

# 山东省人工智能学会

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## 关于第十六届山东省大学生科技节第七届 山东省大学生人工智能大赛暨计算智能应 用挑战赛的通知

为促进计算智能应用领域的学术交流，推动中医药相关技术的不断发展进步，按照第十六届山东省大学生科技节的整体安排，第七届山东省大学生人工智能大赛增设计算智能应用挑战大赛活动。具体通知如下：

### 一、大赛目的

大赛旨在提升我国计算智能研究水平，引导研究人员围绕中医药领域实际需求开展中药草识别、舌象分类等技术的创新研究，促进关键算法的产业化落地、应用。

### 二、组织机构

#### 1. 主办单位：

山东省科学技术协会

山东省教育厅

共青团山东省委员会

山东省发展和改革委员会

山东省工业和信息化厅

山东省人力资源和社会保障厅

2.承办单位:

山东省人工智能学会

3.协办单位:

山东省人工智能学会计算智能专委会

山东中医药大学

山东中医药大学青岛中医药科学院

泉城省实验室

济南大学

青岛市科学技术协会

### 三、大赛内容

本次挑战赛赛题：“中草药识别”、“舌象分类”。赛题详情请见附录1：计算智能应用挑战赛赛题说明。

### 四、参赛要求

1.参赛团队：对计算智能技术或相关领域感兴趣的所有大学生、在校研究生均可报名参加，本赛事以团队形式报名。

2.指导教师：每队参与指导的教师1-2名。

### 五、报名方式

参赛选手在山东省科协（[www.sdast.org.cn](http://www.sdast.org.cn)）网站，选择大学生科技节赛事报名板块进行注册，注册成功后，在大学生科技节赛事报名板块选择赛事报名，登录注册成功的账号，点击左侧菜单栏“大学生科技节赛事服务系统”，点击“个人报名信息”，选择赛事列表中的赛事进行报名。最终报名以省科协网站报名信息为准，没有在省科协网站报名的，不

参加评审，报名无效。报名流程可以参考附录 2：山东省大学生人工智能大赛系统报名操作流程。

## 六、大赛时间安排

时间 环节 地点

2024 年 5 月 15 日前 初赛 线上

2024 年 5 月 24 日 决赛 线下-青岛府新大厦

注：比赛时间安排或有临时调整，以比赛 QQ 群（927057980）通知为准

## 七、奖项设置

本次大赛设置一等奖、二等奖、三等奖，获奖比例分别控制在决赛总团队数量的 5%、15%和 30%以内。

## 八、版权要求

- 1.参赛作品应为原创作品，无著作权争议。
- 2.参赛作品凡被认定属于抄袭、剽窃的，将取消参赛资格，已经入选的作品和个人，评委会将取消其入选资格和相关荣誉，由此产生的一切法律后果由参赛者本人承担。

## 九、联系方式

大赛 QQ 群：927057980

联 系 人：王苹苹 18222165309

程大鹏 13780924821



附录 1:

## 计算智能应用挑战赛赛题说明

### 1 活动目的

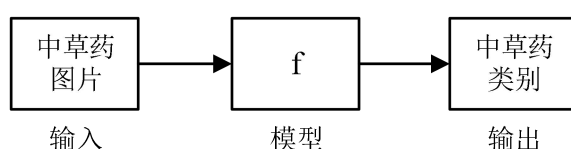
中医药是我国宝贵的资源，具有悠久的历史和丰富的文化内涵。随着智能计算的发展，利用深度学习的来解决中医药传承创新中遇到的问题是重要的发展方向。为此，计算智能应用挑战赛拟针对中医药智能化中待解决的问题展开，为中医药现代化提供技术支持。

### 2 赛题说明

#### 赛题 1：单任务学习-中草药识别

通过分析拍摄的中草药图像对中草药类别进行自动识别，提高识别的效率和准确性，为中草药的质量评估乃至推广普及提供便利。

示例：

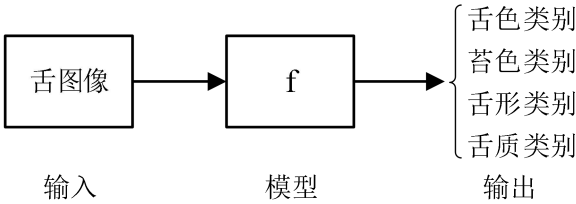


本活动提供川芎、麦冬等 10 余种中药饮片共 1257 张图像数据集及其对应的 label 文档,其中 1119 张图像用于训练,138 张用于测试。图片格式为 jpg 文件,分类 label 为 csv 文件。

