Web Application using Python

Brief Report

Submitted for the partial fulfillment of the degree of

Bachelor of

Technology In

Computer Science & Design

Submitted By

Swati Sharma

0901CD223D04

UNDER THE SUPERVISION AND GUIDANCE OF

Prof. Arti Ahirwar

Professor

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.), INDIA
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Jan-May2025

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Gwalior

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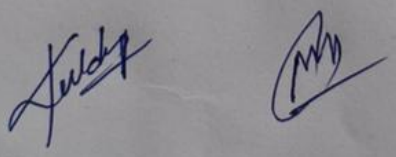

ABSTRACT

This work stipulates two endeavors: an app for Twitter sentiment monitoring framework which employs artificial intelligence techniques to sort tweets into favorable, adverse, or ambiguous sensations; & a backend interface enabling an app for socializing that was erected using the Django REST Framework. Both of these projects are presented in this study.

The explosion of social media backend is accountable for establishing vital features such as posts, stories, comments, shares, and likes, while the sentiment monitoring program displays the processing of natural language and grouping.

The versatility of Python in the realms of data inquiry and web development is illustrated by the two projects at hand.

ACKNOWLEDGEMENT

The full semester project has proved to be pivotal to my career. I am grateful to **Madhav Institute of Technology and** Science for granting me permision to continue my disciplinary/interdisciplinary project as a required course of study under the terms of the Flexible Curriculum Scheme, which is based on the AICTE Model Curriculum 2018 and has been approved by the institute's Academic Council. For this, I would like to thank **Dr. R. K. Pandit**, the institute's vice chancellor, and **Dr. Manjaree Pandit**, dean of the faculty of engineering and technology.

I would sincerely like to thank my department, Department of Computer Science and Engineering, for allowing me to explore this project. I humbly thank **Dr. Manish Dixit**, Professor and Head, Department of Computer Science and Engineering, for his continued support during the course of this engagement, which eased the process and formalities involved.

I am sincerely thankful to my faculty mentor. I am grateful to the guidance of **Prof.Arti Ahirwar**, Assistant Professor, Computer Science and Engineering, for her continued support and guidance throughout the project. I am also very thankful to the faculty and staff of the department.

Swati Sharma

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1. Introduction

In today's world, social media platforms are part of everyone's lifestyle. A microblogging site, Twitter, generates enormous quantity of text data on a daily bases reflecting public sentiments and opinions. This information is valuable for businesses and policymakers as positive or negative sentiment analysis of this data enables them to take actions aligned with public mood. At the same time, social media applications demand powerful backend systems to handle content generated by users and interactions like comments, likes, posts, etc. This report includes a discussion of a Sentiment Analysis project using Twitter data and the implementation of Social Media backend, which demonstrates fundamental skills in data science and web development.

2. Twitter Sentiment Analysis

2.1 Objective

To create an algorithm using machine learning that can filter messages into three distinct categories centered on their perception: unfavorable, adverse, and optimistic.

2.2 Data Collection & Preprocessing

Data Source: Tweets retrieved utilizing the python Tweepy module through the twitter API.

- Stripped Emojis, punctuation marks, labels (#tag), mentioning (@user), and Hyperlinks.
- For reliability, all written material was lowercased.
- Sentences ultimately tokenized into words.
- Lemmatization has been employed to create standardized words and eradicate stop words.

Text data was converted into quantitative vectors of characteristics utilising TF-IDF vectorization, whereas word embeddings with names like Word2Vec or GloVe seemed potentially employed for models based on deep learning.

2.4 Model Training and Evaluation

- A variety of models were evaluated, notably Random Forest, Naive Bayes, and Logistic Regression.
- LSTM Neural System
- Data split: 20% for testing purposes and 80% for instruction.
- Models were assessed using F1-score, recall, accuracy, and precision.

2.5 Results

- The LSTM model's reliability of roughly 86 percent was the highest among the models.
- Data was analyzed using visualization techniques such as word clouds and sentiment distribution pie charts; confusion matrices revealed

tremendous precision in labeling favorable and unbiased sentiments but substantial disorientation in detecting adverse classes.

