user engagement by providing an interactive platform for content discovery. Users can actively participate by creating and sharing within their designated PostBoxes.

- **Streamlined Communication:** Unlike email blasts, which often reach a broad and potentially uninterested audience, PostIT enables targeted communication. By leveraging PostBoxes, users can share information with specific groups within the community, ensuring content reaches the most relevant audience.
- **User-Centric Design:** PostIT prioritizes user experience. The development process focuses on creating a clear, intuitive, and user-friendly interface. This ensures a smooth learning curve for new users and simplifies content creation, sharing, and discovery processes for everyone.

PostIT aims to bridge the gap between traditional content-sharing methods and the need for a more organized, engaging, and user-friendly communication platform. It empowers users to share information effectively, fostering a vibrant and interactive online community.

2. Technologies Used

PostIT leverages a combination of powerful frontend and backend technologies to deliver a seamless user experience and robust functionality.

2.1 Frontend Technologies

The front end of PostIT is responsible for the visual elements and user interactions within the web application. Here's a breakdown of the critical frontend technologies used:

2.1.1 HTML (HyperText Markup Language)

HTML serves as the foundation of PostIT's front end. It defines the structure and content of the web pages, including elements like headings, paragraphs, forms, and buttons. HTML provides the basic building blocks styled and manipulated using other technologies.

2.1.2 Bootstrap

Bootstrap is a popular CSS framework that simplifies the creation of responsive and visually appealing user interfaces. PostIT utilizes Bootstrap to achieve the following:

- **Responsive Design:** Bootstrap ensures the web application adapts seamlessly to different screen sizes, providing an optimal viewing experience on desktops, tablets, and mobile devices.
- **Pre-built Components:** Bootstrap offers a rich library of pre-built components like buttons, navigation bars, and forms. These components streamline the development process and promote consistency in the application's look and feel.
- **Grid System:** Bootstrap's grid system provides a flexible layout structure, allowing developers to arrange elements on the page in a responsive and visually balanced manner.

2.1.3 jQuery

jQuery is a JavaScript library that simplifies DOM manipulation and adds interactivity to web pages. In PostIT, jQuery is used for functionalities like:

- **Event Handling:** jQuery handles user interactions such as clicks, hovers, and form submissions, enabling dynamic behavior on the web pages.

- **Animations and Effects:** jQuery creates animations and visual effects that enhance the user experience.
- **AJAX Requests:** jQuery makes asynchronous requests to the server without reloading the entire page, potentially enhancing responsiveness and user experience.

2.2 Backend Technologies

The backend of PostIT handles data processing, user authentication, and application logic. Here's a look at the core backend technology powering the application:

2.2.1 Django

Django is a high-level Python web framework renowned for its rapid development capabilities and clean, pragmatic design emphasis. PostIT leverages Django's features to achieve:

- **Model-View-Template (MVT) Architecture:** By employing the MVT architecture, Django promotes a clean separation of concerns. This structure keeps the business logic (models), user interface (templates), and request handling (views) distinct, leading to maintainable and scalable code.
- **Object-Relational Mapper (ORM):** Django's ORM simplifies database interaction by providing an abstraction layer. Developers can work with data using Python objects, and Django handles the underlying database communication.
- **User Authentication and Authorization:** Django offers built-in mechanisms for user authentication and authorization, allowing for secure user management within the application.
- **Admin Interface:** Django provides a user-friendly interface that enables administrators to manage the application's content, users, and other aspects.

2.2.2 SQLite3

SQLite3 is a lightweight, embeddable relational database management system. Here's how SQLite3 contributes to PostIT:

- **Database Storage:** SQLite3 is the storage engine for PostIT's data. It manages the application's creation, storage, and retrieval of information.
- **Lightweight and Efficient:** SQLite3 is known for its small footprint and efficient operation. These characteristics make it ideal for web

applications where performance and scalability are important considerations.

