Unit 10

The Computer Challenge-response Test

CAPTCHA

Pre-reading Activities

In this unit, you will

- improve your understanding of the target technical words.
- learn about controlling your ideas in writing a paragraph.
- learn how to preview a reading comprehension passage through pre-reading questions to improve comprehension.
- be familiar with the computer challenge-response test.

I. Target Academic Vocabulary

Check out the meanings and functions of the target academic words in a monolingual and bilingual dictionary.

Purchase (v)

Decipher (v)

Coin (v)

Exceed (v)

Degrade (v)

Impairment (n)

Depict (v)

Acquire (v)

II. Writing development

Supporting topic sentences with 'Contrast'

'Contrast' is defined as "differences". A topic sentence can be supported through *differences* between two things or two aspects of one thing. Some of the common structures of contrast used in a contrastive paragraph, such *as structures of contrast, prepositions, adverbial clause, verbal structures, sentence connectors*, and *conjunctions* are introduced.

A. Structures of contrast (er…..than; more…….than; less……than; as……as)

Google search engine is fast**er than** Yahoo search engine.

is **more** famous **than**

is not **as** slow **as**

is **less** time-consuming **than**

B. Propositions (unlike; contrary to; as opposed to)

Unlike Yahoo search engine, which is less famous, Google search engine is faster and more famous.

Contrary to Yahoo search engine, which is more time-consuming and slow, Google search engine is less time-consuming and faster.

C. Adverbial clauses (whereas; while)

Whereas Yahoo search engine is slow and time-consuming, Google search engine is fast and does not frequently waste users' time.

While Yahoo search engine is slow and time-consuming, Google search engine is fast and does not frequently waste users' time.

III. Pre-reading questions:

Read and respond to the questions below, and then discuss them in pair/group.

1. Does anyone know about what CAPTCHA stand for? Can you explain your strange experience of getting stuck with CAPTCHA?

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2. What are the purposes of having a CAPTCHA in a computer?

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3. How can the blind pass a CAPPTCHA over in a computer?

IV.Reading comprehension passage

This article discusses the computer challenge-response test and adequately describes the applications, accessibility, and technological advertisement.

CAPTCHA

Do you remember the last time you purchased a ticket on Ticketmaster, or wanted to leave a comment on a website which required that you signed in first? You were probably asked to decipher a code of distorted letters, called a CAPTCHA, and type it into a box. And if you wanted to get to the next step, you had to focus quite carefully on reading those characters.

A CAPTCHA is a type of challenge-response test used in computing as an attempt to ensure that a human being generates the response. Luis von Ahn, Manuel Blum, Nicholas J. Hopper, and John Langford from Carnegie Mellon University coined the term "CAPTCHA" in 2000. It is an acronym based on the word "capture" and stands for "**C**ompletely **A**utomated **P**ublic **T**uring test to tell **C**omputers and **H**umans **A**part". Carnegie Mellon University attempted to trademark the term on 15 October, 2004, but the trademark application was abandoned on 21 April, 2008.

The process usually involves a computer asking a user to complete a simple test which the computer is able to grade. These tests are designed to be easy for a computer to generate but difficult for a computer to solve, but again easy for a human being. A common type of CAPTCHA requires the user to type letters and/or digits from a distorted image that appears on the screen. Such tests are commonly used to prevent unwanted Internet bots from accessing websites; the site is able to differentiate between a human being and a bot since a normal human being can easily read a CAPTCHA, while the bots cannot process the

image letters and therefore, cannot answer it properly. Although most CAPTCHAs are letter pictures randomly generated, many of them have become difficult even for a human being to read. Picture CAPTCHAs were created in which a human being is shown a simple test to show a picture of a certain animal (given few animal pictures), which is simple for a human being to process, and therefore easy to pick. A bot cannot process and solve the question because it can analyze the picture, and cannot easily guess the animal.

1. Applications

CAPTCHAs are used in attempts to prevent automated software from performing actions, which degrade the service quality of a given system, whether due to abuse or resource expenditure. CAPTCHAs can be deployed to protect systems vulnerable to e-mail spam, such as the webmail services of Gmail, Hotmail, and Yahoo Mail. Most interactive sites today are run by databases and become quickly clogged and sluggish when a database table exceeds capabilities, the operating server can handle. A website's Google Page Rank can also be reduced by excessive commercial links created by automated posting.