2.6 Discussion

- The text sentiment analysis pinpointed the effectiveness of sequential models which emerged as the clear winner.
- Problems encountered involved detecting sarcasm in sentiment analysis alongside having a small dataset.
- Through sampling methods, data imbalance was resolved.

2.7 Future Work

- Develop a sentiment analysis dashboard for real-time data.
- Extend analysis to international tweets in various languages.
- Add modules for sarcasm and irony detection.

3. Social Media Application Backend Design

3.1 Main Aim

To create a high-availability backend API for a social media application that includes user registration, posting, commenting, liking, sharing, and story features.

3.2 Architecture and Technologies Information

- Django version 4.x with Django REST Framework will be used for backend framework.
- PostgreSQL will be used for the database while SQLite will be used for development.
- Token based via Django REST Framework will be used for Authentication.
- Media is handled either via local file system for development or AWS S3 for production.

3.3 Features of the Application

- User authentication (register, login, and update profile details).
- Multimedia posting with creation, edition and deletion privileges.
- Stories with expiry time of 24 hours.
- Posts can have likes, comments, and shares.
- Reels (short videos) feature placeholder.

3.4 Relational Databases

- User, Post, Story, Like, Comment, and Share. These are the models.
- User-Post relation (one to many), post-comment relation (one to many), post-like relation (one to many) are the relations structures.

3.5All-in-one API General Methods and Examples

Endpoint	Method	Description
/api/auth/register/	POST	Register a new user
/api/auth/login/	POST	Obtain auth token
/api/posts/	GET/POST	Retrieve/create posts
/api/posts/<id>/	GET/PUT/DELETE	Retrieve, update, delete post
/api/stories/	GET/POST	List/create stories
/api/likes/	POST	Like a post
/api/comments/	POST	Comment on a post
/api/shares/	POST	Share a post

3.6 Authentication and Security Features

- Has to be cached the token for authentication and also to submit the request on user's server operated by overrides.

3.7 Testing and Deployment

- Postman manual testing.
- Model and API view unit tests.
- A deployment with environment-related parameters and static/media configuration has been established on platforms with names like Heroku or Railway.

3.8 Challenges and Learnings

- Controlling story expiration and multimedia uploads.
- Optimizing cascade deletes and database relations.