#### 赛题 2：多任务学习-舌象分类

通过分析舌图像对舌色、苔色、舌形及舌质四类舌象进行识别，推进中医舌诊分析的数字化、客观化，为后续智能舌诊推广应用打下坚实基础。

示例：



本活动提供 1890 张舌图像数据集及其对应的 label 文档，其中 1680 张图像用于训练，210 张用于测试。图片格式为 jpg 文件，分类 label 为 csv 文件。

注：参赛团队可任选 1 个赛题进行参赛。

### 3 活动原则

（1）公平竞争：本活动致力于提供一个公平竞争的环境，畅通参与渠道，符合基本条件的单位均可参与。

（2）规则透明：本活动比赛规则清晰、透明，统一提供训练和测试图像，采取统一尺度量化评价，确保参与者对比赛流程有清晰的理解。

（3）专业评审：本活动设立由领域专家组成的评审团队，对参赛作品进行客观、专业的评价，并及时公布结果及评审意见，确保评审结果的权威性和可信度。

（4）环境开放：本活动鼓励开放性，即允许参赛者使用开源工具、算法和框架，形成更加有利于舌诊客观化技术发展的学术交流环境。

(5) 诚信比赛：参赛队伍不得抄袭、剽窃、篡改他人的成果，不得使用非法或不公平的手段获取数据或优势，否则将取消参赛资格和奖励。

#### 4 活动具体安排

##### (1) 数据集情况

我们提供数据集详细的使用说明和许可协议，以确保参赛团队在比赛过程中能够充分利用数据集进行算法研究和开发。

下载地址：<https://medai.sdutcm.edu.cn/rcpy/zlxz.htm>

(2) 初赛：初赛以“线上评审”的形式进行，参赛团队需选择其中一个赛题，利用训练集构建和优化模型，然后在测试集上进行预测，提交预测结果。

将算法代码、算法说明、测试结果（指标请见 6 评价方法）、测试过程（录屏）、版权转移声明等打包为一个 zip 文档，命名格式为“参赛团队名称\_赛题 1 或 2.zip”，并在 2024 年 5 月 15 日前内提交至邮箱 [sdci2024\\_comp@163.com](mailto:sdci2024_comp@163.com)，注意：邮件标题请标注“计算智能应用挑战赛-初赛”字样。

评委会根据参赛团队提交的材料对分类结果进行综合评估，包括但不限于算法的创新性、有效性、技术难度、以及对任务的理解和应用等方面。

(3) 决赛：决赛以“现场评测+答辩路演”的形式进行。活动主办方决赛当日提供测试集，参赛团队需在规定时间内提交测试结果。同时，参与排名晋级决赛的团队需提前准备答辩材料，包括答辩 PPT、参赛总结、算法核心代码、现场

演示 demo 等。评委根据选手当天的测试结果、技术思路、理论深度和现场表现等方面进行综合评分。

(4) 算法使用权要求：对于所提交的代码、算法等，比赛组织单位具有测评和使用权。

## 5 模型评测输入输出格式要求

### 5.1 输入要求

所有图像统一放入指定路径 data 文件夹内。

### 5.2 输出要求

#### 5.2.1 输出路径及命名

各参赛团队将在测试集上识别的结果输出到指定路径下，舌象多任务分类为：  
/classification/out/multi\_output.txt，中草药分类为：  
/classification/out/single\_output.txt。

## 6 评价方法

本活动分类任务测试结果以 F1macro 分数(多任务则计算每项任务 F1macro 的平均值)为主来衡量模型性能，性能评估计算公式如下：

$$F1_{macro} = \frac{1}{n} \cdot \sum^n \frac{2 \cdot (Precision_k \times Recall_k)}{Precision_k + Recall_k}$$

其中，Precision 和 Recall 分别为精度和召回率，n 为类别数。提交结果中缺少 F1macro 值或 F1macro 值计算错误的参赛队伍不计分。

## 7 比赛细则

### 7.1 比赛框架

为了确保比赛的公平性，主办方将提供统一的编程环境

和代码框架。编程环境使用基于 python 编程语言的 Pytorch 框架，代码框架包括数据加载（dataset.py）部分和测试部分（test.py），用户只需根据框架编写模型文件（model\_utils.py）和训练文件(train.py)。

下载地址：<https://medai.sdutcm.edu.cn/rcpy/zlxz.htm>

## 7.2 允许使用的 Python 库

规定参赛者可以使用的 Python 库，仅包括 torch、torchvision、torchaudio、Torchnet、torchtnt、NumPy、Scikit-learn、scipy、tensorboard、pandas、Pillow、pip、matplotlib 等。禁止使用任何第三方分类或分割结果，所有工作需要在赛期内独立完成，否则取消比赛资格。

