Interactively Improving the OpenMind Database: Game for Interactive OpenMind Inprovement (GIOMI)

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ABSTRACT
In this paper, we describe the motivation behind and implementation of GIOMI: Game for Interactive OpenMind Improvement. GIOMI is designed to draw upon the internet community in order to rate assertions in the OpenMind database and thereby improve the quality of the database. To encourage user participation in this project, GIOMI contains a number of features designed to be fun and thus to encourage users to rate numerous assertions.

Keywords
OpenMind, common sense, GIOMI, game, interactive

INTRODUCTION
The Game for Interactive OpenMind Improvement (GIOMI) seeks to fill the previously vacant quality control role for the OpenMind common sense database. Queries to the OpenMind database sometimes return nonsensical results. In order for projects built using the OpenMind database to be maximally useful, these nonsensical results should ideally be either purged from the database entirely, or, at a minimum, returned last for any given search query. Using a visually stimulating, interactive user interface, we created a simple yet addictive game that allows any registered OpenMind project user to rate assertions.

RATING ASSERTIONS
In general, an assertion either is common sense or is not common sense. For example, "Trees have leaves" is common sense, while "Cats have leaves" is generally not considered to be common sense. We contend that statements can be true and yet not be *common* sense. For example, "Catherine Havasi is not a fire-breathing chipmunk" is undeniably a truth, but is not widely known (because most users of the system will not personally know Catherine Havasi) and therefore not "common". We consider all false statements not to be common sense, as well as all assertions that do not make a contribution to the usefulness of the OpenMind database, such as a single word (e.g., "bird").

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Because a certain assertion may have different interpretations depending on the user, we decided to keep track of both positive "+" ratings and negative "-" ratings for each assertions. To accomplish this, we added a "+" and a "-" field to each assertion's entry in the OpenMind database. Each time a particular assertion is rated positively, its positive entry is incremented by one. Similarly, each time a particular assertion is rated negatively, its negative entry is incremented by one. This scheme allows a running total of all ratings to be kept.

We considered an alternate design in which positive and negative ratings were stored together in one combined field. For example, if an assertion had been given 45 positive ratings and 3 negative ratings, the total rating would be 42. We ultimately decided against this combined system, however, because we feel that the combined score might not accurately reflect the combined users' input. For example, the combined system might have assertion A, with 13 positive ratings and 0 negative ratings, and assertion B, with 25 positive ratings and 12 negative ratings. Both assertion A and assertion B would have a combined score of 13, but knowledge of the actual input implies that assertion A is much less controversial than assertion B and therefore more likely to be common sense.

Because not all assertions are clearly "good" or "bad," we considered having users rate assertions on a scale of some sort. This scaling system would also account for assertions that make no sense most of the time, but make lots of sense in certain, very specific situations. However, we decided that the percentage of assertions in this category was likely small, so we did not choose to implement the scaling system. Instead, we provide a skip button. The purpose of this button is to give the user a way to avoid rating a certain assertion if s/he has reservations about giving that particular assertion a "good" or "bad" rating.

MAKING GIOMI FUN

Interface
Since users of the OpenMind site are willing to enter assertions into the database, we hypothesize that these users

would also be willing to rate the assertions. However, it is likely that more users would rate more assertions if the rating mechanism were fun. We therefore set out to create a game-like environment in which users can rate assertions and hopefully have a bit of fun.

At first, we had only one assertion at a time appearing. In the final design, we have three separate assertions visible at any given time. The availability of three choices makes the game more fun because there is an element of selection.

In order to make our system more user-friendly and fun to play with, we allow the user to type in a keyword on which they would like to work. However, random keywords are provided if the user does not enter one, since we anticipate that there will be times during which a user cannot think of a new, interesting keyword to enter.

