

# NOVICE Category Competition Rule Book

Version: 30 Sept 2020

## Challenge Statement

How might a team collaborating remotely be more productive than in a face-to-face meeting?

*e.g. How might we translate body language, nuance, and emotion for more feedback to make remote meetings better?*

## Overview

Novice category consists of three challenges details below:

Challenge	Description	Weightage
<b>Challenge Puzzle 1</b>	We often use chat functions to convey questions and ideas in remote meetings  Train a model to analyse words and sentences in chat communication to predict the mood of the conversation.	20%
<b>Challenge Puzzle 2</b>	Body language and emotion are important indicators of whether productivity is met.  Train a model to analyse images to predict emotions.	30%
<b>Conceptual Solution Challenge</b>	Develop a conceptual solution to address the challenge statement.  e.g. Wearable devices, electronic accessories, mobile app, software etc  Pitch and present your team’s solution to the judging panel. You may refer to the assessment rubric for guidance.	50%

Participating teams to tackle the above 3 challenges.

## Submission Deadline

- Challenge Puzzle 1 – **01 Oct, 1700**
- Challenge Puzzle 2 – **01 Oct, 1700**
- Conceptual Solution Challenge – **02 Oct, 0800**

## Submission Email

- [ntucampcode@roboto.sg](mailto:ntucampcode@roboto.sg)

## Challenge Puzzle 1

### Problem Statement

In this challenge participants are tasked to create a sentiment analysis model. This sentiment analysis model should take in short texts and classify these texts into different categories of emotions.

### Directory

Download files at <https://roboto.sg/novice-challenge-1.zip>

### Dataset

The dataset contains a short text and a sentiment classification. The text sentiment is split into 4 categories, happy, sad, neutral and fury.

- train.csv : training data
- val.csv : validation data
- labelled.csv : dummy data to illustrate required outputs

### Code

- model\_inference.py : dummy script that outputs data in the required submission format.

### Submission

#### Requirements

The most important file is **model\_inference.py**. This python script should perform both data transformation (if required) and model inference. The expected output of the python script should be the model predictions.

The following commands should run and output predictions in `labelled.csv`

- `pip install requirements.txt`
- `python model_inference.py <input_file_name>`
  - example: `python model_inference.py data/val.csv`

A dummy `model_inference.py` is provided. This script provides a recommendation of how the code should be structured.

## Checklist

This checklist can be useful for participants to ensure that the required files are submitted.

Item	Description	Required File Format
Main python Script	Script takes in text.csv and outputs predictions as labelled.csv	<b>model_inference.py</b>
Python Dependencies	Contains a list of python packages used for the submission  Generated from command line <code>pip freeze &gt; requirements.txt</code>	<b>requirements.txt</b>
Trained Model Weights	Saved model weights of the final submitted model	<b>model.h5</b> (neural network model) or <b>model.pkl</b> (sklearn model)
Model Training Source Code	Source code used to train the final submitted model	<b>model_training.py</b> or <b>model_training.ipynb</b>

**NOTE:** If participants used any special libraries or transformers, do include the files in the submission and ensure that `model_inference.py` runs smoothly.

zip the files under `<team_name>_challenge1.zip` and submit to [ntucampcode@roboto.sg](mailto:ntucampcode@roboto.sg)

## Evaluation

Evaluation of model performance will be performed against a test dataset. This test dataset **will not be** provided to the participants. Assessors will run the `model_inference.py` to generate `labelled.csv` for scoring.

## Evaluation Dataset

There will be 8000 rows of data within the test set. The table below shows the distribution of the dataset.

Sentiment	Number of Samples
happy	3059
sad	2725
neutral	1929
fury	287

## Score Rubrics

Category	Points
Model Accuracy	15
Submission Time Ranking	5
<b>Total</b>	<b>20</b>

Submission Time Ranking:

- To qualified for submission time ranking points, your submitted model's accuracy needs to be > 70%.
- If your team submit multiple entries, only latest entry will be considered.
- Points will be awarded as per:
  - 5 points – first team
  - 4 points – second team
  - 3 points – third team
  - 2 points – fourth team
  - 1 point – fifth team
  - 0 point – rest of the teams

## Challenge Puzzle 2

### Problem Statement

In this challenge participants are tasked to create a **neural network model** to classify images based on emotions expressed by the person within the image.

### Directory

Download files at <https://roboto.sg/novice-challenge-2.zip>

### Dataset

The dataset contains 6 different categories, anger, annoyance, doubt, fatigue, happiness, sadness.

- train : directory containing training data
- val : directory containing validation data
- labelled.csv : dummy data to illustrate required outputs
  - filename: name of the file
  - category: classification output

### Code

- model\_inference.py : dummy script that outputs data in the required submission format

### Submission

#### Requirements

The most important file is **model\_inference.py**. This python script should perform both data transformation (if required) and model inference. The expected output of the python script should be the model predictions.

The following commands should run and output predictions in `labelled.csv`

- `pip install requirements.txt`
- `python model_inference.py <input_file_name>`
  - example: `python model_inference.py data/val/`

A dummy `model_inference.py` is provided. This script provides a recommendation of how the code should be structured.

