

ITU AI/ML in 5G Challenge Participation Guidelines

Participation guidelines (Version 09)

Contents

Executive Summary	1
Participation	3
Problem statements	3
Problem statements.....	3
Data policy	3
Training and testing data.....	4
Challenge Phases	4
Phase 1: Curation Phase.....	4
Phase 2: Competition Phase	5
Phase 3: Evaluation Phase	6
Standards, open source and IPR.....	8
Standards.....	8
Open Source.....	8
Quality of Submissions and intellectual property rights	8
Code of Conduct.....	9
Benefits 9	
Benefits for partners.....	9
Benefits for participants	9
Final matters.....	10
Contact 10	
Updates 10	

Executive Summary

The International Telecommunication Union (“ITU”, “we”) is the United Nations specialized agency for digital technologies (ICTs). ITU is made up of a membership of 194 Member States and more than 1000 companies, universities and international and regional organizations.

The ITU AI/ML in 5G Challenge rallies like-minded students and professionals from around the globe to solve real-world problems in communication networks by applying artificial intelligence (AI) and machine learning (ML).

Definitions

Host The host may be university, a company, or an organization, including ITU, that provides the problem statement for the challenge.

Teams comprising 1 to 5 members solve problem statements. Teams will be required to enable, create, train, and deploy ML models such that participants will acquire hands-on experience of AI/ML in communication networks.

Problem statements are provided by hosts. A host in general is a university, a company, or an organization.

Participation is open to any individual from one of the 194 Member States of the ITU. No membership in ITU or any other organization is required. All participants must adhere to the **code of conduct**, included under page 9 of these Guidelines.

Motivation of participants: Teams compete for prizes, ITU certificates and global recognition. They value the opportunities to learn, to publish their findings in peer-reviewed journals (see below), to network with other colleagues, and to find employment opportunities and internships.

Compute platform: ITU provides a state-of-the-art, free-of-charge compute platform to participants of the Challenge who do not have adequate access to compute in their respective institutions. The compute platform will provide participants with access to:

- Free GPU and CPUs
- Hosted Jupyter notebook servers
- Python kernel
- Pre-installed machine learning packages, e.g. PyTorch and Tensorflow

NOTE- In some of the problem statements, we may offer baseline solutions or references which may include implementations using Jupyter notebooks.

Mentoring: Several activities accompany the Challenge such as webinars, roundtables, and hands-on sessions. The ML5G Discovery Channel of the AI for Good platform features related events ([Discovery - AI/ML in 5G - AI for Good](#)) are all available for replay.

Prizes and certificates:

- The best team for each of the problem statements will receive a cash prize if the Judges Panel determines that the solution satisfies the judging criteria.
- Hosts of problem statement may issue additional prizes.
- ITU will also issue various types of certificates to teams who submitted valid solutions to the Challenge.

All events take place **online**.

Participants are encouraged to submit **open-source solutions**.

IPRs (Intellectual Property Rights) belong to the submitter of the solution.

Sponsorship: For sponsorship inquiries, please reach out to

<https://aiforgood.itu.int/sponsor/>.

Participation

Participation is open to ITU members and any individual from one of the 194 ITU Member States. No membership in ITU or any other organization is required.

“Participants” are individuals or teams that participate in the ITU AI/ML in 5G Challenge, providing solutions to problem statements of the Challenge. In past Challenges, slightly more students than professionals participated.

Participants can form teams comprising 1-5 members. Experts will mentor participants on problems, providing guidance and good practices for participation in this Challenge.

Problem statements

Problem statements

Participants will be able to solve problem statements, i.e., real-world problems, some of which are based on ITU standards for ML in future networks, with access to real-world and simulated data, collected and curated by experts.

Teams will be required to enable, create, train and/or deploy ML models such that participants will acquire hands-on experience in AI/ML in areas relevant to future networks.

The host is the entity that defines and provides the problem statement, including data. The host can be a university or a company (e.g., an equipment manufacturer, a telecom operator, or others) or an organization. Participants are required to pick one or more of the problem statements they are interested in working on.

