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TensorFlow Lite Task Library examples for Natural Language Processing

Project for GSoC 2021 with TensorFlow

Project in Idea List

ABSTRACT

TensorFlow Lite Task Library examples for Natural Language Processing is a project, where we have to recreate existing NLP examples in Android & IOS using the new TensorFlow Lite Task Library.

There are three existing NLP examples: Bert QnA, Smart Reply and Text Classification.

- **Bert QnA examples** use Tensorflow Lite Support Library, so it requires a lot of extra code such as data conversion, pre/post processing, loading associated files. So we'll recreate it using Task Library in Android and IOS both.

- Like Bert QnA examples, **Smart Reply example** also uses Tensorflow Lite Support Library, so it requires a lot of extra code and also there's IOS example for Smart Reply. So we'll recreate the Android Example using Task Library, and create the IOS example for the first time using Task Library.

- Unlike Bert QnA examples and Smart Reply, **Text Classification** uses Tensorflow Lite Task Library, and also can switch between both support and Task Library in the android example.

Pre-GSOC Work:

Repository : https://github.com/SunitRoy2703/tflite-NLP-examples

- I'm working on this project for a few time now, and I have successfully Updated the existing BERT Question and Answering Android Example.
- Currently I'm working to update BERT Question and Answering IOS Example

Proposal Timeline

Before May 17:

- Familiarizing myself with the codebase.
- Continuing to contribute to NLP examples.
- Adding documentation for Bert QnA examples in Android and IOS.

May 17 – June 7(Community bonding):

- Discuss with mentors to work out more details about this plan.
- Getting familiar with the structure and codebase of NLP examples.
- Finishing Bert QnA examples with Documentation

June 7 – June 14:

- Discuss with mentors about my progress and schedule.
- Understanding the Text Classification Android example codebase

- Identifying How to update the example
- Starting to update the Text Classification Android example
- Updating the documentation with each changes

June 15 – June 21:

- Discuss with mentors about my progress and schedule.
- Fixing bugs & Testing
- Finishing Text Classification Android example with Documentation

June 22 – June 28:

- Discuss with mentors about my progress and schedule.
- Understanding the Text Classification IOS example codebase
- Identifying How to update the example
- Starting to update the Text Classification IOS example
- Updating the documentation with each changes

June 29 – July 5:

- Discuss with mentors about my progress and schedule.
- Fixing bugs & Testing
- Finishing Text Classification IOS example with Documentation

July 5 – July 11:

- Discuss with mentors about my progress and schedule.
- Understanding the Smart Reply Android example codebase.
- Identifying How to update the example.
- Creating a beta version of Smart Reply Android example.

July 12 – July 16(Evaluation):

- Discuss with mentors about my progress and schedule.
- Preparing codebase for evaluation .

July 17 – July 24:

- Discuss with mentors about my progress and schedule.
- Fixing bugs & Testing
- Finishing Smart Reply Android(beta) example with Documentation

July 25 – July 31:

- Discuss with mentors about my progress and schedule.

- Understanding the Smart Reply IOS example codebase
- Identifying How to update the example
- Starting to update the Smart Reply IOS example
- Updating the documentation with each changes

August 1 – August 7

- Discuss with mentors about my progress and schedule.
- Fixing bugs & Testing
- Finishing Smart Reply IOS example with Documentation

August 8 – August 16

- Fixing Bugs
- App Testing
- Documentation Completion
- Reviewing and Submitting code for final evaluation.

After GSOC:

- Maintaining & Contributing to NLP examples

Essential information

that was asked to be included on TensorFlow's page at g.co/gsoc.

1) Which project(s) are you applying to work on? Please list the projects from the ideas page that interest you. If you would like to propose your own project, please tell us about that here.

I'm applying for Generate TensorFlow Lite examples for Natural Language Processing project.

2) What open-source projects have you worked on before, if any?

I have worked on phimpme and open-event-organizer.

3) What is your prior experience with machine learning? Please describe the courses you've taken, books you've read, or projects you've done.

I've worked with multiple machine learning frameworks for mobile development, like MLkit & Tensorflow Lite.

For example I've implemented the 2d face sticker feature in Essence, using the MLkit Face Detection api.

I also attended Microsoft AI Classroom in October last year, where I got to know about Data Science Life Cycle and Cognitive Services.

Other Than that I've also done the Python Crash Course by Google.

4) Have you used TensorFlow, or any other machine learning framework? If so, what for?

I have used MLKit for implementing the 2d face sticker feature in Essence, other than that I've also used Tensorflow Lite for building prototype apps for face detection and object detection.

5) What TensorFlow product or area are you most excited about? Why?

I'm really excited about on Device Machine Learning.

Performing machine learning on-device can help to improve **Latency**, **Power consumption**, **Connectivity** and the most important **Privacy**.

6) Why are you excited about open-source technology? About machine learning?

For me Open Source is one of the most exciting thing in today's tech world, here I get to see and learn from world's best developers. For example I'm a community member in the Tensorflow JVM team, there I get to see how the most senior developers work and learn from it.

Machine learning is fascinating because programs learn from examples. From the data that you have collected, a machine learning method can automatically analyze and learn the structure already resident in that data in order to provide a solution to the problem you are trying to solve.

7) What is your major in school? Why did you select it? (If you are a graduate student, what is your area of focus?)

Electronics and TeleCommunications Engineering is my major in school. I selected it because I wanted to do something in electronics and digital technology, but back then I wasn't sure about specifically which technology I wanted to contribute, So i selected Electronics and TeleCommunications Engineering, as this gives me the flexibility to work and study in most of my favourite fields.

8) If you are active on social media (Twitter, Reddit, LinkedIn, etc), or if you have a technical blog, personal website, or YouTube channel and feel comfortable sharing the links, please do.

Linkedin

Twitter

Medium

Personal Website

Youtube

9) Is there anything else that you think the TensorFlow team should know?

Since December of last year I've been working as an intern at a startup called Wholesome Company.

I have helped the start up for developing multiple AR apps from scratch, and deploy it to the Playstore.

In the process I have helped them in Research, Modifying their previous projects, Improving their UI/UX, Adding new features, App Security, VCS management, Firebase Integration, App Optimization, 3D object development for AR, Building docs & project structure.

Recently, I got promoted to Junior Software Developer

After that I've helped the startup in Research and building docs.
And now we're in the process of Implementing an out of the box feature in App.