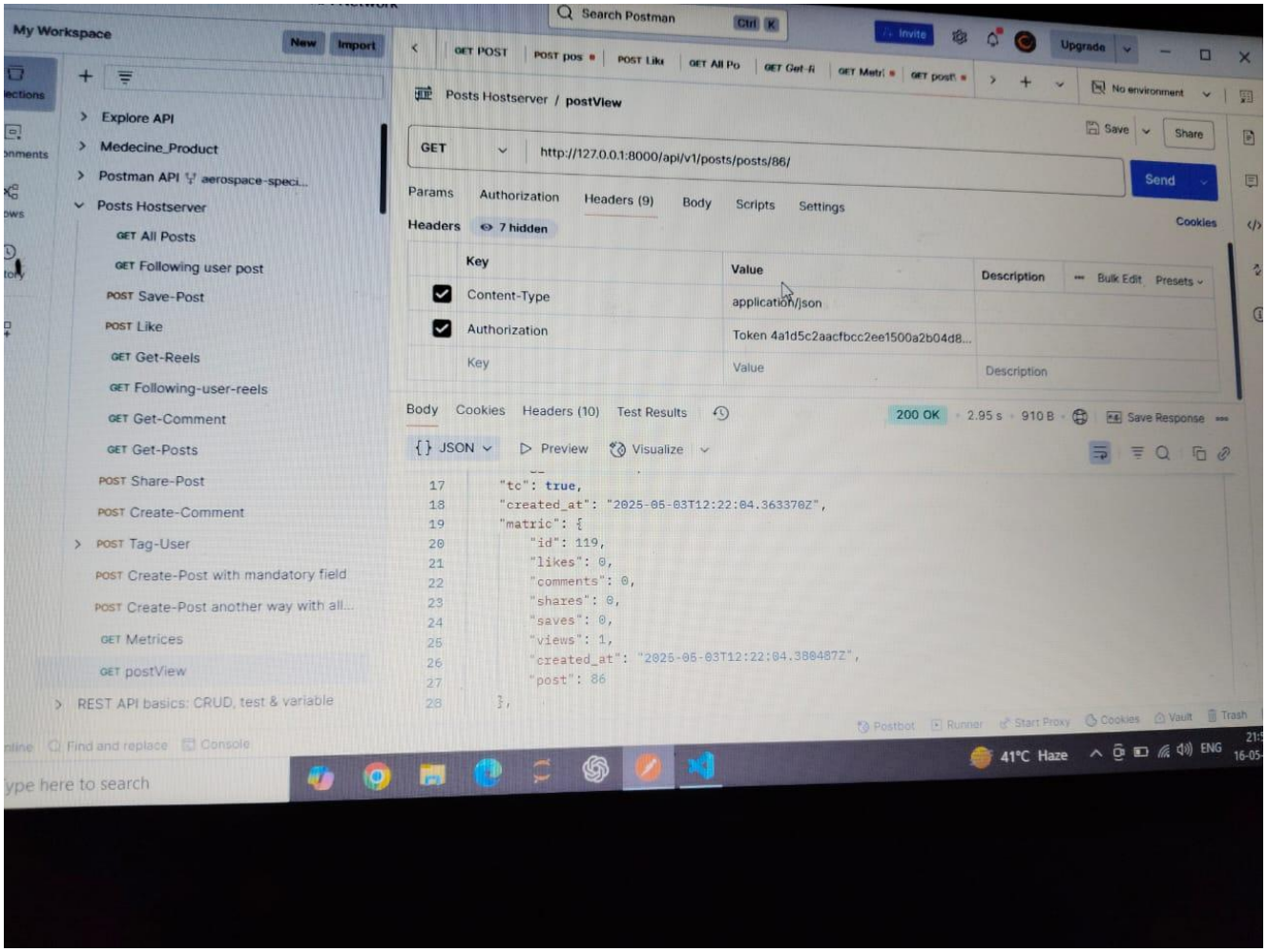
- Safeguarding endpoints against uninvited access.

3.9 Future Work

- Include a friend/follow feature.
- Chat functionality and real-time alerts.
- Content suggestions powered by AI.

