



Surveys



Report Portals



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Resources



Help



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Questions

Group - 4C

Section 1

Edit

Introduction

New text

Hello there!

Welcome to this survey! We are a group of researchers from Dalhousie University, Canada. Recently, we conducted an empirical study involving 85 reproducible bugs from Stack Overflow posts. Our aim was to understand two main aspects: (1) the edit actions that can be employed to complete code snippets for bug reproduction and (2) the information that enhances the reproducibility of bug reports. Our investigation has yielded several interesting findings, and we are seeking your feedback on them.

We reproduced 85 bugs and discovered they could be reproduced using 10 edit actions. To enhance their reproducibility, 5 main information categories need to be present. The edit actions and information categories are described below.

Edit Actions

Input Data Generation: Generating input data which simulates the data used for training the model.

Neural Network Construction: Reconstructing or modifying the neural network based on the information provided

Hyperparameter Initialization: Initializing the hyperparameters for training, such as batch size and number of epochs

Import Addition and Dependency Resolution: Determining the dependencies in the code snippet and adding the missing imports.

Logging: Adding appropriate logging statements to capture relevant information during reproduction

Obsolete Parameter Removal: Removing outdated parameters or functions to match the parameters of the latest library versions

Compiler Error Resolution: Debugging and resolving compiler errors that arise due to the errors in the provided code snippet.

Dataset Procurement: Acquiring the datasets and using them to train the model

Downloading Models & Tokenizers: Fetching pre-trained models and tokenizers from external sources.

Version Migration: Updating the code to adapt the changes introduced in newer library or framework versions.

Information Categories

Data: Shape of the input data, type of data, data distribution.

Model: Neural network architecture, number of layers, neurons, activation function for layers.

Hyperparameters: Batch size, epochs, optimizers, loss function.

Code Snippet: Training code snippet, evaluation script, data preprocessing, and transformation operations.

Logs: Compiler error logs, training error logs

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Section 2

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Demographics

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Question 1

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1. What is your relevant work experience with deep learning?

- ☐ <1 Year
- ☐ 1-5 Years
- ☐ 5-10 Years
- ☐ >10 Years

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Question 2

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2. What is your relevant experience with deep learning bug fixing?

- ☐ <1 Year
- ☐ 1-5 Years
- ☐ 5-10 Years
- ☐ >10 Years

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Question 3

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3. What is your current occupation?

- ☐ Software Practitioner (Software Engineer, Deep Learning Engineer, Machine Learning Engineer etc.)
- ☐ Researcher (Masters/Doctoral Student, PostDoc, Faculty)

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mehilshah

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raisedal

Guide

The following steps are recommended for your survey:

Create questions

Add conditional branching

Customize look and feel

Set privacy and behavior

Translate survey

Publish survey

Analyze collected data



Question 4

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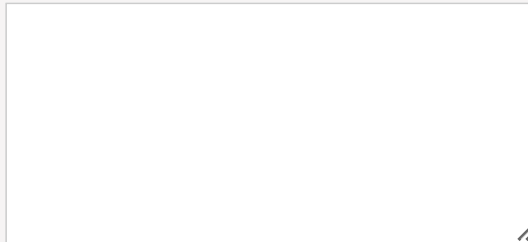
4. What are the deep learning frameworks you have worked with?

- ☐ Tensorflow
☐ PyTorch
☐ Keras
☐ Other

Question 5

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5. What challenges are associated with reproducing deep learning bugs in your day-to-day activities?



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Section 3

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Bug #1

Given the issue description, and the code snippet. Please reproduce the bug, select the most appropriate edit operations and critical information needed to reproduce this bug.

To help the reproduction process, we have provided the sample edit operations [here](#).

Original Issue Report: <https://stackoverflow.com/questions/69137834/keras-valueerror-dimensions-must-be-equal-but-are-2-and-32-for-node-equal>

Description:

I was trying to train a simple Keras network for classification when I faced the following error. I know there is something wrong with my inputs but I couldn't figure out how to fix it. Here is my code (given below)

Dataset Shape:

```
x_train : float32 0.0 1.0 (2444, 64, 64, 1)
y_train : float32 0.0 1.0 (2444, 2)
x_test : float32 0.0 1.0 (9123, 64, 64, 1)
y_test : float32 0.0 1.0 (9123, 2)
```

Error:

```
ValueError: Dimensions must be equal, but are 2 and 32 for '{{node Equal}} = Equal[T=DT_FLOAT, incompatible_shape_error=true]
(iteratorGetNext:1, Cast_1)' with input shapes: [?,2], [?,32,32].
```

Code Snippet: You can use this Colab notebook as the base notebook to start the reproduction process: <https://colab.research.google.com/drive/1eUZNzpmNhadBxC2hW1bZSOGVv8tOXxXG?usp=sharing>

[[Edit](#) | [Delete](#)]

Question 6

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6. What are the edit operations that could be used to reproduce this bug?

