

**REAL**

Reimagining  
algorithmic  
futures

**REAL** (REImagining ALgorithmic futures) is a card deck designed to inspire and provoke thinking about algorithmic systems and how they shape human lives, society, and potential futures. The deck is built around a series of keywords: threshold, steering, codability, replacement, responsibility, repair, and friction. These keywords are developed on the basis of cutting-edge research on human values and societal aspects of algorithmic systems.

Each keyword has a set of nine cards associated with it. One of these is the title card, which features the keyword and its definition. The remaining eight cards feature specific questions. The questions are designed to prompt reflection and discussion about features of algorithmic systems. They aim to stimulate thinking and conversations about the values embedded in algorithmic systems, as well as their social and technological implica-

tions. The goal is to advocate for a more inclusive dialogue concerning varied algorithmic futures.

The REAL card deck can be used by experts, developers, analysts, consultants, students, and researchers. The questions on the cards are designed to work with a specific case or example of an algorithmic system. There is no right or wrong way to use the cards – similarly to Tarot cards. They can be used in group interaction and workshops focused on understanding, analysing, and designing algorithmic systems. When used individually, the cards can aid in refining findings concerning algorithmic systems or thinking through their potential futures. The questions on the cards can help focus fieldwork observations and interviews, and they can be used as prompts to discuss existing algorithmic systems, or ones that are being developed.

# Suggestions for using the **REAL** card deck

## **Engaging with the cards collaboratively**

### **Discovery mode:**

Set the title cards aside for easy reference, then draw two or three question cards from the remaining deck at random and place them on the table in front of you. First, discuss how the keyword(s) represented by those question cards relate to the algorithmic system (and each other). Then discuss what the questions reveal about the algorithmic system. When you are ready to continue, draw an additional question card. What does it add to the setting? You can move the cards around, relate them to one another, and keep adding new cards. If you are not happy with a card you draw, replace it by drawing a new one. If you feel the discussion is exhausted, set the cards aside and draw a new set.

### **Comparative analysis:**

Each participant chooses a keyword that resonates with the algorithmic system they have worked on. Pull out all the cards for one of the keywords. Each participant discusses how the questions on these cards intersect with their knowledge of the algorithmic system. Then, ask what common patterns or themes emerge across the cases? Where can you spot differences? Repeat for the other keywords. This analytical process will strengthen comparisons between cases and help in drawing conclusions about specific cases.

### **Future thinking:**

Engage with the keywords to envision potential futures related to algorithmic systems. Use the questions for the keywords to contemplate and discuss how the specific features of algorithmic systems might evolve over time. What implications do the questions hold for the development of al-

gorithms, and how can they inform your work or research moving forward? What alternative futures can be imagined with the keywords? You can also think beyond the keywords: What limitations might they present?

## Engaging with the cards alone

### **Refine your approach:**

Pick a keyword that you want to think with, then pull out its question cards and use them to refine and expand your questions, aims, or expectations. What new angles can you suggest and explore? Alternatively, draw one or more cards randomly from the deck to find new perspectives or connections between different aspects of the algorithmic system.

### **Focused exploration:**

Select one or more keywords to focus on specific aspects of an algorithmic system. Reflect on the insights gained through the questions posed in the cards and consider how they apply to your project or area of research. Alternatively, you can pick two or more cards and think about the relations

between different aspects of the algorithmic system in question.

### **Analysis:**

Think about how the keywords intersect with your existing knowledge of the algorithmic system. What patterns or themes emerge? How do the insights challenge or affirm your previous understanding? This analytical process will strengthen your analysis and help in drawing your own conclusions.

# Practical suggestions

**There is no fixed way** to use the cards, but for inspiration, here is an example of how to work with the collaborative 'Discovery Mode':

**Consider setting aside** a two-hour time slot. Participant numbers can vary, but you will need a space that allows working in small groups. Have paper, pens, and markers available for participants who wish to write down reflections that come up as they go through the session.

As the cards are designed to work with a specific algorithmic system, each participant should have a case in mind. This might come from their work or research. With students or for other training or education purposes, you might offer one or more case descriptions to the participants beforehand.

**Begin by seating** your participants around a table or tables, either in pairs or small

groups. Place a deck of cards in front of each group. Have them set the title cards aside for easy referencing. Then have them draw two or three question cards at random.

**The design of the cards** allows for flexibility, letting participants choose how they engage with the questions. Allow the cards to steer the participants. The participants can move the cards around, relate them to one another, and so on. Once ready to continue, participants can draw more cards from the deck and either add them alongside existing cards or start a new discussion. If they don't find one card productive, they can replace it with a new one. Previously discussed cards can either be kept close by or put in the discard pile. This process can be repeated until the allocated time is up.

**If there are several pairs** or small groups that go through this process, consider al-

locating some time at the end for a larger group discussion to share reflections.