CAPTCHAs are also used to minimize automated posting to blogs, forums and wikis, whether as a result of commercial promotion, or harassment and vandalism. CAPTCHAs also serve an important function in rate limiting. Automated usage of a service might be desirable until such usage is done to the benefit and to the detriment of human users. In such cases, administrators can use a CAPTCHA to enforce automated usage policies based on given thresholds. Article

rating systems used by many news web sites are another example of an online facility vulnerable to manipulation by automated software.

2. Accessibility

Because CAPTCHAs rely on visual perception, users unable to view a CAPTCHA due to a disability will be unable to perform the task protected by a CAPTCHA. Groups who commonly struggle with visual CAPTCHAs include:

- People who are blind, color blind, or have other issues with vision
- Individuals with dyslexia
- People of advanced age
- People with intellectual or developmental disabilities

Sites implementing CAPTCHAs may provide an audio version of the CAPTCHA in addition to the visual method. The official CAPTCHA site recommends providing an audio CAPTCHA for accessibility reasons, but it is still not usable for deaf-blind people or for users of some text-based web browsers. Due to the sound distortion present in audio CAPTCHAs and visual distortion present in visual CAPTCHAs, offering one as an alternative to the other does not help people with impairments in both areas. While the number of deaf-blind people is small, having some degree of impairment in both hearing and vision is actually common, and very common amongst older people.

3. Technological advertising

Since 2009, CAPTCHA advertising has become much more prevalent. Thousands of hours are spent daily solving CAPTCHAs. Recently, CAPTCHA has been used as a new technique to promote company products or websites. In CAPTCHA advertising, users typically type in brand messages instead of distorted text. Indeed, a group of computer engineers built a security technology company and then layered an advertising company on top of it.

4. Battling with CAPTCHA

A number of research projects have attempted (in some cases, successfully) to beat visual CAPTCHAs by creating programs that contain the following steps:

1. Pre-processing: Removal of background clutter and noise
2. Segmentation: Splitting the image into regions which each contains a single character
3. Classification: Identifying the character in each region

Steps 1 and 3 are easy tasks for computers. The only step where human beings still outperform computers is segmentation. If the background clutter consists of shapes similar to letter shapes, and this clutter connects the letters, the segmentation becomes nearly impossible with current software. Hence, an effective CAPTCHA should focus on the segmentation.

5. *Human solvers*

A CAPTCHA is vulnerable to a relay attack that uses humans to solve the puzzles. One approach involves relaying the puzzles to a group of human operators who can solve CAPTCHAs. In this scheme, a computer fills out a form and when it reaches a CAPTCHA, it gives the CAPTCHA to the human operator to solve. Spammers pay about $0.80 to $1.20 for each 1,000 solved CAPTCHAs to companies employing human solvers in Bangladesh, China, India, and many other developing nations. Other sources cite a cost as low as $0.50 for each 1,000 solved.

Another approach involves copying the CAPTCHA images and using them as CAPTCHAs for a high-traffic site owned by the attacker. With enough traffic, the attacker can get a solution to the CAPTCHA puzzle in time to relay it back to the target site. In October 2007, a piece of malware appeared in the wild which enticed users to solve CAPTCHAs in order to see progressively further into a series of entertaining images. A more recent view is that this is unlikely to work due to unavailability of high-traffic sites and competition by similar sites. These methods have been used by spammers to set up thousands of accounts on free email services such as Gmail and Yahoo. Since Gmail and Yahoo are unlikely to be blacklisted by anti-spam systems, spam sent through these compromised accounts is less likely to be blocked.

