Implementing a remote submission system for the Geometry Friends AI competition

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Learnings Report

Abstract—This document reports my role in the group activity "Implementing a remote submission system for the Geometry Friends AI competition". The main goal is to describe what I have done and what did I learn from those experiences. My main job was to start developing a new version of the game's website to support new features.

Index Terms—(Geometry Friends, Artificial Intelligence, AI, Competition, Submission System, Front-end, WordPress, Website, LaTeX).

MP excelente! Gostava 5 ou 6!

1 Introduction

Geometry Friends [1] [2] is a cooperative puzzle game that was developed by GAIPS INESC-ID laboratory using Microsoft's XNA framework. The game has a website made and supported in WordPress where anyone can see the game description, learn how to play, download the source or the binaries, and see results of artificial intelligence agents competitions. The goal of the game is to solve

Figure 1. Geometry Friends Logo.

different levels using two characters, a circle and a rectangle. To solve one level the players needs to grab all the diamonds that are spread in the level, but to reach the diamonds the players must cooperate to overcome several obstacles in a clever way. Our group job was to

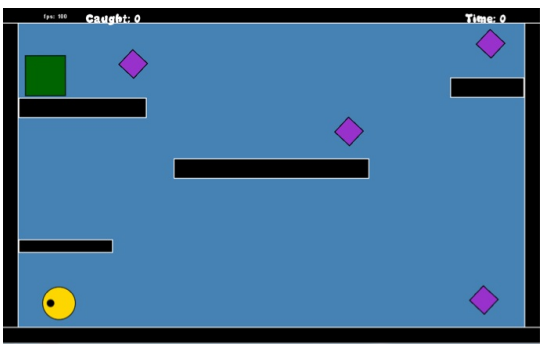

Figure 2. Geometry Friends in-game screenshot.

focus mainly in the artificial intelligence competitions, in which any person can design their own solution and create autonomous agents to control the circle and the rectangle to try to conclude the game successfully. The goal of our work was to improve the submission system existing in the game's website and back-end to allow an automatic mechanism to submit and test competitors solutions. My role in the group was to work in the front-end, managing the website through WordPress to try to support the new automatic submission features.

2 Background

The previous architecture required someone to manually gather the competitors submitted code via email and test it, there was the need

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(1.0) Excellent	LEARNINGS						DOCUMENT						
(0.8) Very Good	Context×2	Skills×1	Reflect×4	Summ×.5	Concl×.5	SCORE	Struct ×.25	Ortog×.25	Exec×4	Form ×.25	Titles ×.5	File ×.5	SCORE
(0.6) Good	0.2	0.4	0.4	0.4	0.6		0.6	0.6	0.6	0.4	1.0	1.0	
(0.4) Fair													
(0.2) Weak													

to waste time and effort to treat the submitted code manually by someone responsible from the game. There was also a lack of feedback to the participants submissions, in which the code would only be evaluated in the competition's deadline end, due to the work needed to test manually each submission of the players frequently. So the competitors only could know the results in the end of the competition, that means that sometimes even minor errors, for example in compilation, could invalidate a whole work of a participant. The website of the game is supported via WordPress, which is a content manager, that gives web developers an easier way to interact with the system. WordPress also have a very big user community which means that there are much plug-ins made by WordPress users that facilitates some features that could be harder to implement. Previously, in the website pages implementation there was no database connections and actually no way to interact directly with the server. It only had some information about the game and the email contact to which the competitors should send their agent code to.

3 Procedure

This section describes the path of the development of the solution.

3.1 Group communication

First of all, since the new members of the project didn't have much knowledge about the Geometry Friends game and system, we scheduled some meetings in which we start having contact to the existing system and start understand what was the idea behind the desired improvements. In our first meeting, I got to know the professor responsible of the activity, professor Rui Prada, also a student, Fábio Almeida, that is working in Geometry Friends project as his Master thesis and other Portfolio IV student Pedro Costa. In this meeting, I was taught about the current system and the current undergoing work. I understood the main goal of the game, differences between levels of the game as well as some results of previous competitions. The professor also explained that some things in the agents evaluation was not fair and those aspects could be improved by doing some minor changes in the game scores. This meeting was very important because it opened the communication channel in the group, we managed to be able to determine responsibilities and gather motivation to start working to improve this system. The professor was very enthusiastic in the way that he talked about the project and gave us a positive attitude to help us to believe that we could do a significant work and improve the current solution. I wasn't able to attend the second meeting due to evaluation schedules in other courses, but I talked with the professor to give a feedback about my work done so far and I asked some questions about preferences in server directory structure and results structure in the database. But I believe that the person to whom I communicated more was Fábio Almeida, that managed to help me understand the available tools that I could use and I discussed with him different solutions to be implemented. Later, we were notified that a new member, Edgar Santos, would join the team. Edgar start talking with the team to fit in the project. I believe that he have shown much interest to give his contribution and I helped him, because he had some questions to which I already known the answer. So I believe that we managed to integrate the new member and keep a good work flow.