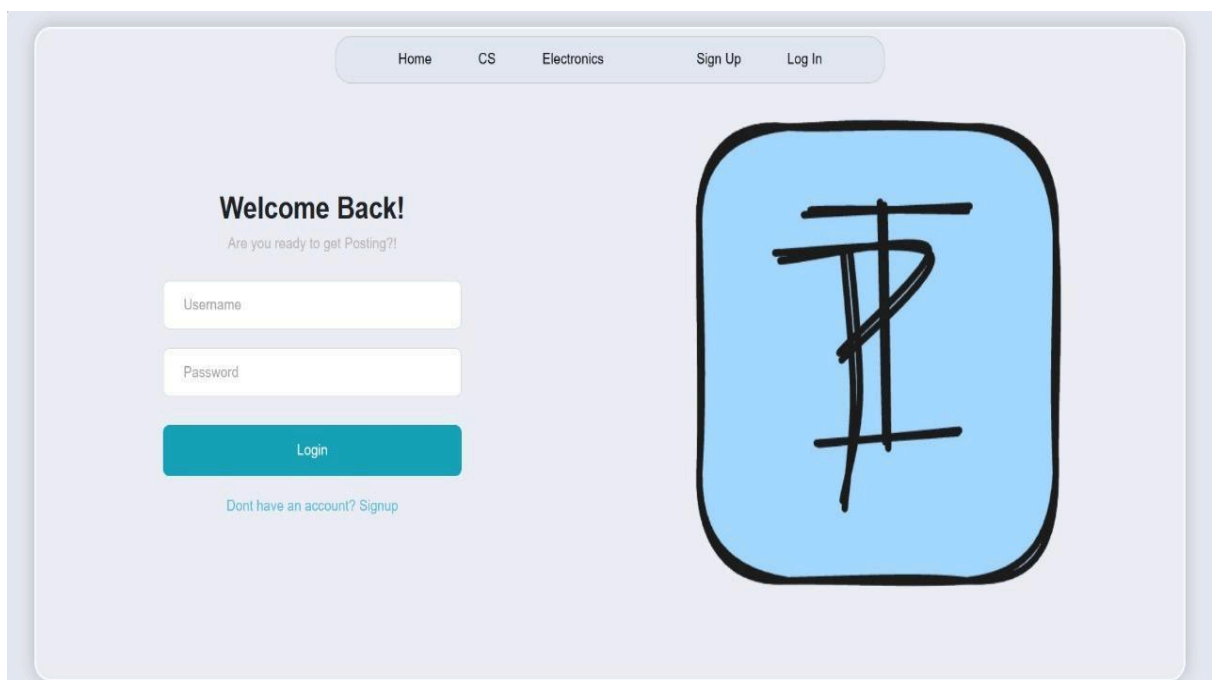
- **Embedded Database:** Unlike traditional client-server database models, SQLite3 can be embedded directly within the application. This eliminates the need for a separate database server, simplifying deployment and maintenance.

3. Functionality

3.1 User Management

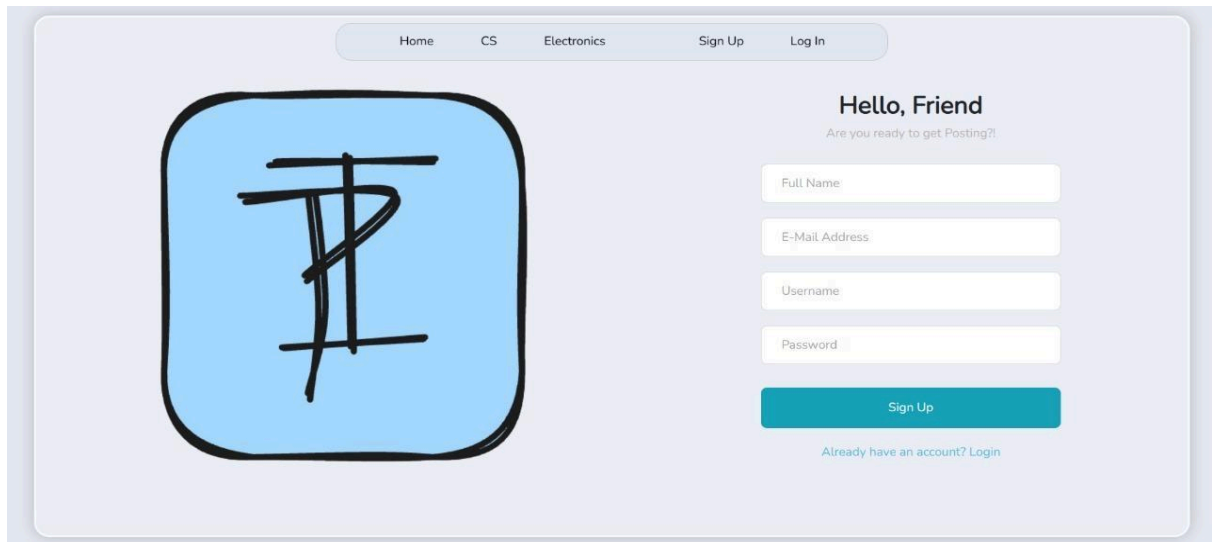
3.1.1 Login

- Existing users can access the platform by providing their registered username and password through a login form.
- The form submits data to a Django view function that is responsible for user authentication. This process involves validating the username and password against stored user credentials in the database.
- Upon successful login, users are led to a personalized homepage within the application.



