INTEGRATION OF HUMAN RESOURCES AND CLOUD SYSTEM FOR BLIND PEOPLE
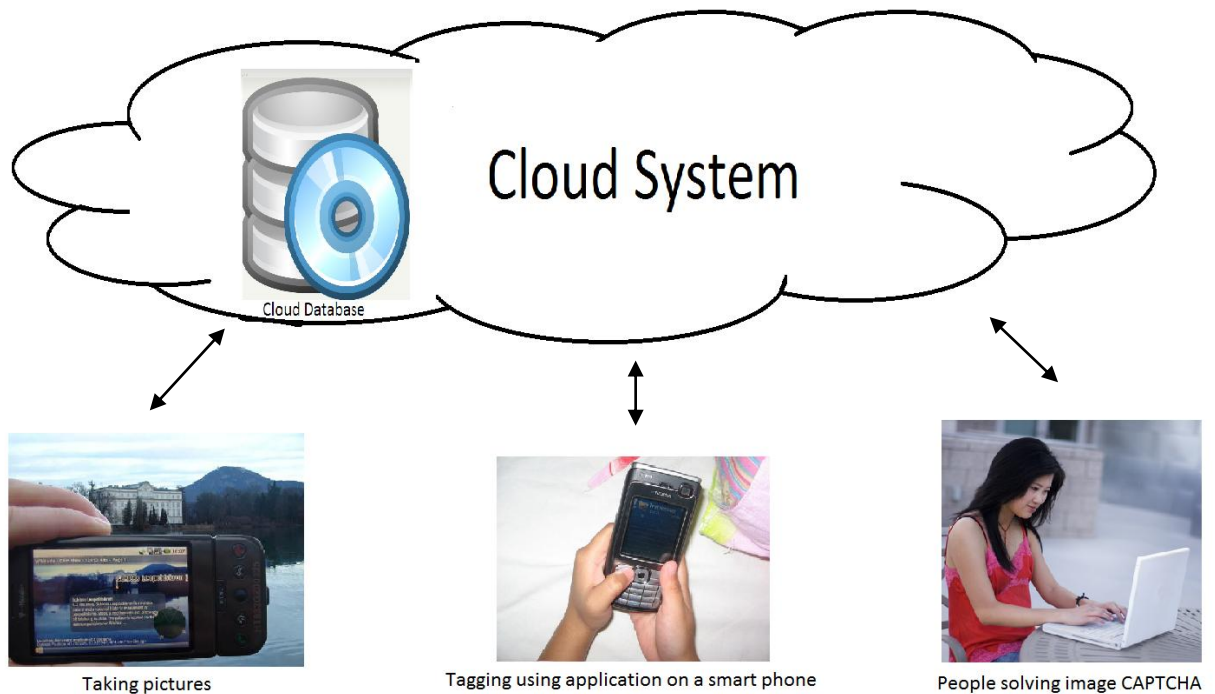
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1. Problem Statement:

There are certain problems that can be solved by computers but the results are less efficient and less accurate as compared to done by humans. Computers today can do some level of image analysis and face recognition but it is not intelligent enough to be very accurate to help a blind person.

2. What needs to be done:

A solution could be achieved by a combination of human resources and computer technology, which can be implemented through a Cloud System. We can take ideas like CAPTCHA that uses the human response to generate things that cannot be read by an optical character reader (OCR). Instead of putting a CAPTCHA text item that cannot be read by an OCR, we can put in a picture that a blind person took and respond to what he or she cannot see. This idea can be achieved by first sending the picture taken by the blind person to the cloud where the image is analyzed and if it is recognized then a response is generated and sent to the blind person, otherwise the picture is sent to the people in the local zip code to tag the picture using a reference list of local businesses. The picture is sent to the people in the locality via an image generating application on their smart phones or if they are solving a CAPTCHA challenge. This can be demonstrated by the following image.

