

## Isfahan Artificial Intelligent 2023 Competitions

The first Isfahan Artificial Intelligence (IAI) event<sup>[1]</sup> was held in conjunction to the fifth ceremony of the Mustafa Science and Technology Prize,<sup>[2]</sup> from October 7, 2023, to October 12, 2023, in Isfahan. The artificial intelligence (AI)

exhibition, AI Forum, AI Investment Event, AI Student Meeting, and AI Competitions were the 5 main parts of this event in 2023 [Figure 1] and the Isfahan Elite Foundation was the main organizer of IAI 2023.



Figure 1: Posters of several events in Isfahan Artificial Intelligence 2023

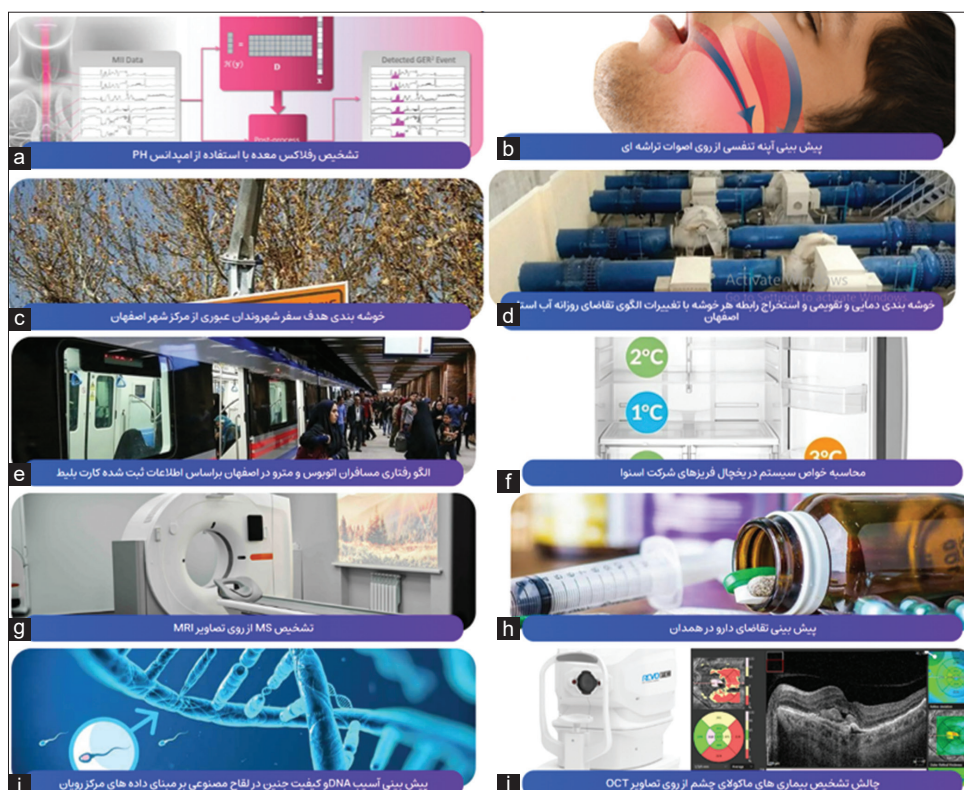


Figure 2: The titles of challenges in Isfahan Artificial Intelligence 2023, (a) Challenge I: Diagnosing gastric reflux using PH impedance, (b) Challenge II: Predicting sleep apnea from tracheal sounds, (c) Challenge III: Clustering the purpose of travel of citizens passing through the center of Isfahan city and predicting the number of traffic in the future according to cameras, (d) Challenge IV: Temperature and calendar clustering and extraction of the relationship between each cluster and changes in the daily water demand pattern of Isfahan Province, (e) Challenge V: The behavioral pattern of bus and subway passengers in Isfahan based on the information recorded on the ticket card, (f) Challenge VI: Calculation of system properties in refrigerators and freezers of Snova company, (g) Challenge VII: Diagnosing multiple sclerosis from magnetic resonance imaging Images, (h) Challenge VIII: Forecasting drug demand in the Hamadan county, (i) Challenge IX: Predicting sperm DNA damage and embryo quality in artificial insemination (based on available data from the Royan Center), (j) Challenge X: Macular pathology detection

The first IAI Competitions launched in August of 2023 and started off with over 100 registered teams composed of university faculty members, students, knowledge-based companies, and tech startups to compete in 10 real-world challenges – All using AI to tackle challenges based on the provided real data [Figure 2, the title of challenges are listed in the caption of this figure].

Over a 4-month period [according to the provided timeline in Figure 3], these teams utilized their AI tools based on training data and presented their initial results by test data for evaluation by technical committees of each challenge. Each team had to submit the following materials for evaluation by the related technical committees:

- An output file relevant to the specific challenge
- The developed code to solve the challenge along with an executable script
- A technical description file of the proposed solution in a defined format

- A 5-min video explaining the code and execution.

According to the technical committees' assessments, 17 teams from 6 challenges (challenge I: 4 teams, challenge V: 3 teams, challenge VII: 3 teams, challenge VIII: 2 teams, challenge IX: 2 teams, challenge X: 3 teams) were selected to present their results and achievements in the final round of competitions which was held in-person in the Abbasi Hotel on February 1 [Figure 4], 2024, and the competitions' steering committee ranked all 17 teams based on the following criteria:

- Technical contribution in their developed models,
- Their results on initial and final test data,
- Their submitted report and teams' presentations.

Ultimately, two teams were awarded first and second place, and three teams received honorable mentions and received 3000 USD, 2000 USD, and 1000 USD prizes, respectively.

The goal of IAI competitions was to take a step toward further developing AI-based technologies for real-world problems,



Figure 3: Timeline of Isfahan Artificial Intelligence 2023 competitions



Figure 4: Several photos from the closing ceremony of Isfahan Artificial Intelligence 2023 competitions

increase the use of data in technical and management decision-making, and strengthen innovative businesses and AI-based technology. The January 2025 and February 2025 issues of JMSS have been dedicated to the results of final rounds of IAI 2023 competitions in the challenges: macular pathology detection (Challenge X), drug demand forecasting (Challenge IIX), reflux detection (Challenge I), and lesion segmentation/localization in magnetic resonance imaging images of patients with multiple sclerosis (Challenge VII). Some dataset of these challenges are available in<sup>[3]</sup> and the reports of 17 final teams are available in.<sup>[2]</sup>

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