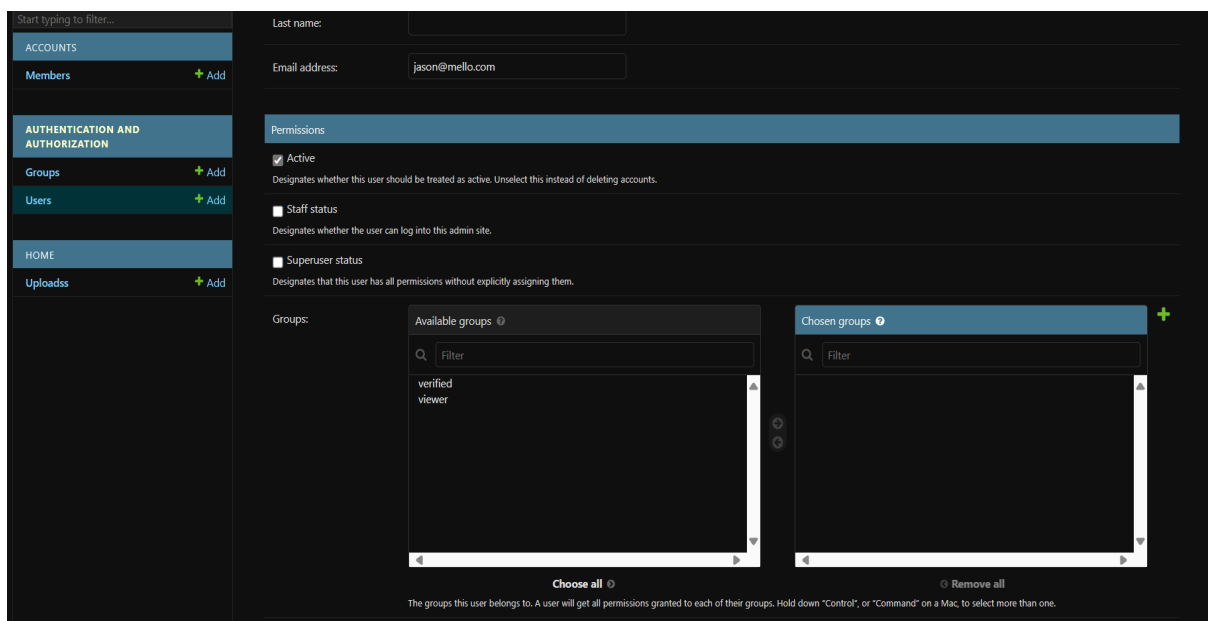
3.1.2 Signup

- New users can create accounts by providing their full name, email address, chosen username, and password through a signup form.
- The form submits data to a Django view function that is responsible for user authentication. The view ensures the entered information adheres to specific formats and prevents potential security vulnerabilities.
- After successful signup, users are redirected to their home page.