4. Conclusion

Two substantial endeavors that make capitalize on Python's adaptability across multiple domains are laid out in the current investigation. Although the Social Media backend program displayed REST API architecture, authentication, and management of databases, the Twitter sentiment monitoring project showcased how to efficiently utilize NLP and machine learning algorithms to sort messages. Both programs provide potential for further advancement as well as a framework for extensible, real-world uses.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POST Like
GET Get-Reels
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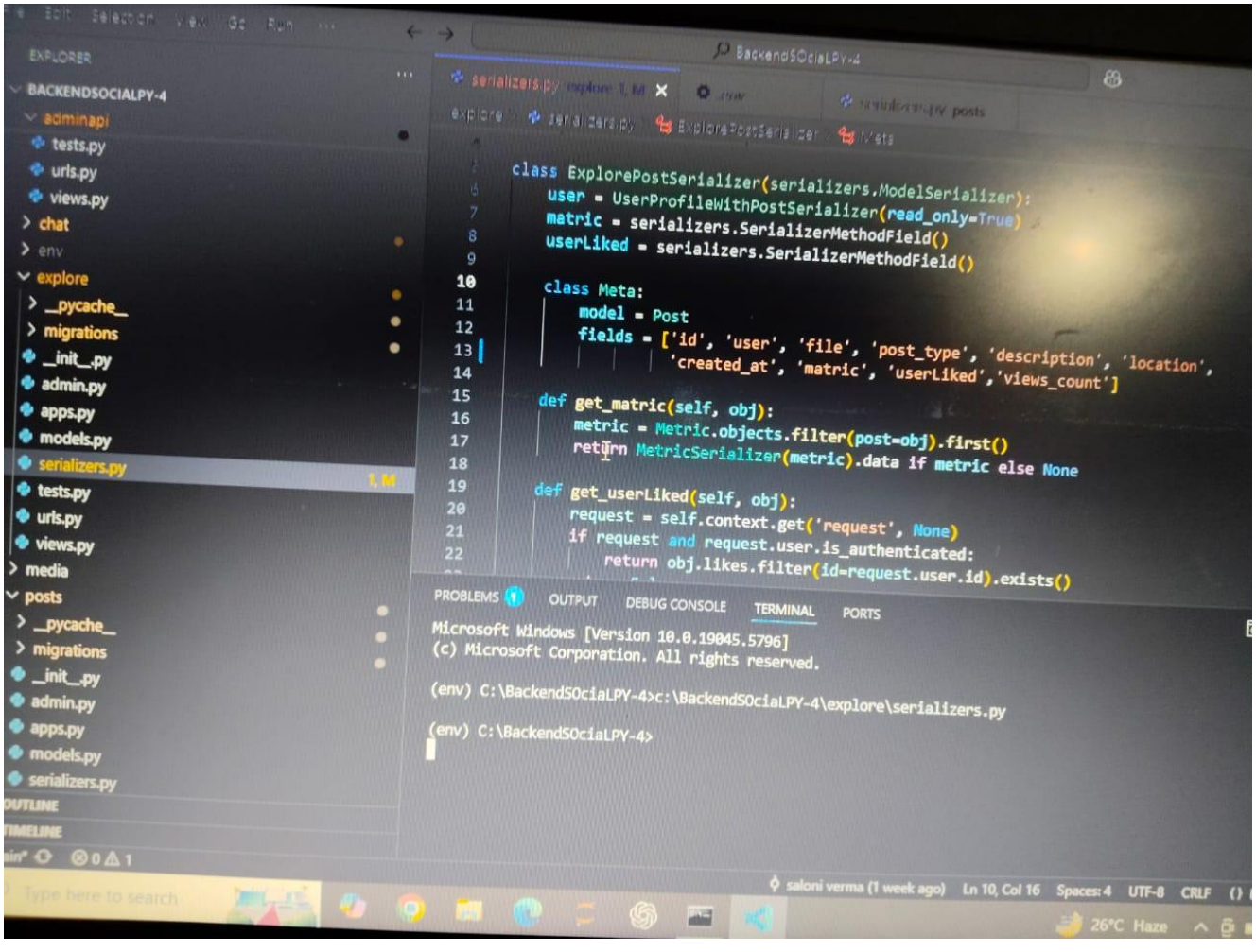
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serializers.py
class ExplorePostSerializer(serializers.ModelSerializer):
user = UserProfileWithPostSerializer(read_only=True)