- | | |
|--|--|
| <input type="checkbox"/> Input Data Generation | <input type="checkbox"/> Neural Network Construction |
| <input type="checkbox"/> Hyperparameter Initialization | <input type="checkbox"/> Import Addition and Dependency Resolution |
| <input type="checkbox"/> Logging | <input type="checkbox"/> Obsolete Parameter Removal |
| <input type="checkbox"/> Compiler Error Resolution | <input type="checkbox"/> Dataset Procurement |
| <input type="checkbox"/> Downloading Models and Tokenizers | <input type="checkbox"/> Version Migration |

Question 7

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7. Why do you think these edit operations could prove useful in reproducing the bug?

Question 8

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8. What are the critical information components that could help the reproducibility of this bug?

- ☐ Data
- ☐ Hyperparameters
- ☐ Model
- ☐ Code Snippet
- ☐ Logs

[Split section](#) | [New text](#) | [New question](#) | [New question from library / other surveys](#)

Question 9

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9. How do you think the selected critical information could be useful in reproducing the bug?

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Question 10

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10. Did you implement any additional operations or actions beyond those suggested by us? Please let us know your thoughts.

[New text](#)

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Section 4

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Bug #2

Given the issue description, and the code snippet. Please reproduce the bug, select the most appropriate edit operations and critical information needed to reproduce this bug.

To help the reproduction process, we have provided the sample edit operations [here](#).

Original Issue Report: <https://stackoverflow.com/questions/64576751/neural-network-typeerror-unsupported-operand-types-for-dense-and-str>

Description:

I am trying to use a neural network to predict the price of houses. Here is what the top of the dataset looks like:

Price	Beds	SqFt	Built	Garage	FullBaths	HalfBaths	LotSqFt
485000	3	2336	2004	2	2.0	1.0	2178.0
430000	4	2106	2005	2	2.0	1.0	2178.0
445000	3	1410	1999	1	2.0	0.0	3049.0

...

I am using the ReLU activation function. When I try to evaluate my model on my test data, I get this `TypeError: unsupported operand type(s) for +=: 'Dense' and 'str'`.

I looked at the types of the columns from my original dataframe, and everything looks fine.

```
print(df.dtypes)
## Output
#Price      int64
#Beds       int64
#SqFt       int64
#Built      int64
#Garage     int64
#FullBaths  float64
#HalfBaths  float64
#LotSqFt    float64
#dtype: object
```

I'm not sure if I am messing something up in my neural network to cause this error. Any help is appreciated

Code Snippet: You can use this notebook as the base notebook to start the reproduction process: <https://colab.research.google.com/drive/127nDAw8gnh9yDpZmHSFDRdDP1Mv7hX6q?usp=sharing>

Question 11

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11. What are the edit operations that could be used to reproduce this bug?

- | | |
|--|--|
| <input type="checkbox"/> Input Data Generation | <input type="checkbox"/> Neural Network Construction |
| <input type="checkbox"/> Hyperparameter Initialization | <input type="checkbox"/> Import Addition and Dependency Resolution |
| <input type="checkbox"/> Logging | <input type="checkbox"/> Obsolete Parameter Removal |
| <input type="checkbox"/> Compiler Error Resolution | <input type="checkbox"/> Dataset Procurement |
| <input type="checkbox"/> Downloading Models and Tokenizers | <input type="checkbox"/> Version Migration |

[Split section](#) | [New text](#) | [New question](#) | [New question from library](#) / [other surveys](#)

Question 12

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12. Why do you think these edit operations could prove useful in reproducing the bug?

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Question 13

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13. What are the critical information components that could help the reproducibility of this bug?

- ☐ Data
- ☐ Hyperparameters
- ☐ Model
- ☐ Code Snippet
- ☐ Logs

[Split section](#) | [New text](#) | [New question](#) | [New question from library](#) / [other surveys](#)

Question 14

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14. How do you think the selected critical information could be useful in reproducing the bug?

[Split section](#) | [New text](#) | [New question](#) | [New question from library](#) / [other surveys](#)

Question 15

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15. Did you implement any additional operations or actions beyond those suggested by us? Please let us know your thoughts.

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Section 5

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Unique ID Generation

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Question 16

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16. Please use this secure [link](#), and enter the Unique ID generated in the following textbox.

If you want to withdraw from the survey, email us with this Unique ID at shahmehil@dal.ca, and we will delete your response.

Unique ID

[New text](#) | [New question](#) | [New question from library / other surveys](#)

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