## Checklist

This checklist can be useful for participants to ensure that the required files are submitted

Item	Description	Required File Format
Main python Script	Script takes in text.csv and outputs predictions as labelled.csv	<b>model_inference.py</b>
Python Dependencies	Contains a list of python packages used for the submission  Generated from command line <code>pip freeze &gt; requirements.txt</code>	<b>requirements.txt</b>
Trained Model Weights	Saved model weights of the final submitted model	<b>model.h5</b> (neural network model) or <b>model.pkl</b> (sklearn model)
Model Training Source Code	Source code used to train the final submitted model	<b>model_training.py</b> or <b>model_training.ipynb</b>

**NOTE:** If participants used any special libraries or transformers, do include the files in the submission and ensure that `model_inference.py` runs smoothly.

zip the files under `<team_name>_challenge2.zip` and submit to [ntucampcode@roboto.sg](mailto:ntucampcode@roboto.sg)

## Evaluation

Evaluation of model performance will be performed against a test dataset. This test dataset **will not be** provided to the participants. Assessors will run the `model_inference.py` to generate `labelled.csv` for scoring.

### Evaluation Dataset

There will be 240 rows of data within the test set. The table below shows the distribution of the dataset.

Sentiment	Number of Samples
anger	30
annoyance	30
doubt	60
fatigue	30
happiness	60
sadness	30

### Score Rubrics

Category	Points
Model Accuracy	25
Submission Time Ranking	5
<b>Total</b>	<b>20</b>

Submission Time Ranking:

- To qualified for submission time ranking points, your submitted model's accuracy needs to be > 70%.
- If your team submit multiple entries, only latest entry will be considered.
- Points will be awarded as per:
  - 5 points – first team
  - 4 points – second team
  - 3 points – third team
  - 2 points – fourth team
  - 1 point – fifth team
  - 0 point – rest of the teams

**Assessment Rubrics for Conceptual Solution Challenge**

Scoring Table	1 Point	2 Points	3 Points	4 Points	5 Points
<b>Commercial and Economic Impact</b>	<p>Solution does not have commercial viability</p> <p>Solution has little to no economic benefit for users (both organizations and individuals).</p>	<p>Solution has some potential to be commercially viable</p> <p>Solution has some economic benefit for users (both organizations and individuals)</p>	<p>Solution has strong potential to be commercially viable</p> <p>Solution has some economic benefit for users (both organizations and individuals)</p>	<p>Solution is almost certain to be commercially viable</p> <p>Solution has great economic benefit for users (both organizations and individuals)</p>	<p>Solution is commercially viable.</p> <p>Solution has immense economic benefit for users (both organizations and individuals)</p>
<b>Mental Wellness Impact</b>	<p>Solution has negative effects on the user's mental wellness.</p>	<p>Solution has little to no effects on the user's mental wellness.</p>	<p>Solution has slight positive effects on the user's mental wellness.</p>	<p>Solution has great positive effects on the user's mental wellness.</p>	<p>Solution has immense positive effects on the user's mental wellness.</p>
<b>Originality of Ideas</b>	<p>Solution or the combination of use-case and solution is a direct or very-close replicate of an existing product or solution available in the market.</p>	<p>Solution or the combination of use-case and solution is quite similar to an existing product or solution available in the market.</p>	<p>Solution or the combination of use-case and solution is somewhat similar to an existing product or solution available in the market.</p>	<p>Solution or the combination of use-case and solution is unique and not similar to an existing product or solution available in the market.</p>	<p>Solution or the combination of use-case and solution is unique and not similar to an existing product or solution available in the market. It is also not similar to other participant's solutions</p>
<b>Product Development Roadmap</b>	<p>Solution has little to no stated development milestones and stages or phases of completion.</p>	<p>Solution has some stated development milestones and stages or phases of completion.</p> <p>Each phase has poorly defined timeframes and resources needed.</p> <p>Each milestone is not specific and measurable.</p>	<p>Solution has most stated development milestones and stages or phases of completion.</p> <p>Each phase has reasonably defined timeframes and resources needed.</p> <p>Each milestone is somewhat specific and measurable.</p>	<p>Solution has all stated development milestones and stages or phases of completion.</p> <p>Each phase has well-defined timeframes and resources needed.</p> <p>Each milestone is specific and measurable.</p>	<p>Solution has all stated development milestones and stages or phases of completion.</p> <p>Each phase has well-defined timeframes and resources needed.</p> <p>Each milestone is specific and measurable.</p> <p>Roadmap caters for contingencies, such as prototype failures and mitigation measures.</p>