matric = serializers.SerializerMethodField()
userLiked = serializers.SerializerMethodField()
class Meta:
model = Post
fields = ['id', 'user', 'file', 'post_type', 'description', 'location',
'created_at', 'matric', 'userLiked','views_count']
def get_matric(self, obj):
metric = Metric.objects.filter(post=obj).first()
return MetricSerializer(metric).data if metric else None
def get_userLiked(self, obj):
request = self.context.get('request', None)
if request and request.user.is_authenticated:
return obj.likes.filter(id=request.user.id).exists()
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(c) Microsoft Corporation. All rights reserved.
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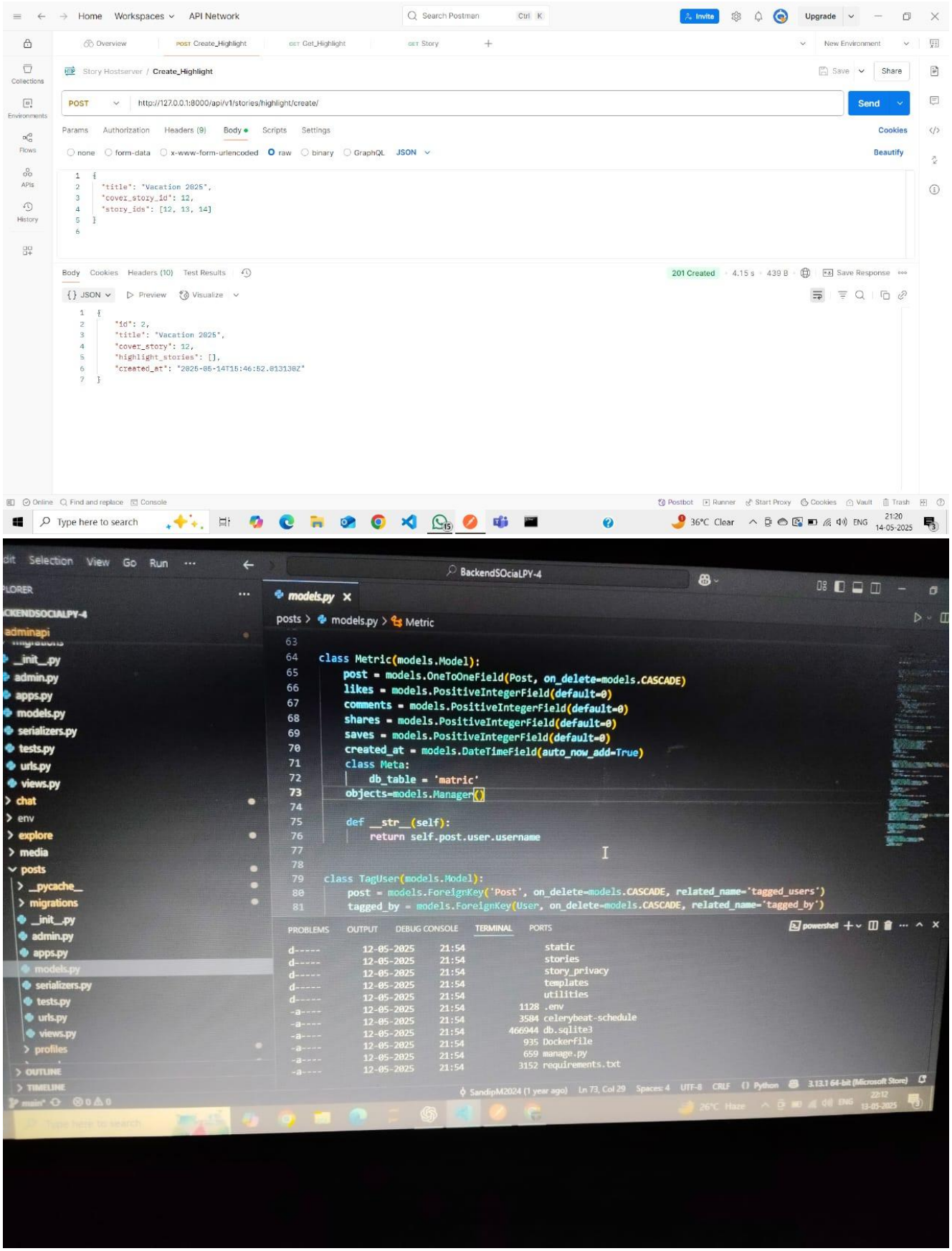
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class Metric(models.Model):
post = models.OneToOneField(Post, on_delete=models.CASCADE)
