

Rules for the Hackathon "SafeSpeak -2024: Deepfake Detection to Ensure Voice Communication Security "

1. General terms

- 1.1. These rules for holding the Hackathon "SafeSpeak-2024: Deepfake Detection to Ensure Voice Communication Security" (hereinafter referred to as the Rules) regulate the procedure for organizing and holding the Hackathon "SafeSpeak-2024: Deepfake Detection to Ensure Voice Communication Security" (hereinafter referred to as the Competition).
- 1.2. The organizer of the Competition is the Order of the Red Banner of Labor Federal State Budgetary Educational Institution of Higher Education "Moscow Technical University of Communications and Informatics" (Address: 111024, Moscow, Aviamotornaya St., Bldg. 8a. Details: INN 7722000820, KPP 772201001, OGRN 1027700117191, OKPO 01179952).
- 1.3. The General Partner of the Competition is ANO "Institute of Artificial Intelligence" (Address: 121170, Moscow, Kutuzovsky pr-kt, 32, bldg. 1, room 4.v.08. Details: INN 7730261209, KPP 773001001, OGRN 1207700493978, OKPO 46794755).
- 1.4. The technical platform for the Competition is <https://www.kaggle.com/>.
- 1.5. These Rules, as well as additional information, are posted on the Internet sites: <http://airi.net/ru/hackathon/safespeak-2024> and <https://www.kaggle.com/>. The site <http://airi.net/ru/hackathon/safespeak-2024> is the Competition Site in accordance with these Rules.
- 1.6. The Competition is held on the territory of the Russian Federation using the Competition Site. The results (solutions) are submitted (uploaded) by the Contest participants (hereinafter referred to as the Participants) to the Contest Website within the timeframes established by the Rules.
- 1.7. The Organizer shall inform about the Contest in the following ways: by posting information materials about it on the Contest Website, as well as by other means at the discretion of the Contest Organizer when conducting a campaign to stimulate the attraction of applicants and Participants to the Contest on the Internet, including through the use of information mailings, to the sending of which the Participant gives consent by registering on the Contest Website, as specified in the User Agreement posted on the Internet site: <https://airi.net/ru/hackathon/safespeak-2024/registration/> .
- 1.8. The Organizer has the right to unilaterally make changes to the Rules no later than 22.11.2024. The Organizer sends all Participants a notice of changes to the terms of the Rules and with the obligatory publication of such changes on the Contest Website. In case of disagreement with the Rules or their updates, Participants are obliged to refuse to use the Contest Website and to participate in the Contest by sending an e-mail about refusal to participate in the Contest to safespeak@mtuci.ru .
- 1.9. The purpose of the Contest is to develop a lightweight neural network for detecting voice spoofing. As part of achieving the goal of the Contest, the Organizer may involve various third parties (regardless of their organizational and legal form), who provide support to the Organizer (including in the form of charitable or other activities), provide technical or other resources necessary for the Contest, provide information support, etc. (hereinafter referred to as the Organizer's Partners).

2. Competition Period

- 2.1. The general period of the Competition is from 07.11.2024 (the start date of registration and actions to participate in the Competition, as provided for in paragraph 2.1.1 of the Rules) to 30.10.2024 inclusive until 23:59 (Moscow time), which consists of the following periods, taking into account the provisions of these Rules:
 - 2.1.1. The period for completing the Competition task and summing up the results of completing the Competition task: from 22.11.2024 to 30.11.2024 inclusive until 23:59 (Moscow time), including:
 - 2.1.1.1. The period for familiarization with the description of the Competition task on the Competition Website and registration for participation in the Competition is from

07.11.2024 to 22.11.2024 until 23:59 (Moscow time).

- 2.1.1.2. The period for uploading solutions to the Competition Website for the Competition Task, from 22.11.2024 to 27.11.2024 until 23:59 (Moscow time).
- 2.1.1.3. The period for publishing the final leaderboard (a ranked list of Participants in accordance with clause 3.5 of the Rules) on the Competition Website and/or on the Competition Technical Platform, determining and notifying the winners (the deadline for announcing the Competition results) for the Competition task is until 23:59 Moscow time) on 30.11.2024.

