Who is with you on your Disney Vacation? An AI Game for Autistic Children

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LEHIGH UNIVERSITY

Development

- HTML5
- PHP
- MySQL
- jQuery Mobile
- CreateJS
- Dropbox.js

See it at:
http://fotofun.herokuapp.com

Key Terms

- *aT*: # times the entity was the correct answer
- *aW*: # times the entity was answered incorrectly
- *aF*: # times the entity was featured as an aswer
- *aX*: # times the entity was incorrectly chosen
- *t*: average time it takes to answer this entity (in sec.)
- *eW*: set of all incorrect answers given for this entity

References
Borges, Lawrence, and News Medical. "CDC: 1 in 88 Kids Has Autism; Docs Debate Cause." *ABC News*. ABC News Network, 29 Mar. 2012. Web.

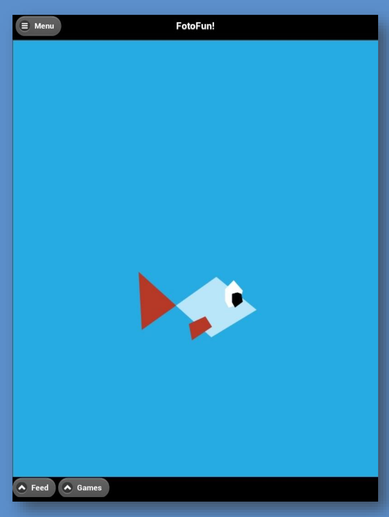
FotoFun!

1 in 88
Children suffer from Autism Spectrum Disorder (ASD)

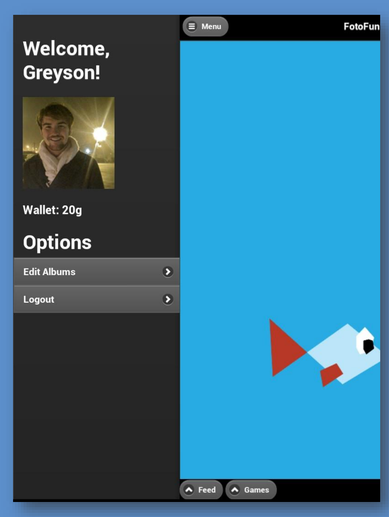
ABSTRACT

Current treatments for ASD and similar disorders involve medication and therapy. Prof. Chuah and I have been working to develop mobile applications that could help those affected at little to no cost. We are hoping to look into the viability of such applications and compare their effectiveness to traditional approaches.

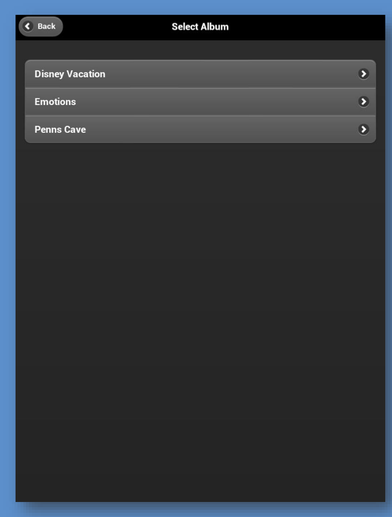
Our most recent project is FotoFun. Using case-based AI and fuzzy logic, the game can deliver questions targeted at improving a child's core deficiencies in face, emotion, and location recognition.



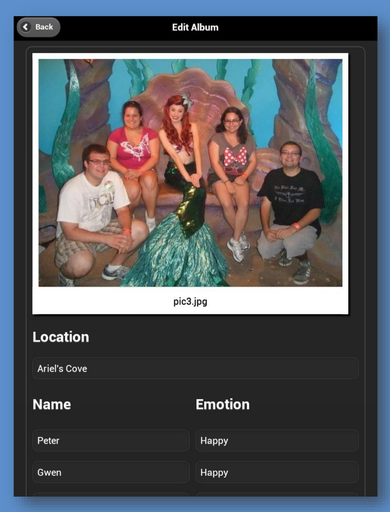
PLAY… with your pet fish. Taking care of it requires gold coins, which can be earned by answering questions



