Bristol Team A screenshots:

```
from deep_translator import GoogleTranslator
```

```
text = '''How can I describe my emotions at this catastrophe, or how delineate the wretch
whom with such infinite pains and care I had endeavoured to form? His limbs were
in proportion, and I had selected his features as beautiful. Beautiful! -- Great God!
His yellow skin scarcely covered the work of muscles and arteries beneath; his hair
was of a lustrous black, and flowing; his teeth of a pearly whiteness; but these
luxuriances only formed a more horrid contrast with his watery eyes, that seemed
almost of the same colour as the dun white sockets in which they were set, his
shrivelled complexion and straight black lips.'''
```

```
translated = GoogleTranslator(source='auto', target='es').translate(text)
```

```
translated
```

```
'¿Cómo puedo describir mis emociones ante esta catástrofe, o cómo delinear el miserable\na quien con tant
os dolores y cuidados infinitos me había esforzado en formar? Sus extremidades estaban\nen proporción, y
había seleccionado sus rasgos como hermosos. ¡Hermoso! -- ¡Gran Dios!\nSu piel amarilla apenas cubría el
trabajo de músculos y arterias debajo; su cabello\nera de un negro lustroso y fluido; sus dientes de una
blancura nacarada; pero estos\nexuberancias sólo formaban un contraste más horrible con sus ojos lloroso
s, que parecían\ncasi del mismo color que las cuencas blancas pardas en las que estaban colocados, su\nte
z arrugada y labios negros y rectos.'
```

Here we used the Google Translator imported from the deep_translator package.

Next we try to take in a speech file – make a transcript of the speech – translate the transcript – output audio file in new language

```
import riva.client
auth = riva.client.Auth(uri='10.100.182.246:50051')
asr_service = riva.client.ASRService(auth)

offline_config = riva.client.RecognitionConfig(
    encoding=riva.client.AudioEncoding.LINEAR_PCM,
    max_alternatives=1,
    enable_automatic_punctuation=True,
    verbatim_transcripts=False,
)

my_wav_file = 'my_offline_synthesized_speech.wav'
riva.client.add_audio_file_specs_to_config(offline_config, my_wav_file)

with open(my_wav_file, 'rb') as fh:
    data = fh.read()

response = asr_service.offline_recognize(data, offline_config)
```

```
def take_in_wav(wavefile):
    import riva.client
    auth = riva.client.Auth(uri='10.100.182.246:50051')
    asr_service = riva.client.ASRService(auth)

    offline_config = riva.client.RecognitionConfig(
        encoding=riva.client.AudioEncoding.LINEAR_PCM,
        max_alternatives=1,
        enable_automatic_punctuation=True,
        verbatim_transcripts=False,
    )

    my_wav_file = wavefile
    riva.client.add_audio_file_specs_to_config(offline_config, my_wav_file)

    with open(my_wav_file, 'rb') as fh:
        data = fh.read()

    response = asr_service.offline_recognize(data, offline_config)
    return response
```

```
def to_script(response, lang):
    x = response.__str__().partition('transcript: ')
    x = x[2]
    x = x.__str__().partition('\n')
    y = x[0]
    translated = GoogleTranslator(source='auto', target=lang).translate(y)
    return translated
```

```
transcript = to_script(take_in_wav('my_offline_synthesized_speech.wav'), 'de')
```

```
print(take_in_wav('my_offline_synthesized_speech.wav'), 'de')
```

```
results {
  alternatives {
    transcript: "The United States of America, commonly known as the United States or Abraham, is a count
ry primarily located in North America. It consists of 50 states, a federal district, five major unincorpo
rated territories, 326 Indian reservations and nine minor outlying islands. "
    confidence: -1.366935133934021
  }
  channel_tag: 1
  audio_processed: 19.200000762939453
}
 de
```

```
to_script(take_in_wav('my_offline_synthesized_speech.wav'), 'de')
```

```
'„Die Vereinigten Staaten von Amerika, allgemein bekannt als die Vereinigten Staaten oder Abraham, sind e
in Land, das hauptsächlich in Nordamerika liegt. Es besteht aus 50 Bundesstaaten, einem Bundesdistrikt, f
ünf großen nicht rechtsfähigen Territorien, 326 Indianerreservaten und neun kleineren abgelegenen Insel
n.“'
```

We were unable to create an audio file in German because ‘the voice for this language was not found’. Below is the python we would then implement if we could find this lost voice.