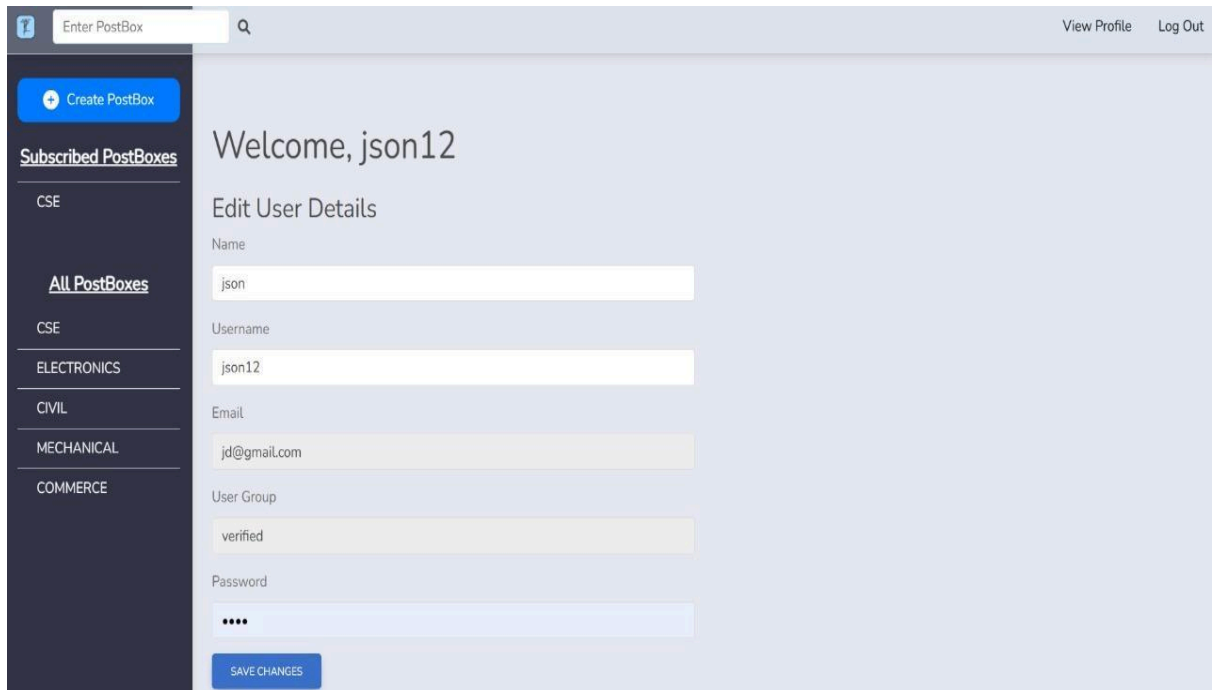
3.1.3 User group allocation

- Admin users can allocate users to one of two groups: 'verified' and 'viewer.'
- Users of the 'verified' group have elevated permissions, allowing them to create 'PostBoxes' and posts within them.
- Users in the 'viewer' group have limited permissions and can only read posts and subscribe to postboxes.
- Admin users have oversight over user groups and permissions, allowing them to allocate users to appropriate groups based on their roles or responsibilities. They can also manage and moderate the content created within the platform, ensuring compliance with guidelines and standards.



3.1.4 Edit User Details

- Allows updating name, username, and password through a form on the profile page. Email and group affiliation are displayed but not editable.



The screenshot shows a web application interface for editing user details. On the left is a dark sidebar with a search bar at the top containing 'Enter PostBox' and a magnifying glass icon. Below the search bar is a blue button with a plus icon and the text 'Create PostBox'. Underneath are two sections: 'Subscribed PostBoxes' and 'All PostBoxes', each containing a list of categories: CSE, ELECTRONICS, CIVIL, MECHANICAL, and COMMERCE. The main content area on the right has a light blue background. At the top right of this area are links for 'View Profile' and 'Log Out'. The main heading is 'Welcome, json12'. Below it is the title 'Edit User Details'. The form contains several input fields: 'Name' with the value 'json', 'Username' with the value 'json12', 'Email' with the value 'jd@gmail.com', and 'User Group' with the value 'verified'. The 'Password' field is currently empty and masked with four dots. A blue 'SAVE CHANGES' button is located at the bottom of the form.

3.2 Post Management

3.2.1 PostBox Creation/Management

- Verified users only can create and manage their PostBoxes. A form allows users to specify a name and description for the PostBox. This will enable users to categorize and organize their content within the application.
- Upon form submission, the data is processed by a Django view function to create a new record in the database associating the PostBox with the user. This creates a dedicated space for users to store their notes or content.

Enter PostBox

View Profile Log Out

Create PostBox

Subscribed PostBoxes

CSE

All PostBoxes

CSE

ELECTRONICS

CIVIL

MECHANICAL

COMMERCE

Create PostBox

Title

Content

SUBMIT

3.2.2 Uploading Content

- Verified users can also create new posts within their PostBoxes. This functionality allows them to add information and media to organize their content effectively.
- Users interact with a form to create a new post, provide a title and content, and optionally upload a file.
- Django handles data validation and securely stores the post and uploaded file within the database (SQLite3) using its ORM (Object-Relational Mapper). This ensures the uploaded content and any additional information are saved persistently within the application.