Scoring Table	1 Point	2 Points	3 Points	4 Points	5 Points
<b>Financial Planning</b>	<p>Little to no financial planning was done.</p>	<p>Some financial planning was done.</p> <p>Financial plan was incomplete or unable to be clearly evaluated.</p>	<p>Financial plan was completed.</p> <p>Financial plan is somewhat feasible and realistic. E.g. The cost to build a Minimum Viable Product is reasonable.</p>	<p>Financial plan was completed.</p> <p>Financial plan is somewhat feasible and realistic. E.g. The total cost to build a MVP is reasonable. The cost to build a mass market product is reasonable. The intended price point or commercialization strategy is viable.</p>	<p>Financial plan was completed.</p> <p>Financial plan is somewhat feasible and realistic. E.g. The total cost to build a MVP is reasonable. The cost to build a mass market product is reasonable. The intended price point or commercialization strategy is viable.</p> <p>Financial plan considers the use of fund-raising, capital partners, joint ventures or similar.</p>
<b>Resources Feasibility</b>	<p>Resources required to create the solution is unrealistically high, even in a MVP or early prototype stage.</p>	<p>Resources required to create the solution is high, in the prototype stage.</p>	<p>Resources required to create the solution is reasonable, in the prototype stage.</p>	<p>Resources required to create the solution is reasonable, in the MVP stage.</p>	<p>Resources required to create the solution is reasonable, in the mass-production stage.</p>
<b>Technological Feasibility</b>	<p>Technology to create solution does not exist yet and is difficult to acquire, i.e. requires significant research and development.</p>	<p>Technology to create solution does not exist yet and requires reasonable research and development</p>	<p>Technology to create solution exists partially and requires minor research and development</p>	<p>Technology to create solution exists and requires the integration of different existing technologies</p>	<p>Technology to create solution exists and requires little to no extra effort to leverage on existing technologies.</p>
<b>Economic Feasibility</b>	<p>Solution requires extremely large amount of resources to prototype, build or mass-produce to scale.</p> <p>The nature of the solution makes it extremely challenging for deployability and scalability.</p>	<p>Solution requires large amount of resources to prototype, build or mass-produce to scale.</p> <p>The nature of the solution makes it challenging for deployability and scalability.</p>	<p>Solution requires moderate amount of resources to prototype, build or mass-produce to scale.</p> <p>The nature of the solution makes it neutral for deployability and scalability.</p>	<p>Solution requires moderate to low amount of resources to prototype, build or mass-produce to scale.</p> <p>The nature of the solution makes it reasonably economical for deployability and scalability.</p>	<p>Solution requires low amount of resources to prototype, build or mass-produce to scale.</p> <p>The nature of the solution makes it economical for deployability and scalability.</p>

Scoring Table	1 Point	2 Points	3 Points	4 Points	5 Points
<b>Quality of Prepared Pitch</b>	<p>Presentation deck was incoherent and flow of presentation was poor.</p> <p>Pitch was not delivered in a convincing manner.</p> <p>No use of any other presentation aids; such as videos, illustrations or like-for-like demo videos.</p> <p>Poor time management (did not finish pitch in given time)</p>	<p>Flow of presentation was average.</p> <p>Pitch was delivered in a somewhat convincing manner.</p> <p>No use of any other presentation aids; such as videos, illustrations or like-for-like demo videos.</p> <p>Poor time management (did not finish pitch in given time)</p>	<p>Flow of presentation was above average, with some form of narrative or story-telling elements.</p> <p>Pitch was delivered in a reasonably convincing manner.</p> <p>Some use of any other presentation aids; such as videos, illustrations or like-for-like demo videos.</p> <p>Average time management (Completed pitch in given time)</p>	<p>Flow of presentation was good, with some form of narrative or story-telling elements.</p> <p>Pitch was delivered in a convincing manner.</p> <p>Good use of any other presentation aids; such as videos, illustrations or like-for-like demo videos.</p> <p>Good time management (Completed pitch in given time or lesser)</p>	<p>Flow of presentation was excellent, with some form of narrative or story-telling elements</p> <p>Pitch was delivered in an extremely convincing manner.</p> <p>Good use of any other presentation aids; such as videos, illustrations or like-for-like demo videos.</p> <p>Good time management (Completed pitch in given time or lesser)</p>
<b>Quality of Answers during Q&amp;A</b>	<p>Presenters gave poor answers when asked on details or to clarify on any aspect of the solution.</p> <p>Presenters defended their solution poorly when challenged on the impact, originality, execution, feasibility, or any other elements of the solution.</p>	<p>Presenters gave average answers when asked on details or to clarify on any aspect of the solution.</p> <p>Presenters defended their solution poorly when challenged on the impact, originality, execution, feasibility, or any other elements of the solution.</p>	<p>Presenters gave clear answers when asked on details or to clarify on any aspect of the solution.</p> <p>Presenters defended their solution reasonably when challenged on the impact, originality, execution, feasibility, or any other elements of the solution.</p>	<p>Presenters gave clear and detailed answers when asked on details or to clarify on any aspect of the solution.</p> <p>Presenters defended their solution well when challenged on the impact, originality, execution, feasibility, or any other elements of the solution.</p>	<p>Presenters gave clear and detailed answers when asked on details or to clarify on any aspect of the solution, to the point that no follow-up questions were needed.</p> <p>Presenters defended their solution extremely well when challenged on the impact, originality, execution, feasibility or any other elements of the solution, promoting the questioner to change their stand.</p>