Data policy

Data will be handled in accordance with policies and regulations relevant to the entities and data concerned. Data may be pre-processed and provided using pre-published APIs, and may be secured using a login/token. Data handling APIs (according to [ITU-T Y.3174](#)) will be provided based on the use case and filtered based on the policies of the involved organization(s). Data anonymization may be applied according to relevant policies and regulations. A non-disclosure agreement (NDA) may be included in the terms of participation. In cases where the Challenge involves local user data, the results may be presented in the form of a competition paper not including local user data. API access to data shall be monitored and licensed based on agreement. Some test data set may be private and will not be disclosed.

NOTE - Some problem statements use “**restricted data**”, which is available only under certain conditions set forth by the host as follows:

Example 1: Restricted data may be made available after signing an NDA.

Example 2: Restricted data may be available only for use within the hosted platform and not for moving out of the hosted platform (i.e., no downloading of data may be allowed).

Example 3: Restricted data may be available to citizens of a particular country or region, e.g., under data privacy regulations of specific regions.

Any personal data collected or otherwise processed by ITU in the course of the Challenges will be handled in accordance with the ITU Data Protection and Privacy Policy.

Training and testing data

Training, validation, and testing data will be provided by the host. Data will be hosted either by the host or by ITU.

Challenge Phases

Administrative support of the Challenge

The ITU Secretariat provides administrative support for the ITU AI/ML in 5G Challenge, in collaboration with the hosts, collaborators, participants, and the Judges Panel.

Phase 1: Curation Phase

The table below is the template that is used for the submission of problem statements for the ITU AI/ML in 5G Challenge.

Table 1: The template for a problem statement

Id	ITU-ML5G-PS-TEMPLATE
Title	<<Add a title for the problem statement>> e.g. "Where is WALDO? - sensing using mmWave communications and ML"
Description	NOTE 1 - include a brief overview followed by a description about the problem, its importance to IMT-2020 networks and ITU, highlight any specific research or industry problem under consideration.
Evaluation criteria	NOTE 2 - this should include the expected submission format e.g. video, comma separated value (CSV) file, etc. NOTE 3 - this should include any currently available benchmarks. e.g. accuracy.
Data source	NOTE 4 - e.g. description of private data which may be available only under certain conditions to certain participants, pointers to open data, pointers to simulated data.
Resources	NOTE 5 - e.g. simulators, APIs, lab setups, tools, algorithms, add a link in clause 2.
Any controls or restrictions	NOTE 6 - e.g. this problem statement is open only to students or academia, data is under export control, employees of XYZ corporation cannot participate in this problem statement, any other rules applicable for this problem, specific IPR conditions, etc.

Specification/Paper reference	NOTE 7 - e.g. arxiv link, ITU-T link to specifications, etc.
Contact	NOTE 8- email id or social media contact of the person who can answer questions about this problem statement.

Phase 2: Competition Phase

Participant Registration

The participants registered for the ITU AI/ML in 5G Challenge will choose one or more problem statements, depending on their interests, and provide solutions to the problem statement(s).

The problem statements are collected in the ITU document “Problem statements and data resources” available here: <https://challenge.aiforgood.itu.int/> and <https://competition.aiforgood.itu.int/>

Participants can register at the ITU website (Problem Statement Portal: [Welcome - EvalAI](#)). The ITU Secretariat will assist participants who register at the ITU website in selecting problem statements and connecting them with a specific host if necessary.

For some problem statements, participants can also register with the host. The host will coordinate with ITU to extend support and guidance.

Participants should start tackling the problem statement as soon as registration opens, and submit solutions during the competition phase.

Guidance and Mentoring

Hosts of problem statements may provide baseline code/models as a starting point for participants. For example, Jupyter and Colab notebooks may be provided. During the competition phase, ITU, in conjunction with hosts, will hold webinars to describe the problem statements, round-tables, and hands-on-sessions to help participants advance smoothly and submit their solutions.

