EXPLORING AI

by Gaelen Hadlett

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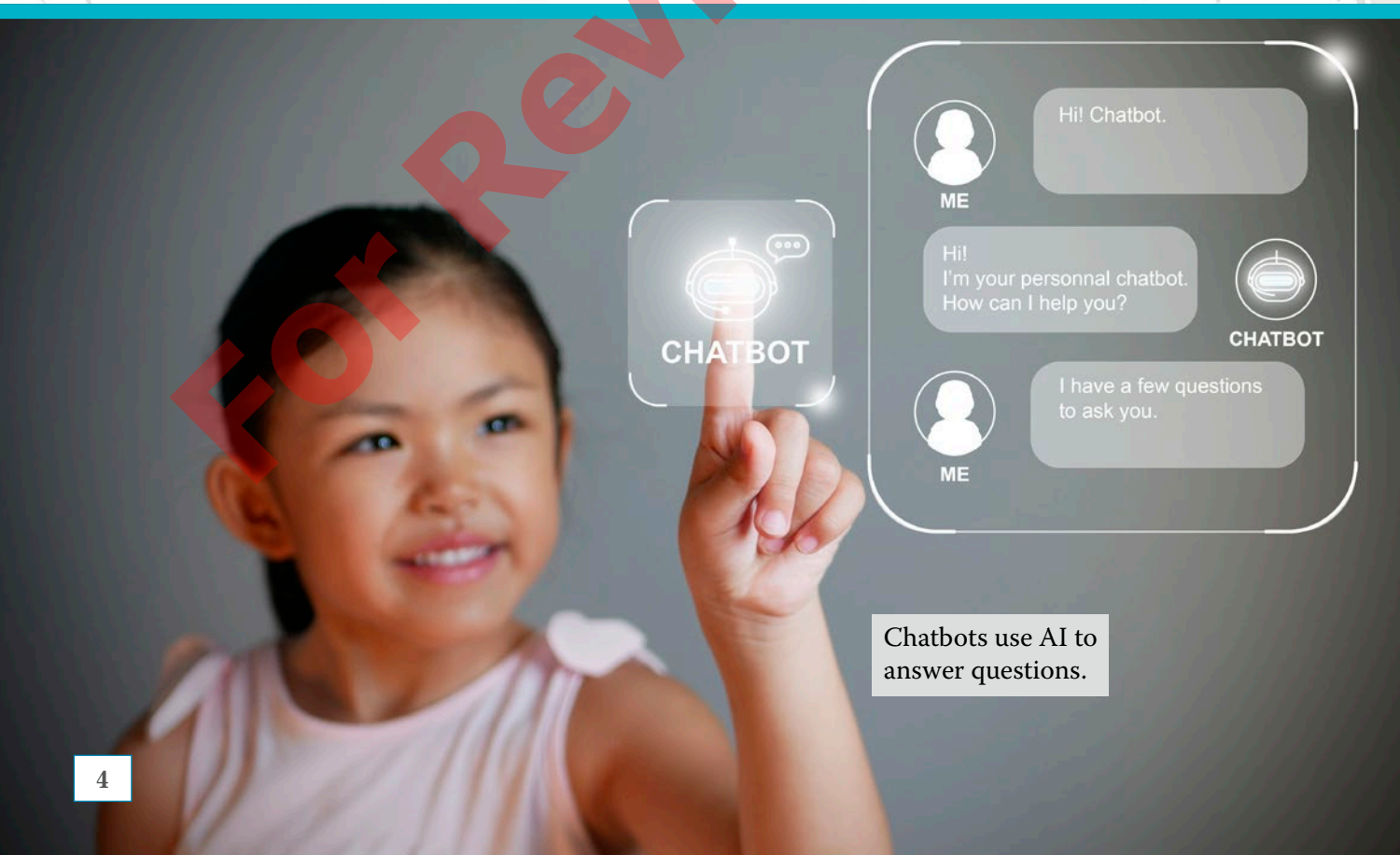
Words in **BOLD** are in the glossary.

INTRODUCTION

All About AI

Recognizing faces of wild animals. Detecting early signs of cancer. Identifying ancient artifacts. Artificial intelligence (AI) can do amazing things.

AI is the ability of a computer to "think" like a human. Computers with AI can solve problems on their own. New discoveries are being made every day by people working to develop AI. AI doesn't just exist in a computer lab, though. You have probably interacted with **virtual assistants**, **chatbots**, and other AI on phones and video games. What are some of the other ways AI helps people? How did this AI develop, and who are the humans responsible for making it?