To create a game, we chose to use Flash instead of a traditional language like plain HTML or java. Flash is much more suited for animated, game-like displays. We settled on the screen layout depicted in Figure 1

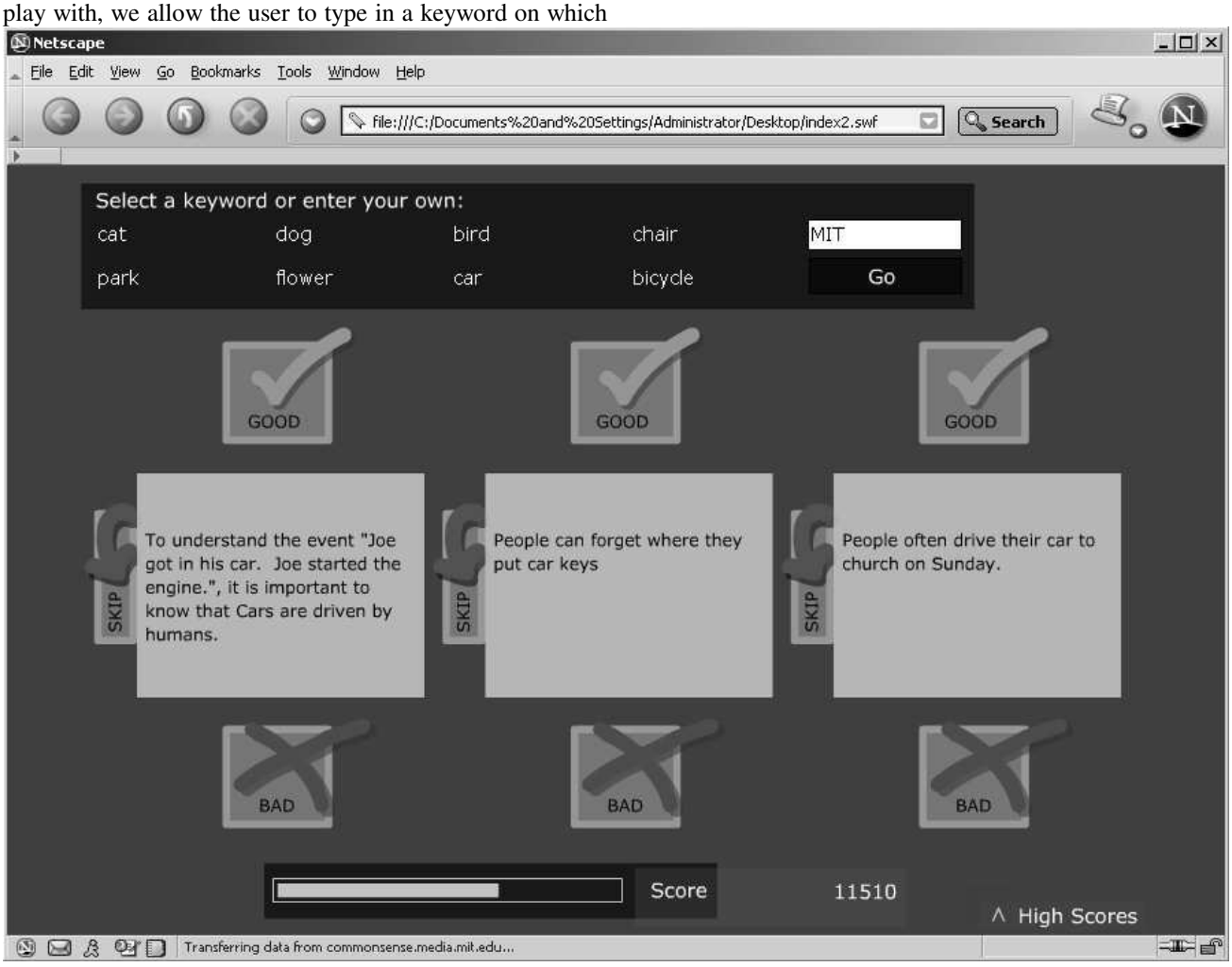

Figure 1: Screenshot of GIOMI

Scoring

To motivate users to rate lots of assertions, we also implemented a scoring system. Each assertion that a user ranks during one login session is worth a linearly increasing number of points. After rating 20 assertions, the user receives a large, random bonus. The 21st assertion ranked is worth more than the 1st; i.e., the value per assertion increases after the 20th assertion is ranked. The cumulative score is stored in that user's database record in an additional field. We chose to use this scoring system because it provides incentive for the user to continue ranking assertions both within one login session and generally. There is also a status bar at the bottom of the window that fills up with each ranked assertion, until the 20th assertion, at which point the random bonus is awarded and the status bar resets. Because users can see their incremental progress, they are more likely to continue playing until reaching the 20th assertion and thus a full

status bar. As further motivation, a Top Ten list of high scorers is linked from the game page and can be viewed at any time. These factors are designed to entice users to rank numerous assertions.

FUTURE IMPROVEMENTS

Interface

We anticipate that ranking assertions on a given topic might trigger ideas for new assertions. To take advantage of this creativity, we would like to include a box on the same page as the game in which users can conveniently enter new assertions.

Motivation

Improvements that might be made to GIOMI include further increasing incentives for users to play the game and developing a way for the users to get immediate feedback about a rating they have made.

Incentives for users to play the game could be increased by adding mini-games within GIOMI that are for the most part unrelated. These mini-games could have a common sense theme. One example might be animations of 5 items, some sensical (a cat chasing a ball of yarn) and some not (a cat driving a car) that cross the window quickly with instructions to "Click the objects that make sense." They should take only a few seconds to play, and could increase the user's score if won. Users could access these mini-games as a reward for having rated some number of assertions, either per login session or cumulatively.

