

Study Preparation

- Ask participants to download the chrome extension and add it.
- Create participant-specific google slide
- Allow screensharing
- Turn on captioning
- Participant slide:

Study Intro

Hello, thank you for agreeing to participate in this study. My name is ____ and I'm a PhD student at _____. We're designing a new tool that can help users learn and understand new apis. Today, I'll provide you with tasks requiring Tensorflow that are needed in general deep learning programming.

Before we begin, I'd like to have you sign this consent form if you haven't done so already. Let me know if you have any questions. You may also notice there's a question about recording you and your screen - please let me know if you are okay with that or not.

Turn on the recording

Turn on transcription

Task Description

In this session, you'll be given, in total, four tasks. For each task, you'll be given textual instruction, input, and expected output. Then you'll be finding Tensorflow methods that are most appropriate to complete the task.

For example, in general python, you'll be given the following requirements.

Show example task: [PERSONAL SLIDE LINK](#)

Given the requirement, "Capitalize the first character of all the words", we want you to find a method that can accomplish the task, "title".

There could be multiple correct answers for each task. In those cases, we ask you to choose a solution that uses the most appropriate Tensorflow method, such that the end code is more readable, more efficient, or fits better in the context.

Next slide

For example, using split and capitalize together is one of the valid answers. However, we consider title is a more appropriate method for this task because title already implements the functionality we need, and there is no need to reimplement that by concatenating multiple functions, which might be less efficient.

In your tasks, you can find solutions that perform better, are more usable, or simply shorter.

Here, we want to note that how fast you find methods is not our main focus of this study. So please take your time in selecting which Tensorflow methods to use.

Also, this is NOT a test of your machine learning or deep learning knowledge, or programming. We want to understand how you do search, and what information you use in completing the tasks.

You will have 5 minutes for each task. The tasks will require you to do some search, and you're free to use any search engines and read any materials.

Before we begin the task, do you have any questions?

Share the personal slide link.

Can you share your screen?

We have found that we get a great deal of information if we ask people to think aloud as they work. All you have to do is to speak your thoughts as you work. If you forget to think aloud I will remind you to keep talking.

Okay, you may begin.

Time 5 min, and inform participants when it's over.

Before the first with-tool task:

Now you'll do the similar tasks, but with a Chrome extension turned on.

This tool is designed to help users discover and compare Tensorflow methods that are similar or relevant to each other.

The extension pre-extracted Stack Overflow answers, and when applicable, the extension will suggest alternatives to the Tensorflow methods on web pages, as well as parts of Stack Overflow answers explaining how the two are different.

Show extension. Ask participants to search for "Tensorflow dropout".

It also provides links to the reference pages of Tensorflow methods, and the original Stack Overflow answer discussing the two Tensorflow methods.

Task 1 (tf.squeeze vs tf.reshape)	
Query (should include Tensorflow)	
Pages	
If tool-use, saw the tool result of X vs Y	
Note	
Have you written similar code in other libraries?	
Some of the participants selected Y for this task. Could you comment on how using X is different than Y, if at all?	
Can you select the best solution? Why? (let participant search if they said "I don't know") (X? Y? Either X or Y?)	

Task 2 (tf.einsum vs tf.matmul + tf.matmul)	
Query	

(should include Tensorflow)	
Pages	
If tool-use, saw the tool result of X vs Y	
Note	
Have you written similar code in other libraries?	
Some of the participants selected Y for this task. Could you comment on how using X is different than Y, if at all?	
Can you select the best solution? Why? (let participant search if they said "I don't know") (X? Y? Either X or Y?)	

Task 3 (tf.concat vs tf.stack)	
Query (should include Tensorflow)	
Pages	
If tool-use, saw the tool result of X vs Y	
Note	
Have you written similar code in other libraries?	
Some of the participants selected Y for this task. Could you comment on	

how using X is different than Y, if at all?	
Can you select the best solution? Why? (let participant search if they said "I don't know") (X? Y? Either X or Y?)	

Task 4 (tf.boolean_mask vs tf.gather + tf.where/tf.equal/tf.squeeze)	
Query (should include Tensorflow)	
Pages	
If tool-use, saw the tool result of X vs Y	
Note	
Have you written similar code in other libraries?	
Some of the participants selected Y for this task. Could you comment on how using X is different than Y, if at all?	
Can you select the best solution? Why? (let participant search if they said "I don't know") (X? Y? Either X or Y?)	

Task 5 (tf.floordiv vs tf.math.divide + tf.floor)	
Query (should include Tensorflow)	

Pages	
If tool-use, saw the tool result of X vs Y	
Note	
Have you written similar code in other libraries?	
Some of the participants selected Y for this task. Could you comment on how using X is different than Y, if at all?	
Can you select the best solution? Why? (let participant search if they said "I don't know") (X? Y? Either X or Y?)	

Task 6 (<code>tf.image.resize_with_pad</code> vs <code>tf.resize</code>)	
Query (should include Tensorflow)	
Pages	
If tool-use, saw the tool result of X vs Y	
Note	
Have you written similar code in other libraries?	
Some of the participants selected Y for this task. Could you comment on how using X is different than Y, if at all?	
Can you select the best solution? Why?	

(let participant search if they said "I don't know") (X? Y? Either X or Y?)	
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Task 7 (tf.nn.conv1d vs tf.nn.conv2d)	
Query (should include Tensorflow)	
Pages	
If tool-use, saw the tool result of X vs Y	
Note	
Have you written similar code in other libraries?	
Some of the participants selected Y for this task. Could you comment on how using X is different than Y, if at all?	
Can you select the best solution? Why? (let participant search if they said "I don't know") (X? Y? Either X or Y?)	

Task 8 (tf.nn.softmax_cross_entropy_with_logits vs tf.nn.sparse_softmax_cross_entropy_with_logits)	
Query (should include Tensorflow)	
Pages	
If tool-use, saw the tool result of X vs Y	
Note	

Have you written similar code in other libraries?	
Some of the participants selected Y for this task. Could you comment on how using X is different than Y, if at all?	
Can you select the best solution? Why? (let participant search if they said "I don't know") (X? Y? Either X or Y?)	

Post Interview

- Do the contents in the API comparison helper make sense to you?
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- Do the contents in the API comparison helper provide necessary/helpful information to correctly completing the task? How? Why?
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- What parts of the API comparison were not necessarily useful in search? why?
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- Thinking of your general experience as a deep learning framework user: after you have identified a specific functionality to implement, what challenges (if any) do you encounter in navigating the documentation?
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- Assuming deep learning framework documentation could show additional information for you on a reference page, what kind of information would you like to see?
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End of study

- Remind participants to remove the extension.
- Ask email address for the giftcard