Chatbots use AI to answer questions.

AI tools can recognize faces to unlock cellphones.

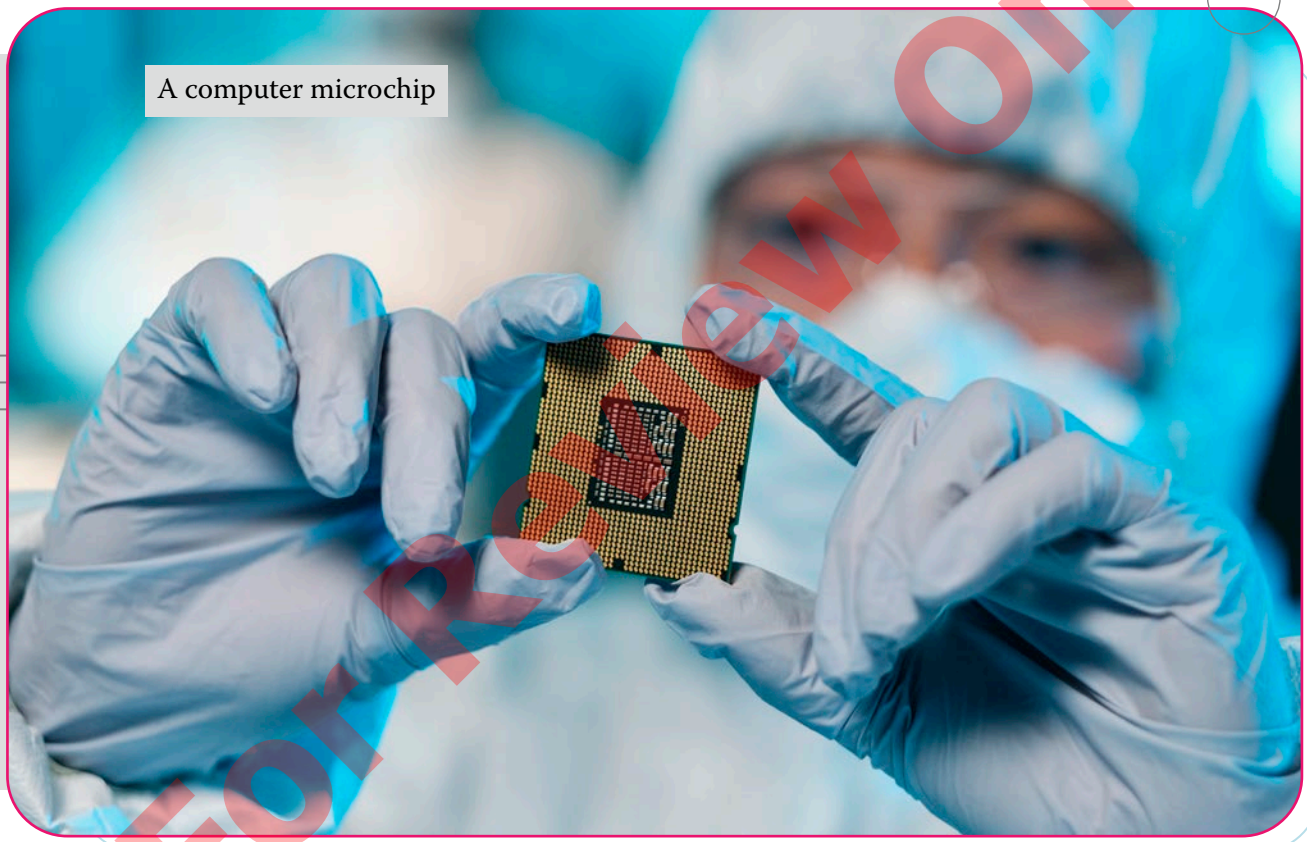
Thinking Machines

Artificial intelligence isn't a new idea. Long before computers were invented, both the ancient Greeks and Chinese created automata. These kinds of machines have moving parts that operate on their own, like a cuckoo clock. People at the time wondered if these machines could think.

In 1950, computer scientist Alan Turing came up with a test to help decide if a computer was intelligent. His test was simple. An interviewer, a person, and a computer program—each in a different room—would all chat through text on a screen. If the interviewer could not tell which of the two other participants was a computer, then the computer passed. Passing the test meant the computer was "thinking" like a human. No computers could pass Turing's test.