3. Participation conditions

- 3.1. A Participant of the Competition may be a legally capable individual who has reached the age of eighteen, who has registered and expressed consent to the Rules (by ticking the box) (hereinafter referred to as the Participant).
 - 3.1.1. After registering on the Competition Website and gaining access to their personal account, Participants of the Competition may unite into groups to jointly complete one or several competition tasks (hereinafter referred to as the Competition Task), forming a Team of Participants (except for cases provided for in paragraph 3.2. of the Rules). Team of Participants is a group of Participants acting on their own behalf, who have completed the Competition Task as a single Participant in accordance with the requirements of the Competition Rules.
 - 3.1.2. The Team of Participants, from 1 (one) to 4 (four) people, may include only Participants who have reached the age of eighteen and meet the requirements for Participants in accordance with paragraphs 3.1, 3.2. of the Rules.
 - 3.1.3. The composition of the Participants is formed and recorded through the functionality of the Participant's personal account on the Technical Platform of the Competition. Leaving the Team of Participants and/or transferring a Participant to another Team of Participants during participation in the Competition is allowed only with the consent of the Organizer by sending an email to safespeak@mtuci.ru .
 - 3.1.4. You can participate in the Competition both individually and in a Team (from 1 to 4 people).
- 3.2. Persons directly associated with the organization of the Competition are not allowed to participate in the Competition.
- 3.3. Each Participant is obliged, within the period established by paragraph 2.1.1.1. of the Rules, to register on the Competition Website and the Technical Platform of the Competition, read and accept the Rules (by ticking the box confirming acceptance of the terms of the Rules in the corresponding web form), complete the Competition Task and send the developed solution to the Organizer by uploading it to the Technical Platform of the Competition.
- 3.4. In the Competition Task, the quality of the proposed solutions is calculated based on the quality metric selected for the Task in accordance with the evaluation criteria posted on the Competition Technical Platform. A description of the metric in two languages is provided in Appendix 1 to these rules.
- 3.5. For the Competition Task, a leaderboard (ranked list - rating) of Participants is formed on the Competition Technical Platform, formed automatically based on the received metric value for the solutions of the Competition Task Participants.

4. Results and Awards

- 4.1. The winners of the Competition Task are defined as the Participants and/or Teams of Participants who received the highest three final scores in the leaderboard after the decision-making period closed at 23:59 on 27.11.2024 (Moscow time), in accordance with paragraphs 3.3. - 3.5. of the Rules. Participants included in a Team of Participants receive a single prize place and a single prize for the entire Team of Participants. If the final score values are the same for several Participants and/or Teams of Participants, the time of uploading the solution to the Technical Platform of the Competition will be taken into account. The previously uploaded solution to the Technical Platform of the Competition will be awarded a higher place.
 - 4.1.1. From the moment the decision-making period ends - from 28.11.2024 to 23:59 on 29.11.2024

(Moscow time), the solutions will be checked and the final leaderboard will be formed.

- 4.1.2. The winners of the Competition Task will be determined and announced by 23:59 30.11.2024 (Moscow time) based on the final (private) leaderboard by posting a text announcement on the Competition Technical Platform, as well as by personally notifying the winners by e-mail specified during registration on the Competition Website.
- 4.1.3. Reward amounts
 - First place – 100 000 rubles.
 - Second place – 75 000 rubles.
 - Third place – 50 000 rubles.
- 4.2. If the winner is a Team of Participants, documents and information are provided for each Participant in accordance with paragraph 6.1.4 of the Rules. Additionally, the Organizer must be provided with an agreement signed by all Team Participants on the distribution of the prize amount between the Team Participants.
- 4.3. The prizes will be awarded to the winners of the Competition by the Competition Organizer by means of a non-cash transfer of funds to the details of one of the banks operating in the Russian Federation, specified by the winners of the Competition in accordance with paragraph 6.1.3 of the Rules, within the timeframes specified in paragraph 2.1.1 of the Rules, provided that paragraphs 4.4 - 4.6 of the Rules have been fulfilled by that time and the documents specified in paragraph 6.1.3 of the Rules have been provided to the Organizer. The Winners shall independently ensure that they have a bank account operating in the Russian Federation.
- 4.4. The winners of the Competition are deemed to have granted the Organizer and the General Partner, free of charge (without payment of additional remuneration), the exclusive right to use the solutions to the Competition Problem under the terms of a simple (non-exclusive) license (in particular, the program code (in the form of source text and object code), algorithms and architecture of the solution) and all materials to them, including preparatory materials and generated audiovisual displays created by the winners of the Competition for participation in the Competition, as well as other results of intellectual activity included in the solution to the Competition Problem (hereinafter collectively referred to as IP), without the Parties signing any additional agreements or other documents, under the following conditions:
 - 4.4.1. Permitted methods of using the IP: reproduction (in full or in part) in any form, adaptation, distribution of copies by any means, processing (modification), making available to the public, public display and other methods, including (but not limited to) those provided for in Article 1270 of the Civil Code of the Russian Federation, with the right of sublicensing to third parties in the same ways and within the same limits;
 - 4.4.2. the right to use the IP is granted to the Organizer and the General Partner for the entire duration of the exclusive right to the IP throughout the world without limitation on the purpose of use;
 - 4.4.3. the Organizer and the General Partner are not obliged to provide the winners with reports on the use of the IP;
 - 4.4.4. the Organizer and the General Partner have the right to use the IP without indicating the name of the author (anonymous use), and also permit such use by third parties;
- 4.5. If a Team of Participants is selected as the winner, the disposal of rights to the IP in accordance with paragraph 4.4 is recognized as having been made jointly by all Participants included in such Team.
- 4.6. The Contest Winners undertake to transfer to the Organizer and the General Partner, upon their request, a report describing the algorithms for solving the Contest Problem, as well as the source text, reproducible (object) code for solving the Contest Problem and all preparatory materials obtained/created during the development of such a solution, including a description of the processes and methods for collecting, systematizing and analyzing data. The use of proprietary technologies (results of intellectual activity, the exclusive right to which belongs to third parties and is not transferred under an open-source license), requiring the paid acquisition of rights to use such technologies, is prohibited in solutions.
- 4.7. The solutions to the Contest Problem proposed by the Participants and/or Teams of Contest Participants are non-refundable.
- 4.8. The award ceremony is taking place at the Moscow Technical University of Communications