likes = models.PositiveIntegerField(default=0)
comments = models.PositiveIntegerField(default=0)
shares = models.PositiveIntegerField(default=0)
saves = models.PositiveIntegerField(default=0)
created_at = models.DateTimeField(auto_now_add=True)
class Meta:
db_table = 'matric'
objects=models.Manager()
def __str__(self):
return self.post.user.username
class TagUser(models.Model):
post = models.ForeignKey('Post', on_delete=models.CASCADE, related_name='tagged_users')
tagged_by = models.ForeignKey(User, on_delete=models.CASCADE, related_name='tagged_by')
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
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-a---- 12-05-2025 21:54 935 Dockerfile
-a---- 12-05-2025 21:54 659 manage.py
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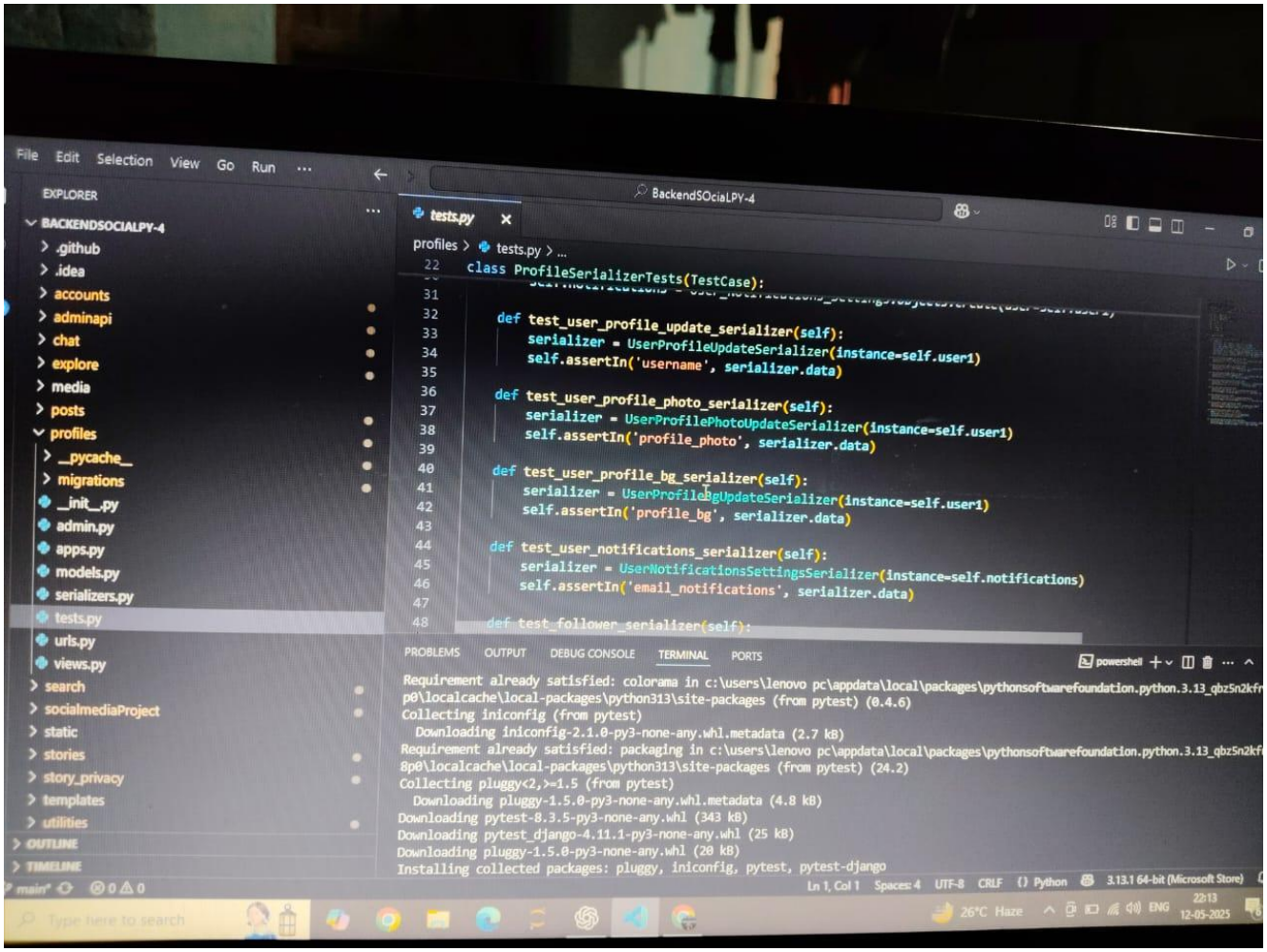