Dreaming of AI

Scientists long dreamed about the creation of AI. An early success was ELIZA, a chatbot created by Joseph Weizenbaum at Massachusetts Institute of Technology (MIT) from 1964 to 1966. ELIZA was designed to act like a therapist. It would respond to every statement made by a human user by asking a question about the human's previous statement. At the time, many people were impressed with this early AI.



A computer microchip

Scientists hoped for more AI advancements in the 1970s and 1980s. But computer hardware wasn't yet up to the task. Computer processors—microchips that run the instructions of computer programs—were not fast enough. The mathematical formulas were not advanced enough either.

While **computer engineers** built faster and more advanced computer hardware, researchers and designers worked on developing new computer programs. By working together and not giving up, they brought about the AI we have today. It can find tumors, listen to whales, measure pollution, and so much more!

People worked together to develop the hardware and software needed for AI.

CHAPTER 1

AI Helps People

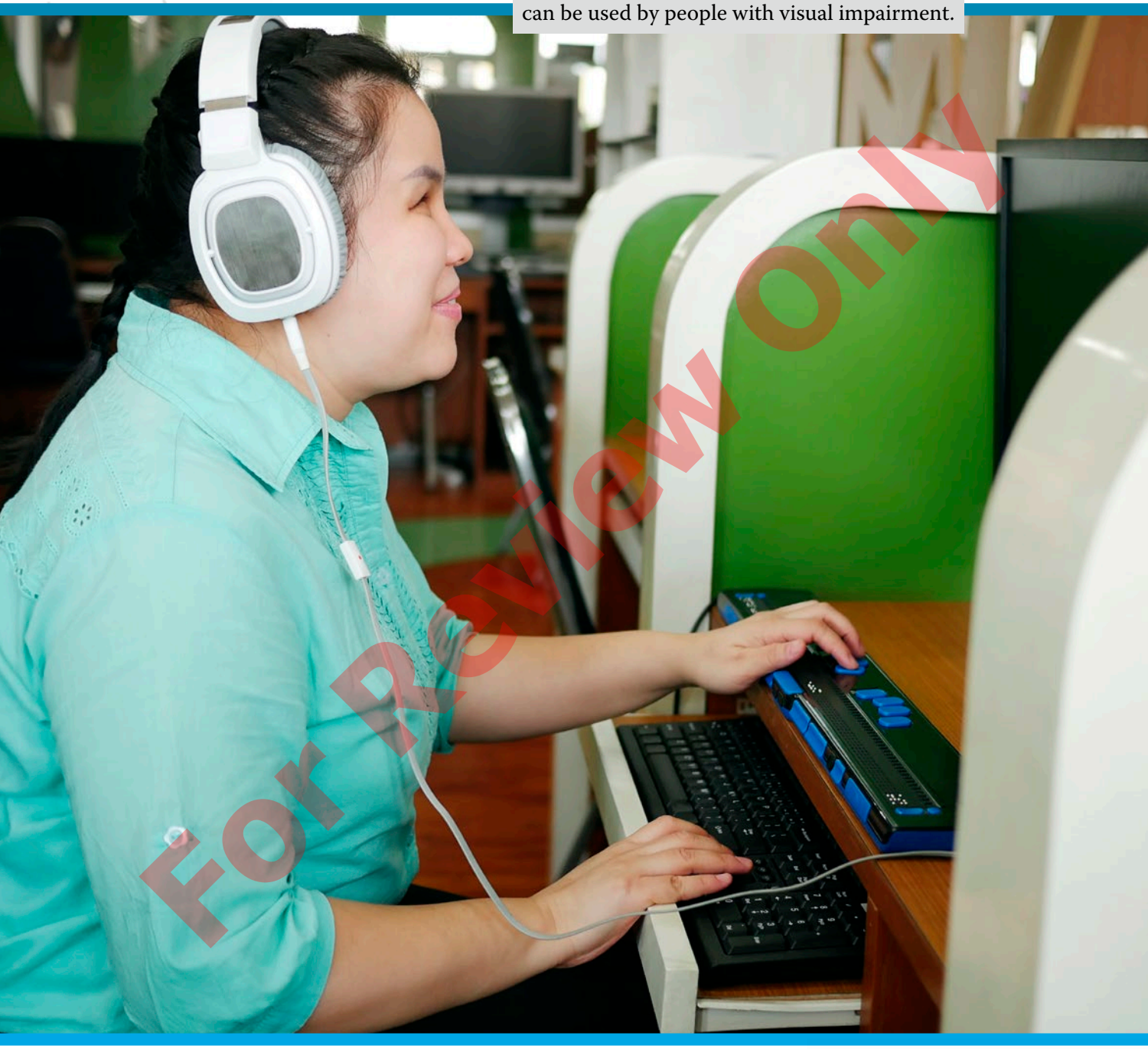
Artificial intelligence is a tool. AI can **analyze** certain situations much faster than humans. Let's take a close look at AI tools developed to help people in two important ways.