Summarising:

hyperparameters:

[82]:
```
import numpy as np
import tritonclient.http as httpclient

from tritonclient.utils import np_to_triton_dtype

URL = "10.98.96.143:8000"
MODEl_GPTJ_FASTERTRANSFORMER = "ensemble"

OUTPUT_LEN = 128
BATCH_SIZE = 1
BEAM_WIDTH = 1
TOP_K = 20
TOP_P = 0.7

start_id = 220
end_id = 50256
```

[83]:
```
client = httpclient.InferenceServerClient(URL,
                                          concurrency=1,
                                          verbose=True)
```

[84]:
```
client.get_server_metadata()
```

```
GET /v2, headers None
<HTTPSocketPoolResponse status=200 headers={'content-type': 'application/json', 'content-length': '254'}>
bytearray(b'{"name":"triton","version":"2.18.0","extensions":["classification","sequence","model_repository","model_repository(unload_dependents)","schedule_policy","model_configuration","system_shared_memory","cuda_shared_memory","binary_tensor_data","statistics"]}')
```

[84]:
```
{'name': 'triton',
 'version': '2.18.0',
 'extensions': ['classification',
  'sequence',
  'model_repository',
```

The input:

[86]:
```
input_user = (
    "We have developed a numerical model to help predict lifetimes of uranium parts in"
    "situations where the uranium surface is exposed to hydrogen in the gas headspace."
    "Assessments can be made based on hydrogen pressure and on an upper limit of size"
    "of a surface breached hydride spot (volume of hydride corrosion product produced)."
    "The model assumes development of a hydride nucleus at a single arbitrary "
    "subsurface location associated with an arbitrary surface defect and follows the "
    "development of the hydride nucleus to the break-through phase and further growth "
    "to the upper limit of acceptable volume of corrosion product. The model has been "
    "developed from an understanding of the hydriding mechanism outlined below in 10 "
    "steps and measured rates of hydrogen ingress at several types (chemically) of "
    "uranium surfaces at ambient temperature and variable pressure. The key points are "
    "1) that the hydrides nucleate only at locations where a surface defect allows"
    "hydrogen ingress (reactant delivery) into the uranium metal subsurface (beyond the "
    "oxide), and 2) that the hydrides which eventually reach surface break-through"
    "status, nucleate and grow in the near surface (few 10s of micron depth maximum) - "
    "those beyond ~50 micron have arrested growth and never reach break-through "
    "status. \n\n"
    "tl;dr\n")
```

[87]:
```
input0 = [[input_user],]
inputs = prepare_inputs(input0)
result = client.infer(MODEl_GPTJ_FASTERTRANSFORMER, inputs)
output0 = result.as_numpy("OUTPUT_0")
```

Result:

We have developed a numerical model to help predict lifetimes of uranium parts insituations where the uranium surface is exposed to hydrogen in the gas headspace.Assessments can be made based on hydrogen pressure and on an upper limit of sizeof a surface breached hydride spot (volume of hydride corrosion product produced).The model assumes development of a hydride nucleus at a single arbitrary subsurface location associated with an arbitrary surface defect and follows the development of the hydride nucleus to the break-through phase and further growth to the upper limit of acceptable volume of corrosion product. The model has been developed from an understanding of the hydriding mechanism outlined below in 10 steps and measured rates of hydrogen ingress at several types (chemically) of uranium surfaces at ambient temperature and variable pressure. The key points are 1) that the hydrides nucleate only at locations where a surface defect allowshydrogen ingress (reactant delivery) into the uranium metal subsurface (beyond the oxide), and 2) that the hydrides which eventually reach surface break-throughstatus, nucleate and grow in the near surface (few 10s of micron depth maximum) – those beyond ~50 micron have arrested growth and never reach break-through status.

tl;dr

The model is based on the following assumptions:

Uranium hydrides are the only active corrosion products.

Uranium hydrides are nucleated at locations where the subsurface uranium metal is exposed to hydrogen in the gas headspace.

Hydride nucleation is a function of hydrogen pressure and the surface defect geometry.

Hydride nucleation and growth are functions of the subsurface uranium metal temperature and hydrogen pressure.

The model assumes that the hydrides which reach break-through status, nucleate and grow in the near surface (few 10s of micron depth