



Surveys



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## Questions

 Group - 3E

### Section 1

Edit

#### Introduction

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Obsolete Parameter Removal: Removing outdated parameters or functions to match the parameters of the latest library versions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

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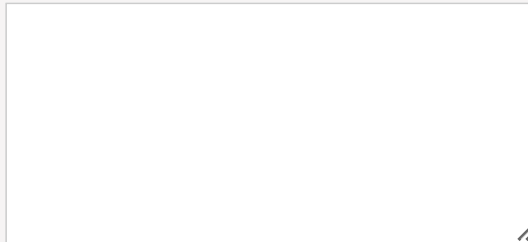
4. What are the deep learning frameworks you have worked with?

- ☐ 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/69549126/tensorflow-typeerror-cannot-convert-1e-12-to-eagertensor-of-dtype-int32>

## Description:

I have a multiclass classification machine learning application for which I want to calculate the f1 score using tensorflow. The predicted and actual values are stored in pandas dataframes `y_pred` and `y_act` respectively. Both are populated with 1's and 0's. So I do something like this (Code Snippet provided below):

However I get the following error

TypeError: Cannot convert 1e-12 to EagerTensor of dtype int32

There must be something with the type casting from pandas to tensorflow which is throwing the error. I have tried a series of mitigations to no avail.

I tried converting the numpy arrays to tensors like so: `pred_tf = tf.convert_to_tensor(pred_numpy, numpy.int32)`

I tried ensuring the pandas dataframe has no 1e-12 instances with: `y_pred = y_pred.replace(1e-12, 0)`

I tried converting to numpy without the `numpy.int32` option.

However I still get the same error. Any tips for converting from pandas to tensors successfully without getting this error?

**Code Snippet:** You can use this Colab notebook as the base notebook to start the reproduction process: <https://colab.research.google.com/drive/14yulCsJ6vg0ECahKeUcQ1BuORi3kkJsZ?usp=sharing>

## Hints:

1. Data, Logs, and Code Snippet can be useful information for reproducing the bug.
2. Import Addition, Input Data Generation, Hyperparameter Initialization, Dataset Procurement, and Logging can be useful edit actions for reproducing the bug.
3. Focus on the statement: "Both are populated with 1's and 0's".

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## Question 6

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

- ☐ Input Data Generation      ☐ Neural Network Construction  
☐ Hyperparameter Initialization      ☐ Import Addition and Dependency Resolution

- ☐ Logging
- ☐ Obsolete Parameter Removal
- ☐ Compiler Error Resolution
- ☐ Dataset Procurement
- ☐ Downloading Models and Tokenizers
- ☐ Version Migration

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#### Question 7

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

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#### 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

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#### 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.

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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/54417736/pytorch-runtime-error-invalid-argument-0-sizes-of-tensors-must-match-except-i>

#### Description:

I have a PyTorch model and I'm trying to test it by performing a forward pass. The model is defined below.

If I try:

```
modl = ResUnet((1,320,320), 1)
x = torch.rand(1, 1, 320, 320)
modl(x)
```

It throws an error

```
-----
RuntimeError                                Traceback (most recent call last)
<ipython-input-46-4ddc821c365b> in <module>
```

```

----> 1 mod(x)

- ./conda/envs/torch0.4/lib/python3.6/site-packages/torch/nn/modules/module.py in __call__(self, *input, **kwargs)
    475     result = self._slow_forward(*input, **kwargs)
    476     else:
--> 477         result = self.forward(*input, **kwargs)
    478     for hook in self._forward_hooks.values():
    479         hook_result = hook(self, input, result)

<ipython-input-36-f9eeefa3c0b8> in forward(self, x)
    221     de2_ = self.d2(de1)
    222     #print de2_.size()
--> 223     de2 = torch.cat([en6add, de2_], 1)
    224     #print de2.size()
    225

```

RuntimeError: invalid argument 0: Sizes of tensors must match except in dimension 1. Got 5 and 4 in dimension 2 at /opt/conda/conda-bld/pytorch\_1535491974311/work/aten/src/TH/generic/THTensorMath.cpp:3616  
I figure the problem is caused by the input size not being a power of 2 but I am not sure how to rectify it for the given input dimenstions (320, 320).

**Code Snippet:** You can use this Colab notebook as the base notebook to start the reproduction process: [https://colab.research.google.com/drive/1hkA6aDFEN3CG7w4qPVijjn1W3IfwEeqJ#scrollTo=J\\_guUFDERox4](https://colab.research.google.com/drive/1hkA6aDFEN3CG7w4qPVijjn1W3IfwEeqJ#scrollTo=J_guUFDERox4)

#### Hints:

1. Logs, Code Snippet and Model can be useful information for reproducing the bug.
2. Input Data Generation, Hyperparameter Initialization, Import Addition, Logging, and Obsolete Parameter Removal can be useful edit actions for reproducing the bug.
3. Focus on the statement: "Got 5 and 4 in dimension 2 at /opt/conda/conda-bld/pytorch\_1535491974311/work/aten/src/TH/generic/THTensorMath.cpp:3616. I figure the problem is caused by the input size not being a power of 2 but I am not sure how to rectify it for the given input dimenstions (320, 320)."

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#### 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                         |

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#### Question 12

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

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

#### 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?

**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

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

**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](mailto: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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