AI Describes What's on the Screen

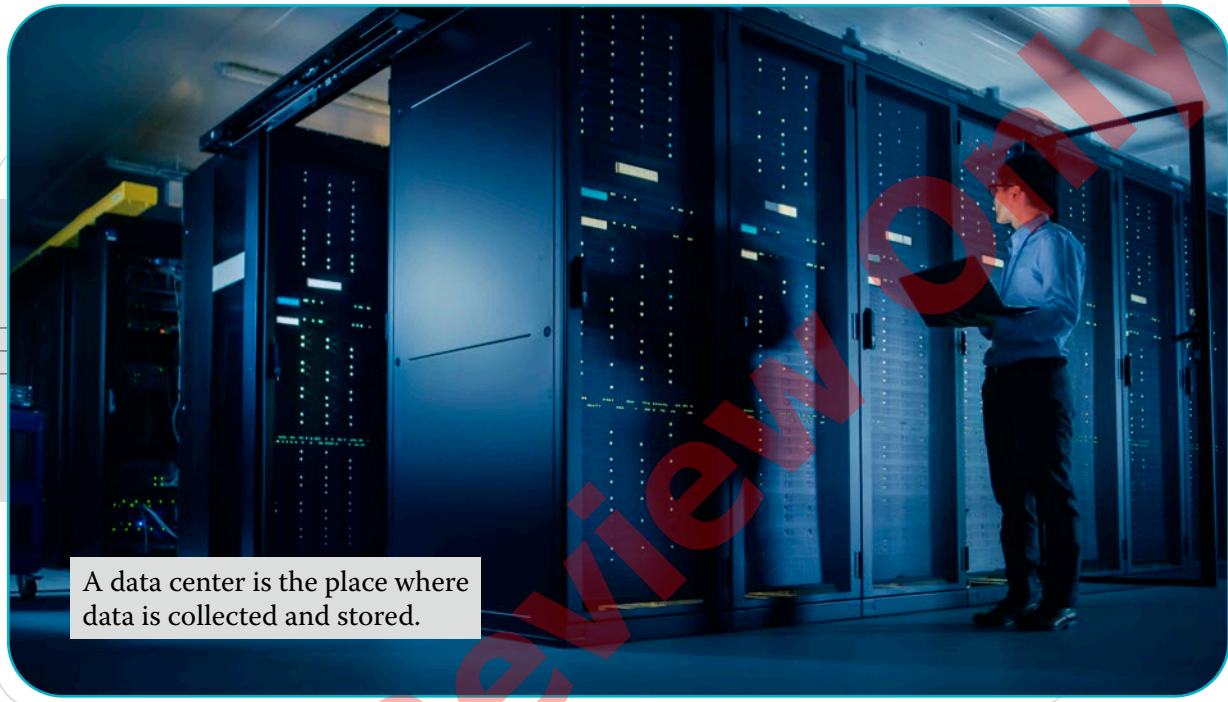
AI can help people who are **visually impaired** know what is being shown on a screen. Ideally, all digital pictures or videos would include a text description that could be read out loud by a computer. Unfortunately, a lot of digital media available today does not include descriptions. AI is changing that.

AI designers create tools that **generate** a text description of a photo or clip of video. The text can then be used by a computer program called a screen reader to read the text out loud. Instead of needing a human to describe digital images, the AI can describe the content.

An AI tool that describes images on a screen can be used by people with visual impairment.



Developing this AI tool was not easy. How it works is that the AI uses machine learning **algorithms** that analyze large sets of **data**. Data can be articles, images, videos, and chat conversations. By analyzing all this data, AI tries to "learn" how to perform a specific task, such as describing what's in a photo on a screen.



A data center is the place where data is collected and stored.

What Is a Machine Learning Algorithm?

An algorithm is a repeatable set of steps that may create an output. An algorithm has inputs, procedure, and outputs. For example, imagine an algorithm for braiding hair. The input could be any type of hair or even a hair-like material, such as yarn or thread. The procedure is a set of steps that are applied to the hair. The output would be a complete braid using the input material.

AI algorithms for braiding might be trained on pictures of many types of braids. The quality of the training data and process are important. The AI algorithm might produce a typical braid. It could also produce interesting new braids or knotty hair styles that aren't braids at all.