The host will present the problem statement as part of the ITU ML5G Webinar series, a curated series of expert talks on AI/ML in communication networks. The format is one hour, about 45 min for the talk, plus 15 min Q&A. The talks are recorded and available for replay ([Discovery - AI/ML in 5G - AI for Good](#)).

ITU Challenge Compute Platform

ITU has put together a state-of-the-art compute platform hosted on its Geneva premises. The compute platform is provided free-of charge to registered participants of the Challenge who lack adequate compute resources. The resources will be provided on a need basis. The compute platform will provide participants with access to:

- I. Free GPUs and CPUs
- II. Jupyter and Colab Notebooks

III. Python Kernel

IV. Pre-installed machine learning packages, e.g. PyTorch and Tensorflow

To allow fair access to the ITU Challenge compute platform for all participants with needs, access will be time-limited. Participants must use the ITU Compute Platform only for the purposes of the Challenge.

Participants are asked to fill out the request form available on the website of the ITU AI/ML in 5G Challenge.

Phase 3: Evaluation Phase

Evaluation of solutions submitted to a problem statement

A preliminary assessment of the solutions submitted for the competition may be conducted automatically via the platform. Subsequently, the host of a problem statement evaluates the solutions from participants using the evaluation criteria set out by the host. The evaluation criteria are contained in the respective descriptions of the problem statement.

In general, the following points serve as a guide in evaluating solutions:

Novelty & originality.

Performance (evaluation based on performance measures such as accuracy, speed, scalability and quality).

Resource needs (memory, CPU, size or others), evaluated with respect to the design criteria

Status and maturity of technical implementation, reproducibility.

Robustness under failure conditions

Viability & impact on market (practicality of the solution and significance of its impact).

Ease of integration (e.g. via (ITU) standard APIs, containers etc.)

Interoperability and mapping to international standards (including ITU standards), as appropriate.

Documentation.

Quality of demonstration and presentation at the Playoffs and the Grand Challenge Finale.

Some criteria are objective, while others are subjective and dependant on the human beings who are evaluating the solution.

Scores will be displayed on a leaderboard.

In addition, or instead of the host, evaluation may be also done by a Judges Panel comprised of one or more individual experts selected by ITU who evaluate the progress and merit of the solutions proposed by the participants.

The winner of each problem statement receives a cash prize. The best teams of each problem statement also receive certificates (see below).

Some hosts of problem statements may hold a final event specific to their problem statement where they may give out prizes.

Certificates

ITU will issue certificates for winners. Below are the certificates of last year's overall winners.

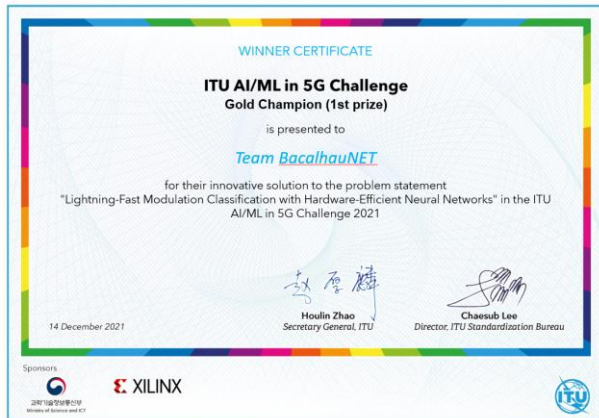


Figure 2: Winners of the Grand Challenge Finale 2021

Standards, open source and IPR

Standards

ITU has developed a range of standards-based Machine Learning mechanisms in 5G. The goal is to provide a full toolkit to build Machine Learning into networks. Participants of the ITU AI/ML in 5G Challenge are encouraged to base their work on international standards.

Open Source

The Challenge encourages the submission of open-source implementations, based on (ITU) standards. Open-source implementations will enable a broad range of stakeholders to access the outcomes of the Challenge and continue collaborating with relevant Challenge participants.

However, solutions based on proprietary implementations may also be accepted based on conditions in the problem statement.