## 7.3 模板构成

主办方提供一个完整的代码模板，包括数据加载、模型训练、评估等基础流程，参赛者须在规定的文件夹内编写代码，不得修改模板的基础结构。各框架具体要求如下：

① dataset.py 为一个完整的数据加载文件，参赛者不能对其做任何更改，只允许调用，否则取消成绩。

② model\_utils.py 为模型文件，主办方只给出了可以调用的库，参赛者可以根据实际设计的模型进行调用，严禁添加/修改库，否则取消成绩。

③ train.py 为训练文件，参赛者可以根据数据读取、模型设计、训练方式等进行综合编写，注意模型最优参数的保存和调用方式（README.md 已说明）。

④ test.py 文件为一个完整的测试文件，参赛者只可修

改四部分内容测试模型（脚本中已明确说明），严禁修改其他未说明部分；在评分过程中，主办方会使用该文件对所有参赛者做出统一标准的评分。

模板具体使用方式已在 README.md 文档中说明，请自行查阅。

## 计算智能应用挑战赛通知（英文版）

# **Notice Regarding the 16th Shandong Province College Student Science and Technology Festival, the 7th Shandong Province College Student Artificial Intelligence Competition, and Computational Intelligence Application Competition**

To promote academic exchanges in the field of computational intelligence applications and to advance the continuous development of traditional Chinese medicine-related technologies, in accordance with the overall arrangement of the 16th Shandong Province College Student Science and Technology Festival, the 7th Shandong Province College Student Artificial Intelligence Competition will include a Computational Intelligence Application Competition. The specific notice is as follows:

### **I. Purpose of the Competition**

The purpose of the competition is to enhance the research level of computational intelligence in China, guiding researchers to conduct innovative research on technologies such as traditional Chinese medicine herb identification and tongue image classification around the actual needs of traditional Chinese medicine. This aims to promote the industrialization and application of key algorithms.

### **II. Organizational Structure**

#### **1. Host Organization:**

Shandong Association for Science and Technology

Education Department of Shandong Province

Shandong Provincial Committee of the Communist Youth League

Shandong Development and Reform Commission

Department of Industry and Information Technology of Shandong Province

Human Resources and Social Security Department of Shandong Province

## 2. Organizing Committee:

ShanDong Association of Artificial Intelligence

## 3. Co-organizer

Shandong Province Artificial Intelligence Society Computational Intelligence  
Special Committee

Shandong University of Traditional Chinese Medicine

Qingdao Academy of Chinese Medical Sciences, Shandong University of  
Traditional Chinese Medicine

Quan Cheng Laboratory

University of Jinan

Qingdao Association for Science and Technology

## III. Competition Contents

The themes for this challenge are "Herb Identification" and "Tongue Image Classification." For more details on the competition topics, please refer to Appendix 1: Explanation of the Challenge Topics for Computational Intelligence Applications.

## IV. Participation Requirements

1. Participating Teams: All college students and graduate students interested in computational intelligence technology or related fields are eligible to participate. Registration for this competition is in the form of teams.

2. Supervising Teachers: Each team can have 1-2 supervising teachers.

## V. Registration Method

Participants can register for the competition through the registration section of the College Student Science and Technology Festival on the website of the Shandong Provincial Association for Science and Technology ([www.sdast.org.cn](http://www.sdast.org.cn)). After successful registration, participants can select the competition registration section in the College Student Science and Technology Festival on the website, log in with their registered account, click on the "Student Science and Technology Festival Event Service System" in the left menu, select "Personal Registration Information," and choose the competition from the list to register. The final registration is based on the registration information on the website of the Provincial Association for Science and

Technology. Participants who have not registered on the website of the Provincial Association for Science and Technology will not participate in the evaluation, and their registration will be invalid. For registration procedures, please refer to Appendix 2: Registration Operation Process for the Shandong Province College Student Artificial Intelligence Competition System

## **VI. Competition Schedule**

Time	Stage	Location
Before May 15, 2024	Preliminary Competition	Online
May 24, 2024	Finals	Offline - Qingdao Fu Xin Building

Note: The competition schedule may be subject to temporary adjustments. Please refer to the competition QQ group (927057980) for notifications.

## **VII. Awards Setting**

In this competition, there will be first prize, second prize, and third prize categories. The proportion of awards will be controlled within 5%, 15%, and 30% of the total number of teams in the finals, respectively.