Cloud Database

Cloud System

Taking pictures   Tagging using application on a smart phone   People solving image CAPTCHA

Another possible application of this idea can be implemented using the facebook feature of auto-face tagging. Suppose a blind person takes a picture of room filled with people. The image is sent to the cloud for image processing, where all the faces are extracted and sent to the facebook. At this phase facebook auto tags as many faces it can tag automatically tag in the same social network. Whatever is left goes to an application where common friends can tag the unknown faces and therefore we end up creating a database of faces relating to different people. This database is then used to respond to the blind person and he gets to know who all are there in the room where he took the picture.

3. What has been done:

A CAPTCHA is a program that can generate and grade tests that humans can pass but current computer programs cannot. The term CAPTCHA (for Completely Automated Public Turing Test to Tell Computers and Humans Apart) was coined in 2000 by Luis von Ahn, Manuel Blum, Nicholas Hopper and John Langford of Carnegie Mellon University. At the time, they developed the first CAPTCHA to be used by Yahoo. It basically makes the database of unreadable words by the OCR (optical character reader) using human resources.

A similar concept to this is the ESP game. The ESP Game is an ongoing project of Carnegie Melon University in Pittsburgh, Pennsylvania. The great thing about this project is that it is both a fun game for the players, and is a unique research project which, in the future, may be useful to all Internet users. Each time you play the game, you are automatically paired up with an anonymous random player who is logged into the site (you never know who you are playing with/against). Each of you are displayed the same random image from the web. Your task is to try to guess a word that your partner would use to describe the image. The catch is that there are a series of taboo words that you cannot use. You also cannot enter other forms of the word (singular/plural, past/present tense, etc), or certain words related to one of the taboos (e.g., if one of the taboo words is "green", you can't enter any other color either). You get 2 minutes and 30 seconds to try to match your answers on up to 15 images. Since it is a timed game, if you and your partner cannot agree on a word, you have the option to pass. If either partner decides to pass, a message will be displayed to the other player. Both players must choose to pass to actually skip an image. Keep in mind that you cannot earn points for images that you pass on. While it's a fun and sometimes addicting game, the real goal behind this project is to give a label to all images on the web. A database of human-provided descriptions of images can make searching for images on the web much easier than it is today. In addition, it can be used to help people with visual disabilities to have a better experience on the web. As stated above, attempts are made to filter objectionable materials from the game play; however the act of allowing users to flag certain images is also helpful for the research being conducted with this project.

Facebook's auto face tagging feature is also a concept that can help in the development to the idea. An increasing number of personal photographs are uploaded to online social networks, and these photos do not exist in isolation. Each shared image likely arrives in a batch of related photos from a trip or event; these are then associated with their photographer and broadcast

out to that photographer's hundreds of online friends, and they join a collection of billions of other photographs, some of which have been manually labeled with the people they contain and other information. Social networks are an important source of image annotations, and they also provide contextual information about the social interactions among individuals that can facilitate automatic image understanding.

4. What can I do:

Sending pictures to the cloud, from which they are sent to different people around the same area to recognize the contents of the picture, can possibly be achieved in a number of ways. Similar to the CAPTCHA technology, a human resource can make a database of images of unidentified buildings and places.

One of the possible and probably the initial way to implement the idea would be making an application on the smart phone that takes pictures of various building, monuments, etc., and sends them to the cloud for recognition. The application should be able to cut out the irrelevant images and send only the relevant images along with the GPS location of each image. This can further be processed on the cloud system and if the image is not recognized successfully, it should be sent to another application on the smart-phones of the people near that area. This application would be always running in the background of a smart-phone. As soon as the application receives an image with a list of business locations surrounding that location, it notifies the user and asks him to tag the picture if he or she knows about it. Once the picture has been tagged the information is sent back to the cloud to create the database. Therefore, in this ambitious project, the first step would be the development of the application and cloud interface.

5. What I have done:

We have done research on how CAPTCHA works and how it can be used to implement our idea of integration of human resources and cloud computing. We have a basic skeleton structure layout on how our idea can be implemented, but we still require more optimizations and brainstorming to make this project even more efficient. We have also looked into what kind of results can we expect in the future on this project and how we can incorporate our idea into a means of recognizing people without any communication via facebook and other social networking sources.

Reference List

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