**Utilising the REAL cards** in both individual and group settings enhances creativity, collaboration, and strategic thought in the realm of algorithmic system design and analysis.

**A printable version** of the card deck, alongside any updates and additional material, can be found online: <https://doi.org/10.6084/m9.figshare.29222054>



# Keyword descriptions

## **Threshold**

*A limit or boundary that triggers a response or an action from the system.*

### **Definition:**

Threshold is a numeric or binary value in a system that, when surpassed, causes a response in the system. Thresholds are part of the system's features but reflect the aims and interests of the system's stakeholders.

### **Example:**

A smart building operates the shading system, including mechanical blinds by measuring the amount of sunlight. If the sun is strong, and the amount of light is above a set threshold, the shades close. If there are clouds, the shades open, letting in more light. The system aims to flexibly accommodate the inhabitants of the building by adjusting shades for them. But this raises questions about what the correct

threshold should be for everyone involved and about situations which straddle this on/off binary.

## Steering

*When the system guides users and users towards specific goals.*

### **Definition:**

Steering in algorithmic systems refers to the capability of a system to guide people or processes toward set targets or desired outcomes. Steering can manifest in various settings and forms of automated guidance, including tools, recommendations, nudges, and prompts. It can be a feature of a broader information system or a specific application.

### **Example:**

Health and fitness apps provide personalised recommendations for daily calorie

intake, exercise routines, and reminders to stay active based on personal data and goals. By tracking progress and offering motivational feedback, the app aims to steer people towards healthier habits and fitness objectives. But what happens when people take these goals too seriously, or try to game the metrics?

## Codability

*Whether a phenomenon, behaviour, process, or experience can be translated into code or not.*

### **Definition:**

Codability serves as a measure of how well a phenomenon can be translated into code or digital data, essential for algorithmic systems. While some phenomena are straightforward to encode, many others are not so due to their complexity and elusiveness. Something tends to get left out when

human phenomena are translated into numbers and data points.

**Example:**

Chatbots respond to customer queries based on natural language processing and machine learning. They can be programmed to detect and respond to emotions based on the language used in messages. However, the full depth of human emotional experience, including non-verbal cues and societal norms, is difficult to nail down in language alone.

## Replacement

*The process by which technologies are seen to replace human labour or methods.*

**Definition:**

Algorithmic systems are often positioned as taking over tasks performed by humans, or aspects of their expertise. This might

involve small supportive parts of the work that algorithmic systems perform alongside humans, or the replacement of human workers or expertise with automation.

**Example:**

Caseworkers in child protection are given a new tool that employs AI to predict future harms faced by clients. At first sight, the tool appears well-suited for child protection, because the assessment of clients' future safety and risk is an integral part of casework. But which aspects of human expertise does the tool replace? Does it help caseworkers with the assessments they make, or replace assessment practices with new ones?

## Responsibility

*Who is in charge of or accountable for the system's outcomes.*

### Definition:

When algorithmic systems participate in decisions alongside humans or make decisions automatically, it might be unclear who or what is ultimately responsible for the outcomes and can be held accountable. The system itself, its users, its developers, and the curators of the data the system uses can all be seen as contributing to model decisions.

### Example:

An algorithmic system in cancer screening identifies low risk of cancer. A radiologist comes to the same conclusion. At a later stage, cancer develops. This raises the question of who is responsible for the initial conclusion: the doctor, the healthcare organisation, or the technology company that developed the algorithmic system?

## Repair

*When something in the system doesn't work as expected, it requires repair.*

### Definition:

Repair refers to the processes and mechanisms that identify and resolve issues arising when algorithmic systems do not perform as expected. This can encompass failures in functionality or unmet expectations. The goal of repair is to restore the system to its intended operational state or readjust its aims.

### Example:

A new university system for logging work-related travel failed to acknowledge researchers with urgent travel patterns. These researchers used to have permanent travel permits, which were no longer included in the new system. Their needs required adding additional travel options into the system, but this raises questions

about how personalised the system should be and when exceptions become something to be fixed.

## Friction

*Describes resistance or tension arising in encounters of diverse interests, aims, or qualities.*

### **Definition:**

Friction in algorithmic systems refers to the resistance or tension that emerges when different stakeholders, including citizens, experts, developers, organisations, and regulatory bodies, have diverse interests, aims, or qualities that may rub against each other. This friction can manifest in various forms, including usability issues, operational inefficiencies, and value clashes, but friction can also be productive in pointing out interactions and system features that call for improvement.

### **Example:**

Patients and healthcare professionals may experience friction when an algorithmic system's recommendations on care conflict with local clinical judgement and expertise. This situation creates uncertainty and awkwardness for both patients and doctors, but it might also point to ways to improve clinical practice.

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