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class ProfileSerializerTests(TestCase):
def test_user_profile_update_serializer(self):
serializer = UserProfileUpdateSerializer(instance=self.user1)
self.assertIn('username', serializer.data)
def test_user_profile_photo_serializer(self):
serializer = UserProfilePhotoUpdateSerializer(instance=self.user1)
self.assertIn('profile_photo', serializer.data)
def test_user_profile_bg_serializer(self):
serializer = UserProfileBgUpdateSerializer(instance=self.user1)
self.assertIn('profile_bg', serializer.data)
def test_user_notifications_serializer(self):
serializer = UserNotificationsSettingsSerializer(instance=self.notifications)
self.assertIn('email_notifications', serializer.data)
def test_follower_serializer(self):
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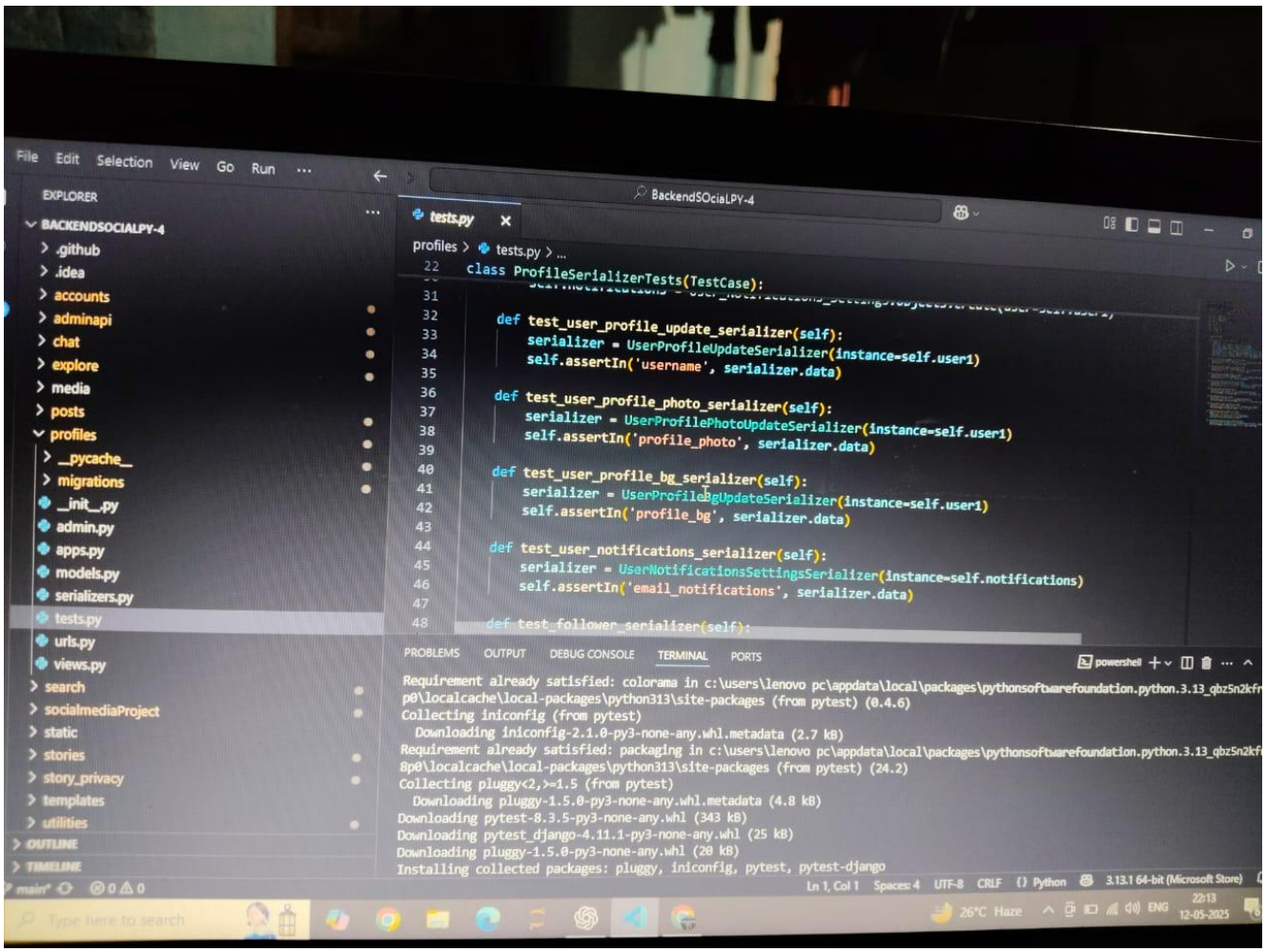
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