ARC Prize and ARC-AGI: Advancing Towards Artificial General Intelligence

What Is ARC-AGI?

A Benchmark for Measuring Progress Towards AGI

ARC-AGI is a benchmark designed to test general intelligence in AI systems. It evaluates an AI’s ability to acquire new skills and adapt to novel tasks it hasn’t seen before.

François Chollet's Vision

François Chollet, creator of Keras and AI Researcher at Google, introduced ARC-AGI in his influential 2019 paper "On the Measure of Intelligence," aiming to evaluate AI's general intelligence.

> *“The intelligence of a system is a measure of its skill-acquisition over a scope of tasks, with respect to priors, experience, and generalization difficulty.”*

— François Chollet, “On the Measure of Intelligence”

Redefining Intelligence

Intelligence isn’t just performing tasks; it’s about efficiently acquiring new skills outside of prior training. AGI must adapt to new environments and challenges unpredictably.

Why Traditional Metrics Fall Short

- Depend on extensive prior knowledge
- Bias from unlimited training data
- Lack true generalization measurement
- Mask actual intelligence capabilities

Abstraction and Reasoning Corpus (ARC-AGI)

ARC-AGI is a collection of unique tasks designed to test an AI’s ability to generalize using minimal prior knowledge, mirroring human cognitive abilities.

Unique Training and Evaluation Tasks

Tasks consist of input-output pairs using grid-based puzzles. Grids vary in size from 1×1 to 30×30, with squares of different colors. AI must infer the transformation rules.

An ARC-AGI Task Breakdown

- **Input**: A grid with colored squares
- **Output**: Transformed grid based on a hidden rule
- **Challenge**: Infer the rule and apply it to new inputs

The Priors Humans Have

- **Objectness**: Objects persist over time
- **Goal-Directedness**: Objects may have intentions
- **Numbers & Counting**: Quantify objects
- **Basic Geometry**: Understand shapes and spaces

1. Objectness

- Objects are discrete entities
- Persist continuously over time
- Don’t appear or vanish without cause
- Interact based on circumstances

2. Goal-Directedness

Some objects act as agents with intentions, pursuing goals that influence their behavior. Recognizing this helps predict and understand actions.

3. Numbers & Counting

- Count and order objects
- Use basic arithmetic
- Quantify based on appearance or movement

4. Basic Geometry & Topology

Understanding shapes, patterns, and spatial relationships is fundamental. This includes recognizing transformations like rotation and mirroring.

Creating a Fair Comparison

- AI lacks inherent priors
- Relies on data and algorithms

- Humans have innate understanding
- Possess core knowledge from birth

A Stepping Stone Towards AGI

Solving ARC-AGI would signify a major advancement in AI, leading to systems capable of learning new tasks efficiently, much like humans.

Programming by Example

Achieving ARC-AGI could enable creating programs through input-output examples without coding expertise, democratizing programming and automation.

ARC-AGI Tasks and Data

- Tasks have input-output pairs
- Grids represented as JSON arrays
- Success is pixel-perfect outputs

Tips for Contestants

- Focus on skill acquisition
- Embrace hybrid methods
- Start small and scale up
- Draw inspiration from cognition
- Aim for generalizable abstractions
- Welcome new ideas

Code Submission Guidelines

- Submit through Kaggle notebooks
- Follow evaluation instructions
- Adhere to code requirements

$600,000 for 85% Accuracy

Achieve 85% accuracy on ARC-AGI to win the grand prize, marking significant progress towards AGI.

How Your Solution Is Evaluated

- Correct predictions on private test set
- Two attempts per test input
- Final score is average correct over total tasks

Code Requirements

- No internet during submission
- Hardware limitations
- Runtime limits (up to 12 hours)

Submitting a Paper

Write a paper to accompany code submissions; outline key sections like abstract, methodology, and results. Paper Awards recognize significant contributions.

Forming a Team

Teamwork enhances problem-solving. Consider collaborating to combine diverse skills and tackle ARC-AGI challenges effectively.

Thank You

We appreciate your time and interest. Let’s make history together by advancing towards AGI.