and Information Technology at the address: Moscow, Aviamotornaya St., 8A, 11/30/2024 at 11:00

5. Rights of Participants of the Organizers

- 5.1. The Participant has the right to:
 - 5.1.1. Take part in the Competition in the manner determined by the Rules.
 - 5.1.2. In the event of recognition as the winner of the Competition, demand the issuance of the prize stipulated by these Rules.

6. Responsibilities of Participants

- 6.1. Participants undertake to:
 - 6.1.1. Use the Competition Website and the Competition Technical Platform in accordance with its purpose and solely for the purposes of participating in the Competition.
The solution developed by the Participant (or the Team of Participants) must be fully created during and for the purposes of the Competition and not be a development of an existing product or solution.
 - 6.1.2. When participating in the Competition, including when preparing a solution to the Competition Problem, when preparing and developing algorithms, writing program code within the framework of the Competition, do not use the results of intellectual activity, as well as materials and information that are not protected as results of intellectual activity, if such use entails a violation (risk of violation) of the rights and legitimate interests of third parties and / or creates any restrictions on the disposal of rights to intellectual property in accordance with paragraph 4.4 of the Rules.
 - 6.1.3. In the event that the Participant and / or the Team of Participants are recognized as the winners of the Competition, each Participant is obliged to provide the following information / documents to the Organizer by e-mail: safespeak@mtuci.ru within 3 (three) business days from the date of receipt of the request:
 - a copy of the certificate of registration with the tax authority of an individual at the place of residence (TIN) (if available);
 - a copy of the identity document;
 - documents required to determine the tax status;
 - details of the Russian bank account for the payment of the prize (the prize amount is credited in rubles to the winners' accounts opened only in Russian banks);If the winner of the Competition fails to provide the specified information/documents within the time period specified above, the winner of the Competition will lose the right to receive the prize.
 - 6.1.4. Not to use software that disrupts the operation of the Competition Website and/or the Competition Technical Platform, other automated systems, or that makes it possible to change the Competition results. If the Organizer detects attempts to disable the Organizer's information system, the Participant who made such attempts will lose the right to participate in the Competition and receive a prize.
 - 6.1.5. Not to use the information and materials presented on the Competition Website and/or the Competition Technical Platform by reproducing, processing, or otherwise for any purpose without the prior written permission of the Organizer.
 - 6.1.6. Not to register an account on behalf of a person that the Participant is not (fake account). The Participant is obliged to use only reliable information when registering.
 - 6.1.7. Refrain from any actions that may cause damage to the Organizer, as well as from any actions associated with a risk to life and health.
 - 6.1.8. Comply with the law, including not disclosing any information about the decisions of the Participants, not transferring information about other Participants to third parties, including in order to avoid violating the legislation on personal data. In case of violation of this paragraph, the violating Participant shall bear responsibility independently.
 - 6.1.9. Not to use for personal or commercial purposes, not to publish outside the Competition, not

to transfer to third parties, information received from the Competition Organizer, other Participants within the Competition, without obtaining prior consent from the Competition Organizer.

