



SamvidDhi

Hands-on Assessment (Python Developer Position)

Thank you for your application for the position of Python Developer. The next step is to complete the tasks described below.

We strongly believe in hands-on work. So, we are giving you two tasks where you have to put your knowledge, skills and creativity to solve these tasks.

NOTE:-

- It is important to ensure that both problems are completed to the best of one's abilities in order to get preference over other candidates.
- Once you have completed the task, please share the **Github repository of your project**, and **Screenshots/Video recordings of the overall working** of the project. Also, if possible, the deployed version with its corresponding link.
- Please note that you will be expected to present your project during the interview, so it is important that you have it readily accessible on your system and fully functional.
- **Deadline: 5 days starting from the day of assigning the task.**

Problem I. Data Analytics

The task is to create a machine learning model that can evaluate the performance of TA(Teaching Assistant) based on the Teaching Assistant Evaluation Dataset (Check the attached "data.csv" file).

The data consist of evaluations of teaching performance over three regular semesters and two summer semesters of 151 teaching assistant (TA) assignments at the Statistics Department of the University of Wisconsin-Madison. The scores were divided into 3 roughly equal-sized categories ("low", "medium", and "high"). For more details about the attributes check the "data.names" file.

The first 5 columns are the features and the last column is the score. The model should be able to classify the score(High, medium, or low) of TA based on the value of the first 5 columns.



Instructions:-

To create an ML model for evaluating teaching assistant performance, follow these steps:

1. Perform exploratory data analysis (EDA) using tools like pandas, numpy, and matplotlib.
2. Preprocess the data by cleaning, handling missing values, and transforming it into a suitable format for machine learning algorithms. Feature engineering can also be performed.
3. Split the preprocessed data into training and testing sets.
4. Select an appropriate multiclass classification algorithm such as logistic regression, SVM, or random forests. Train the algorithm on the training set and optimize hyperparameters using cross-validation.
5. Evaluate the trained model on the testing set using metrics such as accuracy, precision, recall, and F1-score.
6. Finally, the model should be saved in the local drive for future evaluation.

Problem II. API Development

This task aims to evaluate the developer's skills in building a Restful API using Flask and using any database of choice, handling JSON data, implementing JWT authentication, and performing CRUD operations on a simple database.

Attribute Information:

1. Whether or not the TA is a native English speaker (binary)
(1=English speaker, 2=non-English speaker)
2. Course instructor (categorical, 25 categories)
3. Course (categorical, 26 categories)
4. Summer or regular semester (binary) 1=Summer, 2=Regular
5. Class size (numerical)
6. Class attribute (categorical) 1=Low, 2=Medium, 3=High

Create a Restful API using Flask to manage a simple database of Teaching Assistants, which can be implemented using either PostgreSQL, SQL, or Sqlite, with the following features:

Instructions:

1. The API should use JWT authentication to ensure that only authenticated users can access the API.
2. All request and response interactions with the API should be in JSON format.



SamvidDhi

3. The API should be capable of performing four operations: Add, Retrieve, Update, and Delete on the database.
4. The database should consist of a table named 'TA' containing columns such as 'id', 'native_english_speaker', 'course_instructor', 'course', 'semester', 'class_size' and 'performance_score'.
5. The "Add" operation should create a new entry within the 'TA' table. The records for this operation should be supplied in the form of JSON. Kindly Convert the value of each attribute to their respective values(refer the Attribute Information part of the 'data.names' file or see above in this document)
6. The "Retrieve" operation should provide a response in JSON, identified by the 'id'.
7. The "Update" operation should update a particular record identified by the 'id'.
8. The "Delete" operation should delete a particular record identified by the 'id'.
9. Write unit tests using pytest or unittest to ensure the correctness of the application's functionality.
10. (Optional) Conduct integration testing using Python Splinter to validate its performance and usability.
11. (Optional) Create a two-page web interface for providing input and output.

Please complete the task and try to submit both the tasks(Files and Screenshot/Video recording in a zip, submit in reply to this email) on or before 5th day starting from the day the task gets assigned to you. Based on the tasks, we will invite the candidates for the technical interview. We wish you All the very best for this assignment!

Best Regards,
SamvidDhi Intelligent System LLP
Contact: hiring@samviddhi.com
<https://www.samviddhi.com/>