Enter PostBox

View Profile Log Out

CSE

This is a CSE PostBox

SUBSCRIBE

Subscribed PostBoxes

CSE

All PostBoxes

CSE

ELECTRONICS

CIVIL

MECHANICAL

COMMERCE

Title

Content

File

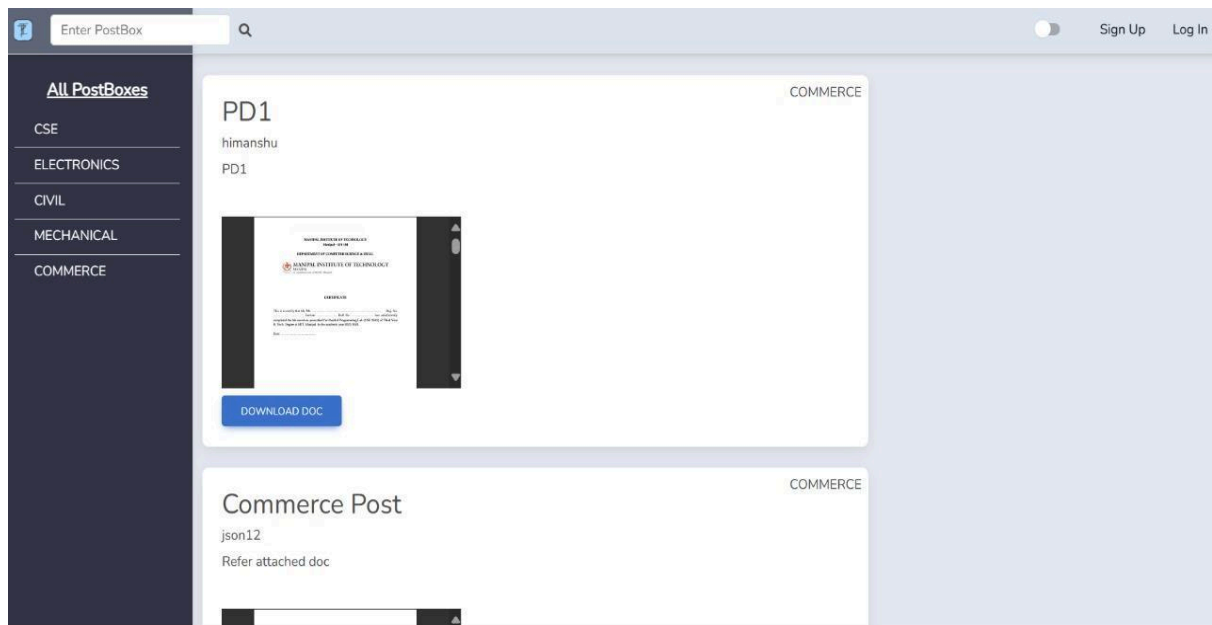
Choose File No file chosen

POST

This is a CSE post

3.2.3 Viewing Posts/Dashboard

- Users can view the content (posts) uploaded within their PostBoxes. The template iterates through data retrieved from the database and dynamically displays the content of the post. This allows users to see information organized within their designated PostBoxes.



3.2.4 PostBox subscriptions

The subscription feature allows users to subscribe to different PostBoxes on the platform. Once a user is subscribed to a PostBox, they will receive email notifications whenever a new post is created in that PostBox. The emails contain a sneak peek of the new post's content and encourage the user to log in to the platform to read the full content. This feature helps users stay updated with the latest posts in their subscribed PostBoxes.

4. Models

4.1 Overview of the Main Models

The application utilizes four main models to manage user data, post information, file uploads, and subscriptions:

- post_boxes (stores post titles and content)
- uploads (stores uploaded files, titles, and descriptions and links them to PostBoxes and Users)
- subscription (tracks user subscriptions to specific PostBoxes)
- auth_user (Provided by Django) (manages user accounts, authentication, and permissions)



4.2 Description of the post_boxes Model

The PostBox model is the foundation for storing and organizing content within the PostIT application. It defines two essential fields:

- **title (CharField):** This field stores a concise title for the PostBox. The title is a heading that gives users a basic understanding of PostBox's content.
- **content (CharField):** This field represents the description body of the PostBox content. It allows users to express their thoughts and ideas in a text format, and to give a brief description of the PostBox.

4.3 Description of the uploads Model

The Uploads model caters specifically to uploads associated with PostBoxes and Users. It extends the functionality of PostBoxes by enabling users to attach relevant files, enriching the content experience. The Uploads model comprises five fields:

- **title (CharField):** This field stores a brief description of the uploaded file (maximum 100 characters). The title provides users with context about the file's content.
- **content (CharField):** This field allows additional details about the uploaded file (maximum 500 characters). Users can utilize this field to provide further explanation or background information beyond the file title.
- **file (FileField):** This field is crucial for storing the uploaded file. Django's storage system manages the underlying file handling, ensuring secure and efficient storage.
- **submission_page (ForeignKey):** This ForeignKey field establishes a many-to-one relationship with the PostBox model. This association guarantees that each uploaded file is linked to a specific PostBox, enabling organized storage and retrieval of files within their respective PostBoxes. The `on_delete=models.CASCADE` argument ensures that when a PostBox is deleted, all related Uploads instances are also deleted, maintaining data consistency.
- **user (ForeignKey):** Another ForeignKey field, creating a many-to-one relationship with Django's built-in User model. This association enables tracking the User who uploaded each file, providing accountability and facilitating potential permission or access controls based on users. Similar to `submission_page`, `on_delete=models.CASCADE` ensures that all their uploaded files are deleted when a User is deleted.

4.4 Description of the subscription Model

The Subscription model focuses on user subscriptions to specific PostBoxes. It has two core fields:

- **user (ForeignKey):** This ForeignKey field establishes a many-to-one relationship with Django's User model. It tracks the User who has subscribed to a particular PostBox.
- **postbox (ForeignKey):** Another ForeignKey field creates a many-to-one relationship with the PostBox model. This association ensures that each subscription is linked to a specific PostBox, allowing users to follow PostBoxes of interest and receive updates on their content. Additionally, the `unique_together` meta option with `('user', 'postbox')` enforces a constraint, guaranteeing that a User can only subscribe to a specific PostBox once. This prevents duplicate subscriptions.