## **VIII. Copyright Requirements**

- 1.The entries must be original works with no copyright disputes.
2. For entries identified as plagiarism or infringement, the eligibility for evaluation will be revoked. Selected works and individuals will have their selection status and related honors revoked by the judging committee. Any legal consequences arising from this will be borne by the participants themselves.

## **IX. Contact Information**

Competition QQ Group: 927057980

Contact Person: Wang Pingping +8618222165309

Cheng Dapeng +8613780924821

ShanDong Association of Artificial Intelligence

April 1, 2024

## Appendix 1:

# Challenge Explanation of the Computational Intelligence Application Competition

## 1 Purpose of the Event

Traditional Chinese medicine (TCM) is a valuable resource in China, with a long history and rich cultural significance. With the development of artificial intelligence, utilizing deep learning to address the challenges encountered in the inheritance and innovation of TCM is an important direction for development. Therefore, the Computational Intelligence Applications Competition aims to address the unresolved issues in the intelligentization of TCM, providing technical support for the modernization of traditional Chinese medicine.

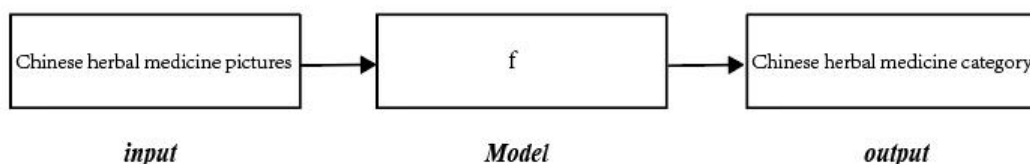
## 2 The Competition Topic Explanation

### Competition Topic 1:

#### Single-Task Learning - Chinese Herbal Medicine Identification

Automatically identify the categories of Chinese herbal medicine through the analysis of captured images, aiming to enhance the efficiency and accuracy of identification. This facilitates the quality assessment, promotion, and popularization of Chinese herbal medicine.

Example:



This event provides a dataset of over 1257 images of more than 10 types of Chinese herbal medicine, including Chuanxiong and Maidong, along with their corresponding label documents. Among these, 1119 images are allocated for training purposes, while 138 images are designated for testing. The image format is JPG, and

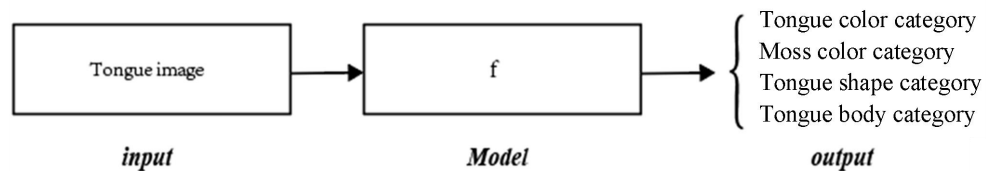
the classification labels are stored in CSV files.

## Competition Topic 2:

### Multi-Task Learning - Tongue Image Classification

By analyzing tongue images, identify four categories of tongue features: tongue color, coating color, tongue shape, and tongue body. This advancement aims to digitize and objectify traditional Chinese tongue diagnosis analysis, laying a solid foundation for the subsequent promotion and application of intelligent tongue diagnosis.

Example:



This event provides a dataset of 1890 tongue images along with their corresponding label documents. Among these, 1680 images are allocated for training purposes, while 210 images are designated for testing. The image format is JPG, and the classification labels are stored in CSV files.

**Note: Participating teams can choose one of the competition topics for entry.**

### 3 Principles of the Event

(1) Fair Competition: This event is committed to providing a fair competitive environment, ensuring open participation channels where eligible entities can take part.

(2) Transparent Rules: The rules of this event are clear and transparent, with standardized training and testing image provision, and unified quantitative evaluation metrics, ensuring that participants have a clear understanding of the competition process.

(3) Professional Evaluation: This event establishes a judging panel composed of domain experts to provide objective and professional evaluations of the entries. The results and feedback from the judging panel are promptly announced to ensure the

authority and credibility of the evaluation results.

(4) Open Environment: This event encourages openness, allowing participants to use open-source tools, algorithms, and frameworks, fostering an academic exchange environment conducive to the development of objective tongue diagnosis technology.

(5) Integrity competition: Participating teams are not allowed to plagiarize, tamper with other people's results, or use illegal or unfair means to obtain data or advantages. Otherwise, their qualifications and rewards will be cancelled.