- 6.1.10. Not to disclose to third parties and not to use any materials provided by the Organizer, outside the framework of participation in the Competition - for any purposes and by any means not related to participation in the Competition.
- 6.2. The Contest Organizer reserves the right to disqualify any Participant (unilaterally terminate the Participant's participation in the Contest with the loss of the right to receive a prize) if the Participant has violated the requirements of the law or the Rules, or if the Contest Organizer reasonably believes that the Participant has attempted to gain an advantage over other Participants through fraud, abuse or other unfair methods, or has violated the rights of third parties, including copyright holders.
- 6.3. In the event of a violation of their obligations by the Participant, the Participant shall be liable in accordance with the current legislation of the Russian Federation and these Rules.

7. Obligations of the Organizer

- 7.1. The Organizer undertakes to:
 - 7.1.1. Conduct the Competition in the manner specified by the Rules.
 - 7.1.2. Award the winners of the Competition within the timeframe and in the manner specified by the Rules.

8. Limitation of Liability

- 8.1. The Participant uses the Competition Website and the Competition Technical Platform on an "as is" basis. The Organizer assumes no liability, including for the compliance of this website with the Participant's goals and expectations.
- 8.2. The Organizer shall not be liable to the Participants or any third parties for any violation of these Rules by the Participants and/or third parties.
- 8.3. The Participant accepts and agrees that the Organizer shall not be liable for any losses incurred by the Participant as a result of participation in the Competition and use of the Competition Website and/or the Competition Technical Platform or any information located on them.

9. Processing of personal data

- 9.1. In accordance with Federal Law No. 152-FZ of 27.07.2006 "On Personal Data", the Participant is notified that from the moment of registration for the Competition (by checking the box in the relevant web form), the Organizer carries out automated (using automation tools) and non-automated (without using such tools) processing of the Participant's personal data, namely:
 - 9.1.1. last name; first name; which are generated when using the Competition Website and/or the Competition Technical Platform, other personal data that the Participant can provide independently in any available way, for the purpose of organizing and holding the Competition, including providing the opportunity to take part in the Competition in accordance with the Rules, sending notifications related to the Competition, eliminating errors in the operation of the Competition Website and/or the Competition Technical Platform.
 - 9.1.2. information on registration with the tax authority of an individual at the place of residence (if any), information from an identity document, bank details, information from documents for determining tax status, information about the prize, information from the agreement on the distribution of the prize between the Team Members, other information requested by the Organizer as part of the prize payment and which the Participant can independently provide in any available way - for the purpose of providing the prize (if the Participant becomes the winner of the Competition);
 - 9.1.3. residential address, telephone number, email address, information contained in identity documents, and other personal data that the Participant can independently provide to the Organizer or the Organizer's contractor in any available way - for the purpose of providing assistance in attending the award ceremony for the winners of the Competition, organizing the

accommodation and travel of the winners to the territory of the award ceremony.

- 9.2. The processing of personal data is carried out by performing the following actions (operations): collection, recording, systematization, accumulation, storage, clarification (update, change), extraction, use, depersonalization, blocking, deletion, destruction, as well as transfer (provision, access) of personal data to the General Partner of the Competition. By agreement with the Participant, the Organizer may transfer personal data to organizations providing assistance to the winners of the Competition in attending the award ceremony.
- 9.3. The processing of personal data for other purposes may be carried out on the basis of a separate consent of the Participant to the processing of personal data.
The Organizer of the Competition guarantees the processing of personal data, as well as ensuring the confidentiality and protection of the processed personal data in accordance with the requirements of the Federal Law of 27.07.2006 No. 152-FZ "On Personal Data". When processing personal data, the Competition Organizer undertakes to take the necessary legal, organizational and technical measures to protect personal data from unauthorized or accidental access to them, destruction, modification, blocking, copying, provision, distribution, as well as from other illegal actions.
- 9.4. The processing of personal data by the Organizer is carried out in accordance with the Personal Data Processing Policy, as well as the data protection and information security standards adopted by the Organizer. Full information on the processing of personal data by the Organizer is available at the link: <https://mtuci.ru/sveden/document/doc/politika.pdf>. The processing and protection of personal data by the owner of the Technical Platform of the Competition is carried out in accordance with its own Policies and standards. The processing of personal data by the website <https://www.kaggle.com/> is carried out in accordance with the documents published on this website.
- 9.5. The Participant agrees that the Organizer reserves the right to notify him by e-mail or through notifications on the Competition Website not only about changes in the Rules, but also about changes in the operation of these sites.
- 9.6. In the event that requests and appeals related to the processing of personal data are sent to the Organizer, the Organizer has the right to request from the subject of personal data additional information necessary to confirm the identity of the subject of personal data and the authenticity of such a request/appeal.