4.5 Description of the `auth_user` Model (Provided by Django)

The application leverages Django's built-in `auth_user` model to manage user authentication, permissions, and related functionalities. Django pre-defined this model and provides essential user account management features.

5. Views

Views in Django applications handle user requests and define the application's logic. They retrieve data from models, process user input from forms, and render the appropriate HTML templates in response. This section explores the different views used in the PostIT application.

5.1 Overview of the Views Used in the Application

The PostIT application utilizes several views to manage user interactions and display content:

- **index:** Displays the main landing page with a list of PostBoxes, uploaded files, and subscription management features.
- **postbox:** Shows the details of a specific PostBox, including its content, uploaded files, and subscription options.
- **createpost:** Allows verified users to create new posts within a specific PostBox.
- **createpostbox:** Enables verified users to create new PostBoxes.
- **subscribe:** Handles user subscriptions to specific PostBoxes.
- **signup:** Processes user registration.
- **login:** Authenticates users and logs them into the application.
- **logout:** Logs out the currently authenticated user.
- **profile:** Enables users to edit their profile information.

5.2 Description of the index View

The index view serves as the application's main landing page.

```
1 def index(request):
2     all_posts = Uploads.objects.all().order_by('-id')
3     postbox_list = PostBox.objects.all()
4     if request.user.is_authenticated:
5         subscribed_postbox_list = Subscription.objects.filter(user=request.user).values_list('postbox__title', flat=True)
6     else:
7         subscribed_postbox_list = []
8     has_verified_permission = request.user.groups.filter(name='verified').exists()
9     context = {"all": all_posts,
10              "postbox_list": postbox_list,
11              "has_verified_permission": has_verified_permission,
12              "subscribed_postbox_list": subscribed_postbox_list}
13
14     return render(request, "home.html", context)
```

5.3 Description of the postbox View

The Postbox view displays the details of a specific PostBox.

```
1 def postbox(request, postbox_name):
2     postbox_description = "This is a postbox for " + postbox_name
3     if request.user.is_authenticated:
4         subscribed_postbox_list = Subscription.objects.filter(user=request.user).values_list('postbox_title', flat=True)
5     else:
6         subscribed_postbox_list = []
7     showfrom = True
8     try:
9         postbox = PostBox.objects.get(title=postbox_name)
10        postbox_description = postbox.content
11        uploads = Uploads.objects.filter(submission_page=postbox)
12    except PostBox.DoesNotExist:
13        postbox_description = "Please contact an admin or verified user to create the Postbox: " + postbox_name
14        uploads = Uploads.objects.none()
15        showfrom = False
16    has_verified_permission = request.user.groups.filter(name='verified').exists()
17    print(has_verified_permission)
18    postbox_list = PostBox.objects.all()
19    return render(request, "postbox.html", {
20        "postbox_name": postbox_name,
21        "postbox_description": postbox_description,
22        "subscribed_postbox_list": subscribed_postbox_list,
23        "has_verified_permission": has_verified_permission,
24        "postbox_list": postbox_list,
25        "uploads": uploads,
26        "showfrom": showfrom
27    })
```

5.4 Description of the createpost View

The createpost view handles user-submitted posts within a specific PostBox.

```
1 def createpost(request):
2     if request.method == "POST":
3         form = CreatePostForm(request.POST, request.FILES or None)
4         if form.is_valid():
5             current_user = request.user
6             form.instance.user = current_user
7             current_page = request.POST.get('page_name')
8             postbox = PostBox.objects.get(title=current_page)
9             print(f"Current user: {postbox}")
10            form.instance.submission_page = postbox
11            form.save()
12
13            # Get all subscriptions for the postbox
14            subscriptions = Subscription.objects.filter(postbox=postbox)
15
16            # Send an email to each user
17            for subscription in subscriptions:
18                subject = f'New Post Created in "{postbox.title}"'
19                message = f"""
20 Hello {subscription.user.username},
21
22 A new post titled "{form.instance.title}" has just been published in the "{postbox.title}" department.
23
24 Here's a sneak peek of the content:
25
26 {form.instance.content[:100]}...
27
28 We encourage you to log in to our platform as soon as possible to view the full content and stay updated.
29
30 Best regards,
31 PostIT Team
32 """
33                email_from = settings.EMAIL_HOST_USER
34                recipient_list = [subscription.user.email,]
35                send_mail(subject, message, email_from, recipient_list)
36
37            return redirect('index')
38        else:
39            print(form.errors)
40            return redirect('createpost')
41    else:
42        rules = "Please make sure to follow the rules and guidelines"
43        return render(request, "postbox.html", {"postbox_name": rules})
```