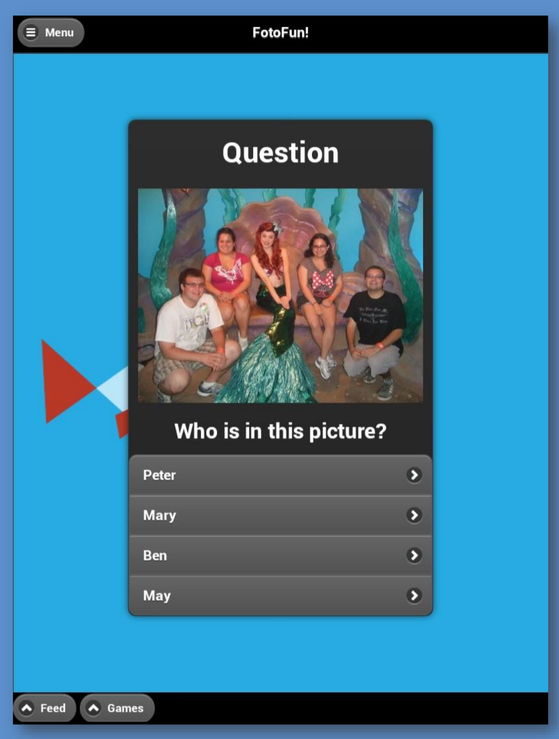
EDIT… your settings and get access to building your photo library.



SELECT… an album to edit from your Dropbox.



TAG… photos in an album with their location, the people in it, and the emotion they are expressing.



ALGORITHM

We have a fuzzy set of all entities (emotion, face, or place), which are represent by a **Difficulty** value.

Difficulty = **Inaccuracy** + **Ponder** + **Mistake**

$$\text{Innacuracy} = \frac{aW}{aT} \times 0.6$$

$$\text{Ponder} = \min\left(\frac{t}{10}, 1\right) \times 0.2$$

$$\text{Mistake} = \frac{aX}{aF} \times 0.2$$

Using this fuzzy set, we can establish fuzzy boundaries for what dictates an easy, medium, or hard question. Hard questions are most likely to test a player's weak areas.

Now that we have a question, we can populate it with answers that the player most often confuses for the correct answer. We can use the following process to find such candidates.

For each unique $e \in eW$,

define **count** = $\{t \mid \exists w \in eW\ (w[\text{name}] = e[\text{name}] \wedge w[\text{name}] = t[\text{name}])\}$

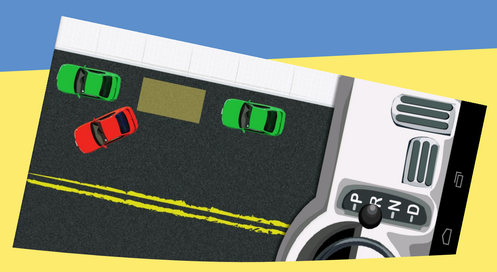
Then, for every **count**, we can define **frequency** = $\frac{|count|}{|eW|}$

We can then use the entities with the 3 highest values of **frequency** to be multiple choice answers.

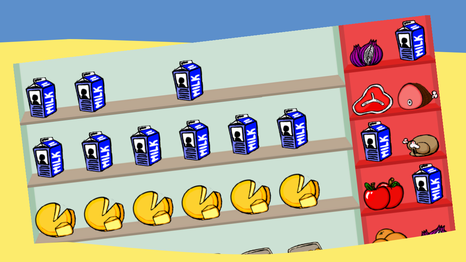
CONCLUSIONS

While research is ongoing, results so far look promising. These interactive mobile technologies appear to be a fantastic way for individuals with ASD and similar disorders to learn new skills. The Centennial School is currently using our ATM Simulator to great effect, and we hope to get more of our mobile applications in use.

ATM Simulator



Driving Simulator



Shelf Stocking Simulator