Research Project Title: Human Computing Games to Solve Difficult Problems

Faculty Mentor: Dr. Charles Cusack, Department of Computer Science

Project Description:
A human computing game (HCG) is a game in which the player performs some useful computation as the game is being played. Although at least 30 HCGs have been developed in the past few years, most solve what might be called recognition problems (e.g. describe a picture or music with words, locate a dog in a picture, etc.). They view the player as a battery that powers their algorithm, not like an independent computational unit that might have something unique to contribute. The goal of my research group is to use HCGs to solve cognition problems. These problems require more than simple recognition to solve, and I am interested not only in the solutions they come up with, but the techniques they employ. The problems of interest are a special class of problems (called NP-Complete) for which no efficient algorithms are known.

This summer we will work on implementing one or more HCGs in Java and/or Flash. We may also create websites related to HCGs and integrate our work into social media sites like Facebook. The game(s) we work on will be based on our previous work (Pebble It, a game that helps solve problems related to graph pebbling), a "tree search game", or on already-popular games based on NP-complete problems (e.g. Lights Out, Minesweeper, Rush Hour).

We are interested in two types of students:
1. those with artist skills to help with the graphics in the game(s) and on the website
2. those with technical/programming skills to work on the games and/or webpages

Background: Candidates should have at least one of the following (please describe in your application):
1. Artistic ability and experience with some graphical design software.
2. Experience with HTML and other web-related technologies.
3. Experience with Java, C++, or a similar language.
4. Familiarity with PHP and/or MySQL.