5.5 Description of the createpostbox View

The createpostbox view enables users to create new PostBoxes.

```
1 def createpostbox(request):
2     if request.method == "POST":
3         title = request.POST.get('title')
4         content = request.POST.get('content')
5         PostBox.objects.create(title=title, content=content)
6         return redirect('index')
7     else:
8         postbox_list = PostBox.objects.all()
9         has_verified_permission = request.user.groups.filter(name='verified').exists()
10        if request.user.is_authenticated:
11            subscribed_postbox_list = Subscription.objects.filter(user=request.user).values_list('postbox__title', flat=True)
12        else:
13            subscribed_postbox_list = []
14        return render(request, "createpostbox.html", {"postbox_list": postbox_list,
15                                                       "has_verified_permission": has_verified_permission,
16                                                       "subscribed_postbox_list": subscribed_postbox_list
17                                                       })
```

5.6 Description of the subscribe View

The subscribe view handles user subscriptions to specific PostBoxes.

```
1 def subscribe(request, postbox_name):
2     postbox = PostBox.objects.get(title=postbox_name)
3     user = request.user
4     if request.user.is_authenticated and not Subscription.objects.filter(user=user, postbox=postbox).exists():
5         Subscription.objects.create(user=user, postbox=postbox)
6     elif request.user.is_authenticated and Subscription.objects.filter(user=user, postbox=postbox).exists():
7         Subscription.objects.filter(user=user, postbox=postbox).delete()
8     return redirect('postbox', postbox_name=postbox_name)
```

5.7 Description of the signup View

The signup view handles user registration.

```
1 def signup(request):
2     if request.method == "POST":
3         user = request.POST.get("user", None)
4         email = request.POST.get("email", None)
5         name = request.POST.get("name", None)
6         password = request.POST.get("pass", None)
7
8         print(user, name, password, email)
9
10        if User.objects.filter(username=user).exists() or User.objects.filter(email=email).exists():
11            print("User or email taken")
12            messages.error(request, "Username or email already taken.")
13            return redirect("/signup")
14
15        account = User.objects.create_user(username=user, email=email, password=password, first_name=name)
16        account.save()
17
18        group = Group.objects.get(name="viewer")
19        account.groups.add(group)
20        print("User Created")
21
22        return redirect("/login")
23    else:
24        return render(request, "signup.html")
```

5.8 Description of the login View

The login view authenticates users and logs them into the application.

```
1 def login(request):
2     if request.method == "POST":
3         user = request.POST.get("user", None)
4         password = request.POST.get("pass", None)
5         print(user, password)
6
7         user = User.objects.filter(username=user).first()
8         if user is None:
9             print("User does not exist")
10            messages.error(request, "User does not exist.")
11            return redirect("/login")
12
13            if not user.check_password(password):
14                print("Incorrect Password")
15                messages.error(request, "Incorrect Password.")
16                return redirect("/login")
17
18            auth.login(request, user)
19
20            print("User Logged In")
21            return redirect("/")
22        else:
23            return render(request, "login.html")
```