Another incentive that might be added could be based on cumulative number of assertions rated. This incentive would be a level-based privilege system as found on many community-centered websites. A user would start out at the first level, for example, in a medieval-themed level system, as a peasant. After rating some number of assertions, the user would obtain the next level, e.g., merchant. Some number of assertions later, the next level would be reached, e.g., Lord. Users' level rankings would be visible to other users, and privileges would increase with level. For example, a score bonus might be offered to top-level players. This sort of level-based system has worked well in many online communities to increase participation, and might work very well with GIOMI.

Feedback

Users might also enjoy seeing immediate feedback once they have rated a particular assertion. The most straightforward way to provide this benefit is to have the current positive and negative totals appear briefly and quickly after the user has chosen a rating. This allows the user to see if others agree with his or her opinion and would likely be of interest.

User-Suggested Features

Because users generally know best what users want, we surveyed the top 50 OpenMind contributors to discover what might motivate them to use a system like GIOMI and what features they desire. We received numerous responses. Users overwhelmingly would like to be allowed permission to correct the spelling and / or grammar of assertions. A level-based privilege system could be used to determine which users gain this editing power. Another suggestion was to extend the game to somehow allow users to identify and mark duplicate assertions for possible deletion. Both of these frequent suggestions would be relatively simple to implement and could result in vast improvements in the overall quality of the OpenMind database.

IMPLICATIONS

The most important future work that could follow this project would be to implement improvements in searching the OpenMind database. Instead of the current method of returning results from a query randomly, the search engine could easily be modified to return results with the most positive ratings first and the most negative ratings last (or in some other order). This revised search method would result in more relevant, and likely more useful, results, which would then improve other common sense applications. Furthermore, an algorithm could easily be written to tag assertions with a number of negative ratings exceeding some threshold (either a constant threshold, like 25, or a percentage threshold with relation to positive ratings, e.g., 30% of all ratings for that assertion are negative). A human could then review tagged assertions for possible deletion from the database. This process would result in removal from the database of "garbage" entries, thereby improving the overall quality of the OpenMind database.

ACKNOWLEDGMENTS

We thank Prof. Henry Lieberman and Teaching Assistant Hugo Liu for their inspiration and for their thoughtful comments.