6. Interaction with images as an alternative to texting

Some researchers promote interaction with images as a possible alternative for texting CAPTCHAs, given the common feeling that they are "one of the most hated pieces of user interaction on the web". Computer-based recognition algorithms require the extraction of color, texture, shape, or special point features, which cannot be correctly extracted after the designed distortions. However, human beings can still recognize the original concept depicted in the images even with these distortions. A recent example of interacting with images of CAPTCHA is to present the website visitor with a grid of random pictures and instructs the visitor to click on specific pictures to verify that they are not bots (such as "Click on the pictures of the airplane, the boat and the clock"). Image interaction CAPTCHAs face many potential problems, which have not been fully studied. It is difficult for a small site to acquire a large dictionary of images to which an attacker does not have access and without the means of automatically acquiring new-labeled images, an image-based challenge does not usually meet the definition of a CAPTCHA.

Post-reading Activities

I. Reading comprehension

Directions: Mark each statement as T (True), F (False), or NG (Not Given) to the information in the reading comprehension passage.

---------1. The purpose of CAPTCHA is to show that the response is provided by a machine.

---------2. Based on the passage, CAPTCHA follows I/O intensively.

---------3. CAPTCHA can easily prevent Internet bots from reading distorted images.

---------4. CAPTCHA only relies on visual perceptions.

---------5. The more Internet advertisings become available, the more Internet bots are created.

---------6. Yahoo and Gmail are more likely to be the target by the anti-spam systems.

---------7. The heavy-traffic sites cannot copy CAPTCHA images.

---------8. Company products and websites can be promoted through using a CAPTCHA.

Questions ***9-15***: Choose the appropriate letter ***A-C.***

9. The term CAPTACHA was supposed to be known in public in.....

A. 2000

B. 2004

C. 2008

10. CAPTCHA can have all the following applications but.....

A. preventing automated software from functioning.

B. keeping the system safe from the e–mail spam.

C. promoting automated posting blogs and forums.

11. Which of the following option is NOT true regarding the accessibility of CAPTCHA?

A. People having visual problems cannot use it.

B. Very old people cannot use it.

C. People having a hearing problem cannot use it.

12. One of the following steps..... is the most important for a CAPTCHA according to the passage.

A. pre-processing

B. segmentation

C. classification

13. How much do spammers pay for each 1000 solved CAPTCHAs in developing countries?

A. From $0.50 to $1.0.

B. From $0.80 to $1.20.

C. From $0.50 to $2.0.

14. How do users feel about interaction with images as a possible alternative for texting CAPTCHAs?

A. They are happy with them.

B. They might not like them.

C. They hate them.

15. People with intellectual and developmental disabilities might be able to use all the following BUT.....

A. Google or page rank.

B. challenge-response test.

C. digital outputs.

II. Vocabulary activities

Directions: Read each sentence on inputs and outputs of a computer stated below. Circle the one word or phrase in parentheses ( ) that has the same meaning as the underlined word in the sentence. Compare your answers with a partner.

1. A CAPTCHA is a type of challenge-response test used in computing as an attempt (*effort/result/process*) to ensure that a human being generates the response.
2. An acronym (*the first/middle/last letter of a word*) is based on the word "capture" and stands for Completely Automated Public Turing test to tell Computers and Humans Apart.
3. A common type of CAPTCHA requires the user to type letters and/or digits from a distorted (*organized/clear/deformed*) image that appears on the screen.
4. Most interactive sites today are run by databases and become quickly clogged and sluggish when a database table exceeds (*improves/ increases/ facilitates*) capabilities the operating server can handle.
5. Automated usage of a service might be desirable until such usage is done to the benefit and to the detriment (*harm/benefit/role*) of human users.
6. The only step where human beings still outperform (*destroy well/ debilitate increasingly/perform better*) computers is segmentation.
7. A CAPTCHA is vulnerable to relay (*demand/command/message*) attack that uses human beings to solve the puzzles. One approach

involves relaying the puzzles to a group of human operators who can solve the CAPTCHAs.

8. A website's Google Page Rank can also be reduced (*decreased/increased/resulted*) by excessive commercial links created by automated posting.

III. Writing development activities

Directions: List the differences between image and audio CAPTCHAs and write down three points of differences you can think of. From this list, select a point, which you think is the most important. Then, write a topic sentence showing that you will describe these differences. Work with a partner or in groups and show your topic sentence to your classmates to see if it is suitable for the differences, which you plan to write about.

List of three points:

1.----------

2.----------

3.----------

The most important point is ----------

Topic sentence is ----------