#### **4 Detailed arrangements for activities**

##### **(1) Data set situation**

We provide detailed usage instructions and license agreements for the data set to ensure that participating teams can fully utilize the data set for algorithm research and development during the competition.

download link: <https://medai.sdutcm.edu.cn/rcpy/zlxz.htm>

(2) Preliminary competition: The preliminary competition is conducted in the form of "online review". The participating teams need to choose one of the competition questions, use the training set to build and optimize the model, and then make predictions on the test set and submit the prediction results.

Pack the algorithm code, algorithm description, test results (see 6 Evaluation Methods for indicators), test process (screen recording), copyright transfer statement, etc. into a zip file with the naming format of "Participating Team Name\_Contest Question 1 or 2.zip " and submit it to the email [sdci2024\\_comp@163.com](mailto:sdci2024_comp@163.com) before May 15, 2024. Note: Please mark the title of the email with the words "Computing Intelligence Application Challenge-Preliminary Round".

The judging panel will conduct a comprehensive evaluation of the classification results based on the materials submitted by the participating teams, including but not limited to the innovation, effectiveness, technical difficulty of the algorithm, and understanding and application of the task.

(3) Final competition: The final will be held in the form of "on-site evaluation + defense road show". The event organizer will provide a test set on the day of the finals, and participating teams must submit test results within the specified time. At the same

time, teams participating in the rankings and advancing to the finals need to prepare defense materials in advance, including defense PPT, competition summary, algorithm core code, on-site demonstration demo, etc. The judges will make a comprehensive score based on the contestants' test results, technical ideas, theoretical depth, and on-site performance on the day.

(4) Requirements for the right to use algorithms: The competition organizing unit has the right to evaluate and use the submitted codes, algorithms, etc.

## **5 Model evaluation input and output format requirements**

### **5.1 Input requirements**

All images are placed in the data folder of the specified path.

### **5.2 Output requirements**

#### **5.2.1 Output path and naming**

Each participating team will output the results recognized on the test set to the specified path. The tongue image multi-task classification is: /classification/out/multi\_output.txt, and the Chinese herbal medicine classification is: /classification/out/single\_output.txt.

## **6 Evaluation methods**

The test results of the classification task of this activity are mainly based on the F1macro score (for multi-tasking, the average  $F1_{macro}$  of each task is calculated) to measure the model performance. The performance evaluation calculation formula is as follows:

$$F1_{macro} = \frac{1}{n} \cdot \sum_{k=1}^n \frac{2 \cdot (Precision_k \times Recall_k)}{Precision_k + Recall_k}$$

Among them, Precision and Recall are precision and recall rate respectively, and n is the number of categories. Teams whose  $F1_{macro}$  value is missing from their submitted results or whose  $F1_{macro}$  value is calculated incorrectly will not be scored.

## **7 Competition rules**

### **7.1 Competition Framework**

In order to ensure the fairness of the competition, the organizer will provide a unified programming environment and code framework. The programming environment uses the Pytorch framework based on the Python programming language. The code framework includes a data loading (dataset.py) part and a testing part (test.py). Users only need to write the model file (model\_utils.py) and training file (train.py) according to the framework. py).

download link: <https://medai.sdutcm.edu.cn/rcpy/zlxz.htm>

### **7.2 Allowed Python libraries**

It is stipulated that the Python libraries that contestants can use include only torch, torchvision, torchaudio, Torchnet, torchnt, NumPy, Scikit-learn, scipy, tensorboard, pandas, Pillow, pip, matplotlib, etc. It is prohibited to use any third party to classify or segment results. All work must be completed independently during the competition period, otherwise the competition will be disqualified.

### **7.3 Template composition**

The organizer provides a complete code template, including basic processes such as data loading, model training, and evaluation. Participants must write code in the specified folder and are not allowed to modify the basic structure of the template. The specific requirements of each framework are as follows:

① dataset.py is a complete data loading file. Participants cannot make any changes to it and are only allowed to call it, otherwise the results will be cancelled.

② model\_utils.py is a model file. The organizer only provides libraries that can be called. Contestants can call them based on the actual designed model. Adding/modifying libraries is strictly prohibited, otherwise the results will be cancelled.

③ train.py is a training file. Participants can comprehensively compile it based on data reading, model design, training methods, etc. Pay attention to the saving and

calling method of the optimal parameters of the model (README.md has explained).

④ The test.py file is a complete test file. Participants can only modify four parts of the test model (clearly stated in the script). Modification of other unspecified parts is strictly prohibited; during the scoring process, the organizer will use this file to evaluate all test models. Competitors make unified standard scores.

The specific usage of the template has been explained in the README.md document, please check it yourself.