5.9 Description of the logout View

```
1 def logout(request):
2     auth.logout(request)
3     return redirect("/")
```

5.10 Description of the profile View

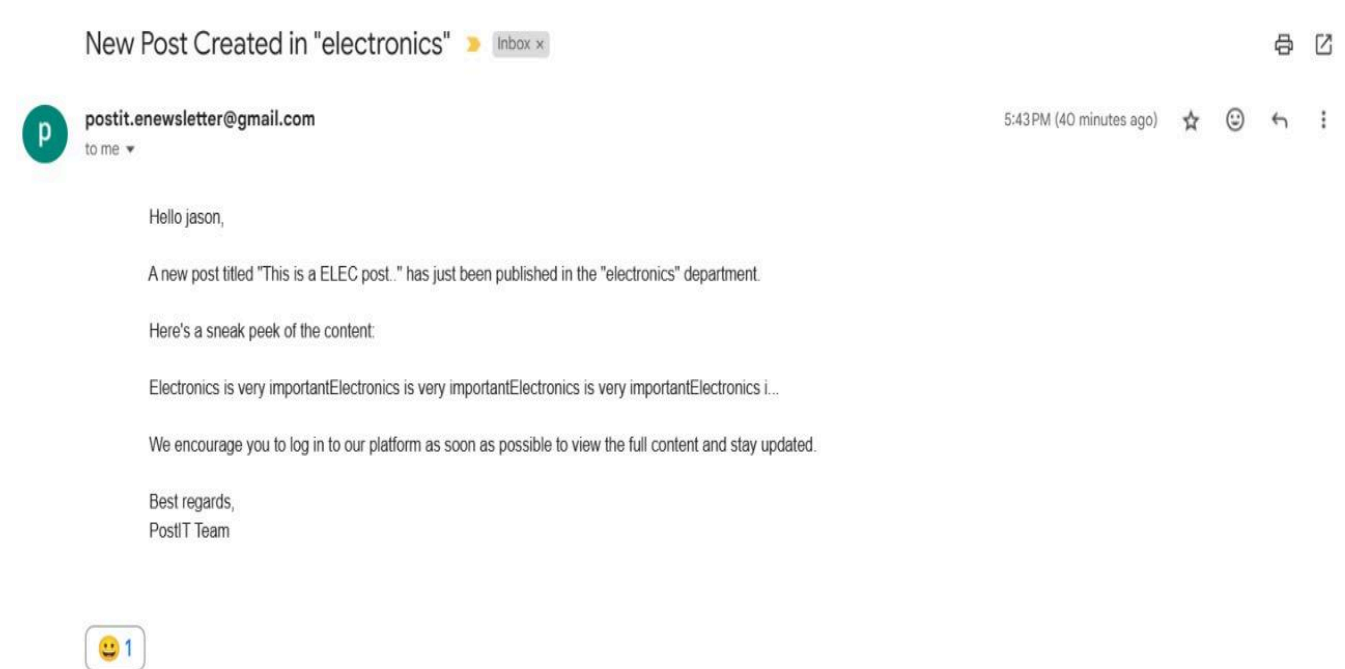
```
1 def profile(request):
2     if request.user.is_authenticated:
3         if request.method == "POST":
4             name = request.POST.get("name", None)
5             username = request.POST.get("username", None)
6             password = request.POST.get("password", None)
7
8             user = request.user
9             user.first_name = name
10            if username: # Check if username is provided
11                user.username = username
12            if password:
13                user.set_password(password)
14            user.save()
15
16            return redirect("/") # Redirect to home page or any other desired URL
17        else:
18            has_verified_permission = request.user.groups.filter(name='verified').exists()
19            subscribed_postbox_list = []
20            if request.user.is_authenticated:
21                subscribed_postbox_list = Subscription.objects.filter(user=request.user).values_list('postbox__title', flat=True)
22            else:
23                subscribed_postbox_list = []
24            postbox_list = PostBox.objects.all()
25            return render(request, "profile.html", {"user": request.user,
26                                                    "postbox_list": postbox_list,
27                                                    "has_verified_permission": has_verified_permission,
28                                                    "subscribed_postbox_list": subscribed_postbox_list
29                                                    })
30        else:
31            return redirect("/login")
```


6. Additional Features

6.1 Email Notifications

The PostIT application leverages email notifications to inform users about new content within their subscribed PostBoxes. This functionality ensures subscribers receive updates when verified users add new posts.

- When a verified user creates a new post in a PostBox, the system automatically triggers an email notification process.
- This notification is sent to all users who have subscribed to that specific PostBox.
- The email notification contains relevant details such as:
 - Post Title
 - PostBox name
 - Post excerpt



7. Conclusion

7.1 Summary of Project

The PostIT application is a web-based platform designed to facilitate creating, sharing, and managing user-submitted content within designated "PostBoxes." This report has documented the key functionalities and technical aspects of the application.

Key Functionalities:

- **User Authentication and Management:** Users can register, log in, log out, and edit their profiles.
- **PostBox Creation and Management:** Authorized users can create new PostBoxes and manage existing ones (permissions and settings).
- **Content Creation and Uploads:** Users can submit posts within specific PostBoxes, including titles and content, and optionally attach files.
- **Post Viewing and Downloading:** Users can view all posts within a PostBox and download the attached files.

Technical Stack:

- **Frontend:** HTML, Bootstrap, JQuery
- **Backend:** Django (Python web framework) with SQLite3 database

7.2 Future Prospects and Improvements

The PostIT application has a strong foundation and potential for further development and feature enhancements. Here are some future considerations:

- **Advanced Search Capabilities:** Implementing search filters based on keywords, tags, or user-defined criteria would allow for more targeted content retrieval.
- **Content Editing and Versioning:** The ability to edit existing posts and maintain version history could be beneficial for managing evolving content.
- **Mobile Responsiveness:** Optimizing the application for mobile devices would improve accessibility and user experience on various platforms.
- **Advanced Content Management:** Exploring features like rich text editing, media embedding, or comment sections could provide a more versatile content creation environment.

- **Integration with External Services:** Cloud storage or social media platforms could offer additional content-sharing and collaboration functionalities.

By implementing these potential improvements, the PostIT application can evolve into a more robust and user-friendly platform for managing and sharing information within a collaborative environment.