Quality of Submissions and intellectual property rights

Submissions must be original unpublished works that are not currently under review by another contest or journal and must be solely owned by the participant. In addition, Submissions must not: (a). violate the intellectual property rights of third parties; (b). be illegal under applicable national laws and international law; and (c). depict or incite hatred, defame, abuse, harass, stalk, threaten a specific person or social group, incite violence or conflict or otherwise violate the legal rights of third parties (including those of privacy and publicity).

Participants will retain the intellectual property rights on the contents of their submissions. However, each participant grants ITU a limited, non-exclusive, global royalty-free right and license to use, reproduce, communicate, demonstrate, make available for public display, and distribute the contents of his/her submission for ITU's and the Challenge's informational and educational or awareness purposes, via digital or other means, including ITU's website. The participant hereby represents that he/she has the legal right to grant such a license to ITU.

By entering the Challenge, each participant agrees to release and hold ITU harmless from and against any and all claims, expenses, and liability, including but not limited to negligence and damages of any kind to persons and property, infringement of trademark, copyright or other intellectual property rights arising out of or relating to their participation in the Challenge and the contents of their submissions.

Code of Conduct

All participants must adhere to the following code of conduct:

1. Participants will treat each other, other teams and participants with respect, professionalism, fairness, and sensitivity to our many differences and strengths.
2. All discussions will be courteous. Participants must not accept or engage in abusive behaviour in any form, whether it is verbal, physical, sexual, or implied.
3. We value giving credit when credit is due. Participants must only take credit for their own original work. Where required, participants shall add citations and give credits to others. Plagiarism will result in immediate disqualification from the Challenge.
4. Judges' decisions will be final.

Benefits

Benefits for partners

The Challenge offers partners the following:

Visibility throughout the year
Find global talent
Find innovative solutions to your AI/ML use cases in networks.

Benefits for participants

Shape the future: Opportunity to define, provide inputs and shape the technologies related to AI/ML and 5G networks.
Create your network: Network with ITU experts and peers.
Be practical: Platform to gain hands-on experience related to AI/ML and concepts related to future networks.
Be known: Gain global recognition in the form of prizes, appreciation and publications of the results in the ITU News Magazine and ITU Journal on Future and Evolving Technologies (ITU J-FET; <https://www.itu.int/en/journal/j-fet>), subject to acceptance.
Realize your dreams: Receive expert support to implement use cases and technology ideas using software and access to platforms, e.g. baseline solutions, notebooks and toolsets.
Employment and internship opportunities.
Free (hosted) access to AI/ML platforms and GPUs.

Final matters

ITU shall have the right, in their sole discretion, to abbreviate, modify, suspend, cancel or terminate the Challenge without any future obligation, by notifying the participants via an announcement at [ML5G Challenge - AI for Good](#)

ITU reserves the right in its sole discretion to disqualify any submission which does not comply with the present Guidelines.

Participants in the Challenge are not allowed to use the titles, acronyms and logos of the ITU or other branding elements of ITU on material that was produced by them. Participants are also not allowed to use their submissions for purposes and aims inconsistent with ITU's mandate and mission.

Nothing in this Letter is deemed to create an employment, legal partnership, joint venture or agency relationship between ITU and the participants.

Participation in the Challenge does not create any partnership, employment, agency, grant, procurement, or other legal or financial relationship between the ITU and the participants, nor does it give rise to any obligation on the part of the ITU to provide further funding, support, services, or opportunities.

Nothing in or relating to this letter or any other document in relation thereof shall be considered to be a limitation or a waiver of the privileges and immunities of ITU.

Any dispute between a participant and ITU arising from, or in connection with, these Guidelines shall be settled directly and amicably by them through mutual negotiations.

Contact

Email: AI5GChallenge@itu.int

Website: [ML5G Challenge - AI for Good](#)

Problem Statement Portal: <https://competition.aiforgood.itu.int/>

Slack Channel: itu-challenge.slack.com

Updates

These Guidelines are subject to amendment by ITU at its discretion and may be revised periodically. The most up-to-date version of the Guidelines applicable to Challenges can always be accessed via the following link: [ML5G Challenge - AI for Good](#)