

- 1 Look at the photos below. What do you think is happening in each picture?
- 2 How often do you make or watch videos? Do you know how video digital devices work? Work in pairs and discuss how you think videos are stored and then transferred to our screens.

Video compression: how we get data fast!

We take our digital devices for granted these days. Our phones, tablets and laptops have become everyday objects, essential for watching programmes on demand or for catching up with world events. In a world dominated by the media and social networks, many of us use our gadgets to record our life and post it online. With a push of a button or a swipe of a finger, our videos and messages are uploaded. Have you ever wondered how this happens?



Binary data

All the information we record, whether audio or visual, is actually made up of ones and zeroes. This is known as binary data. The individual frames and images of our videos are represented digitally using this binary code. Within each video file, there are billions of ones and zeroes, making the file enormous. In order to transfer this file to websites and social networks, it needs to change. It would take far too long to upload and take up far too much digital space if we left it as it is.

Encoding the file

One way of changing the file is to encode the binary data. Think of the last video you took. There will be hundreds of repeated images in each frame, each stored as raw binary code. Computer programmers write a series of logical instructions, called an algorithm, to remove any repeated and therefore unnecessary data. This reduces the file size, making it faster to upload or stream.

File compression

This reduction in the size of files is known as compression. Compression allows us to store hundreds of files on our gadgets. There are two main types of compression:

- lossy compression, which reduces file size by removing redundant data forever but can impair picture quality;
- lossless compression, which reduces file size without losing detail, but needs a fast broadband connection for good quality videos.



Downloading and streaming

Once the file is encoded, compressed and uploaded, it needs to be downloaded or streamed. This has become an increasingly vital part of the process, as we are used to watching whatever we like, wherever and whenever we like. To keep up with public demand, some news networks provide 24-hour live streaming of their coverage. To achieve this, journalists upload their broadcasts which are then available to watch simultaneously online. The compressed news reports are decoded using a codec. This is a specially designed computer programme to read audio and video files.

Luckily, all the programming, encoding and compressing is done automatically when we make or stream a video. The vital technology is already embedded in your device, so next time you pick up your favourite gadget to make or watch a video online, remember the amazing journey it has taken to get there.

3 Read the text. Then find a word or phrase from the article to match each definition.

- 1 digital information made up of ones and zeroes: _____
- 2 a series of logical instructions written by a computer programmer: _____
- 3 the reduction in size of digital files: _____
- 4 a quick form of compression, where unnecessary data is permanently removed: _____
- 5 a form of compression which does not lose detail: _____
- 6 a computer programme which reads audio and video files: _____

4 Read the text again and choose the best answer.

- 1 Binary files need to be compressed because they
 - a) take up too much storage.
 - b) are poor quality.
 - c) are too small.
- 2 Reducing a file size makes it
 - a) slower to upload.
 - b) faster to upload.
 - c) impossible to upload.
- 3 Algorithms are programmes which find and
 - a) delete repeated images.
 - b) save repeated images.
 - c) copy repeated images.
- 4 People, nowadays, are used to
 - a) programming their own gadgets.
 - b) catching up with the news on TV.
 - c) watching the news on demand.
- 5 To decode compressed files, you need
 - a) a codec.
 - b) fast broadband speed.
 - c) an algorithm.

5 Work in pairs and answer the questions.

- 1 Describe the journey a video file takes from when you make it to when someone watches it online.
- 2 Have you ever experienced any problems when uploading or streaming videos?



DID YOU KNOW?

- The American news network, CNN, were the first to stream live news coverage online and on mobile devices. In July 2011, CNN announced that they had created an app so audiences could view the news on any of their devices. General Manager, KC Estenson, said, 'CNN is taking a significant step forward in offering live news coverage to our audiences whether they are on their couches at home or have their toes in the sand on the beach.' Since then, other major news organisations, like the BBC and Al Jazeera, have also used improvements in computer programming to bring us the news 24 hours a day.

PROJECT

- 6 Work in pairs. You are going to make a short video about one aspect of video compression. Choose one of the following subjects and find out more about it:**

- binary data
- codecs
- algorithms
- file compression

- 7 Use a mobile phone or tablet to make a video about your chosen subject.**

- 8 Show your video to another pair or to your class. Explain how your process works, using illustrations if possible. Upload your finished video to the school website so that other students can learn from you!**

VOCABULARY FOCUS

embed [v]: to fix firmly into something

encode [v]: to put something into code

frame [n]: a single scene from a film or video

impair [v]: to affect something negatively

post (online) [v]: to upload

raw [adj]: basic, unchanged

redundant [adj]: unnecessary

simultaneously [adv]: at the same time

store [v]: to keep

stream [v]: to watch or listen to a file from the internet

vital [adj]: essential, necessary