10. Final Provisions

- 10.1. The Organizer may, at its discretion, provide a basic solution to the Contest Problem, which is a program code that sets the minimum quality threshold for Participants' solutions. In this case, Participants have the right to use the basic solution during the Contest period solely for the purpose of solving the Contest Problem.
- 10.2. Registration of a Participant in the manner prescribed by Section 3 of the Rules means his/her unconditional agreement with all the terms of the Contest and these Rules.
- 10.3. Relations between the Organizer and the Participant are governed by the legislation of the Russian Federation. Issues not regulated by the Rules are subject to resolution in accordance with the legislation of the Russian Federation.
- 10.4. If for one reason or another one or more clauses of the Rules are invalid or have no legal force, this shall not affect the validity or applicability of the remaining clauses.
- 10.5. Nothing in the Rules may be understood as establishing between the Participant and the Organizer an agency relationship, partnership relationship, joint activity relationship, personal employment relationship, or any other relationship not expressly provided for by the Rules.
- 10.6. All disputes and disagreements that arise in connection with the organization and holding of the Competition shall be resolved through negotiations and the submission of an official (pre-trial) claim. Disputes that are not resolved through negotiations within the pre-trial settlement within 60 (sixty) calendar days from the date of receipt of the official (pre-trial) claim shall be resolved in court at the location of the Organizer.
- 10.7. Documents and information sent via the Participant's e-mail specified during registration on the Competition Website and the Organizer's e-mail safespeak@mtuci.ru shall be recognized

as written evidence.

- 10.8. The provisions of the Rules that by their nature must remain in effect after the termination of the Rules (in particular, liability, obligations to maintain confidentiality of information, the rights of the Organizer with respect to the use of the results of intellectual activity) shall continue to be in effect after the termination of the Rules for any reason.
- 10.9. These rules are written in Russian and English. In case of discrepancies, the version compiled in Russian takes precedence.
- 10.10. The Organizer has the right to transfer its rights and obligations to third parties without the separate consent of the Participant, but with mandatory prior notification of the Participant prior to such transfer. The Participant has no right to transfer its rights and obligations to third parties without the written consent of the Organizer.

Description of the Equal Error Rate metric

Equal Error Rate (EER) is a metric used to evaluate the quality of a binary classifier. It indicates the point where the False Acceptance Rate (FAR) and False Rejection Rate (FRR) are as close as possible. A low EER shows that the system is balanced and able to minimize errors at the same time, which is quite important in the speech recognition task (to determine whether the speech is genuine or fake).

How EER is calculated

Generating thresholds:

The classifier generates scores for the positive (genuine speech) and negative (fake speech) classes.

All scores are sorted to create thresholds at which different combinations of FAR and FRR can be observed.

Calculating FAR and FRR:

False Acceptance Rate (FAR): The proportion of fake samples that are incorrectly classified as genuine at a given threshold.

False Rejection Rate (FRR): The proportion of genuine samples that are incorrectly classified as fake.

These metrics are calculated for each threshold.

Determining the EER point:

The EER is the point at which FAR = FRR

This is usually achieved by finding the threshold at which the difference between FAR and FRR is minimal, and then calculating the average of FAR and FRR at that point.

Algorithm for calculating Equal Error Rate (EER)

Input: Positive scores `pos_scores`, negative scores `neg_scores`

Output: Equal Error Rate (EER) value

1. Combining and sorting ratings:

$$all_scores = sort(pos_scores \cup neg_scores)$$

2. Calculate FRR and FAR for each threshold:

Calculate False Rejection Rate (FRR) as the proportion of positive estimates less than the threshold:

$$FRR(t) = \frac{count(pos_scores < t)}{|pos_scores|}$$

Calculate the False Acceptance Rate (FAR) as the proportion of negative ratings that are not less than the threshold:

$$FAR(t) = \frac{count(neg_scores \geq t)}{|neg_scores|}$$

3. Finding the optimal threshold:

Find the threshold t^* at which $|FRR(t) - FAR(t)|$ is minimal

4. Calculating EER:

Determine EER as the average value $EER = \frac{FRR(t^*) + FAR(t^*)}{2}$

Return value: EER