Recent advances in computational capabilities of machines alongside advances in algorithmic intelligence, have surpassed expectations and resulted in staggering feats such as `AlphaGo' defeating a world champion in the game of Go using deep neural networks. With all the perceived superiority of machines in decision making using Deep Learning we are interested in the question -- *Do machines think like humans?.*

We will attempt to do this by making a **two-player game** on recognizing images. Two players are paired in the beginning of the game -- The **Proposer** and the **Guesser.** Such games are called games with a purpose (GWAP).

Rules of the game

The proposer get to see the **entire image** and the **label** that he has to help the **guesser** guess the label. The sooner the Guesser succeeds, the more points both the Guesser and the Proposer get.

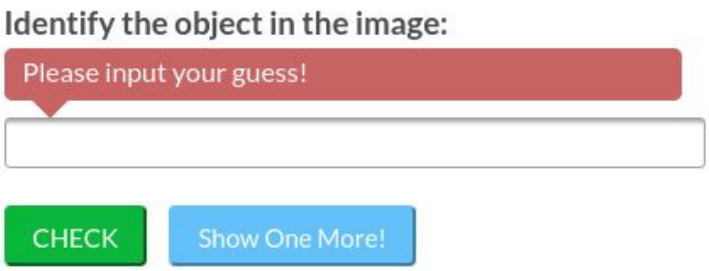
Example of Image and label : [The proposer is shown this image and wants the guesser to guess: **GoKart**]

The image is segmented into multiple segments (in this case 50 segments). The proposer can click on any of the segments (one at a time). Once the proposer clicks on a segment, that segment appears on the screen of the **guesser.** The **Guesser** then has to guess the label (unknown to the guesser). The guesser is allowed 3 tries.

The proposer gets its turn if

1) the guesser has three wrong guesses in a row or
2) The guesser gives up

Below is an example screen for the guesser after 5 segments have been chosen by the proposer. Pretty lousy proposer dont you think ;-).



Now the proposer has to judiciously chose the next segment based on the earlier guesses of the **guesser.** The figure above shows 10 segments selected by the proposer in that order. The number 1 was the first proposal, 2 the second proposal and so on..

The game ends if the guesser is successfully able to guess the label, or if all segments are opened, or if the guesser decides to quit.

Points system

The fewer segments needed to guess the better it is for both the players. The score for both players is the number of uncovered segments until a successful guess. This score is then maintained in a leaderboard showing top players.

More game play elements

More game play elements may be added for a better gaming experience by adding timers, removing taboo segments etc, challenge players with uploading custom images with labels etc.

Single player game

When there is no pairing possible, a single player can play against a random oracle which selects a set of random segments incrementally. Then ask the same player to propose better segments. These segments would be pre-recorded for future guessers. Another option would be to make the game asyncrhonous by letting the proposer propose and notify when there is a guess avaialble.

Multiplayer game

You can extend the game to multiplayer setup where one proposer proposes to multiple guessers.

Where is the Machine Learning here ?

One can replace the Proposer by a Neural Network which does the proposing. This is an advanced mode and can be left out for now. Only thing to remember here is that the game play data can be used to evaluate if Machines think like humans or not…

Dataset

The dataset can be downloaded from here
https://liveuis-my.sharepoint.com/:f:/g/personal/2918066_uis_no/EujmTv3yyCIIgBRSmDAqJy8BLDe9we4ritxgxkTyxXCTgg?e=hKbzcd

It has 3 files

1. scattered images.zip this contains a collection of folders each for an image and each folder contains image segments 0 up to 50 in png format
2. Image_mapping.csv image to id mapping
3. Label_mapping.csv id to label mapping

Similar games:

1) https://www.cs.cmu.edu/~biglou/Peekaboom.pdf