3.2 Developing the Front-End

After understanding the desired changes in the submission system, I start studying the existing website pages mainly the submission related pages. I realized that there were only just some text instructions about the email to which the competitors should send their agent code and documentation to and some restrictions in the code sent. The goal of the new submission system was that a competitor should be able to upload his source code and documentation directly in the website, by choosing the competition that they are applying to. Then, the uploaded files would be moved to the competition folder in the server together with the competitor data information. I needed to

provide a way to upload the source code and the documentation of the agent directly in the website. To be able to do this, I created a new version of the submission page, where I used two WordPress plug-ins, Wordpress File Upload and Insert PHP. The new page now have two upload buttons, one for source code and the other for documentation. The submitted files are uploaded to the server directories. I also used Insert PHP to have a way to create a connection to WordPress database, so that the website users could select the competition that they want to apply to. So I set up a PHP database connection providing the user name and password and then a query is sent to a "tracks" database table and the results are then inserted in a drop-down list. Then, I added a

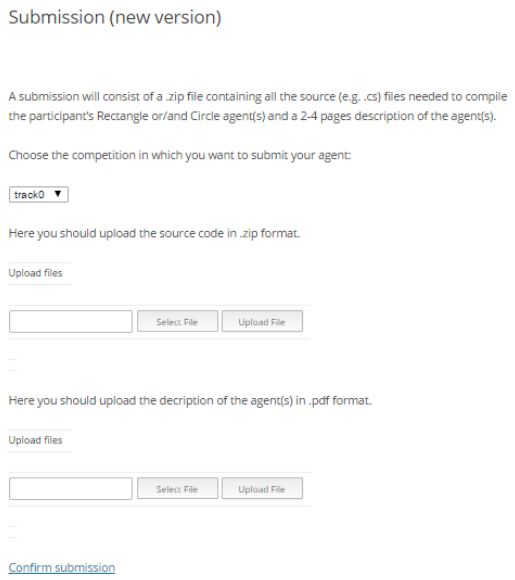

Figure 3 New submission page.

link to confirm the submission, that redirects to a page that alerts the user if the submission has any error. This error will be determined by a automatic script that will run in the server, that will handle new submissions. This part of the error detection belongs to the thesis that the Instituto Superior Técnico student Fábio Almeida is working on. After this first error detection, the goal is that other script will compile and run tests over the submitted agents. Due to the fact that this process takes some time to finish, it is not possible to give an instantaneous feedback. So it was decided in the group that

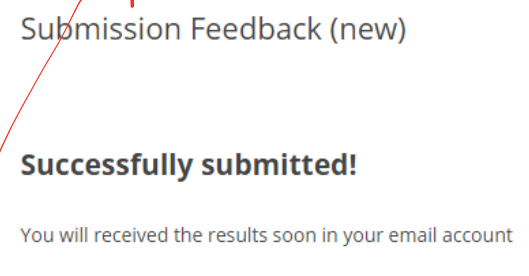

Figure 4 New submission feedback page.

this information would be sent when possible through an automatic mail competitor email address. The last change needed in the website pages is that the results should be gathered and updated in an automatic manner in the website results page. In the existing system, it is mandatory that someone compiles the results manually and attach the results to this website page.

3.3 Main learning during the development

With all this work, I managed to improve myself in two main ways, in terms of technology knowledge and user relation. In the chapter of technology, I managed to learn how WordPress works while using it to a real system that is used by some users. I was interested to learn WordPress or Drupal for sometime and this was the perfect opportunity to reach this goal. I also had contact with Microsoft's XNA framework, since I played the game and analyzed the code structure. Then in terms in the relation game developers and site managers have with the users of their systems I start understanding different issues in both sides. First of all, the discomfort attached to the previous solution where the user had to follow several instructions in the website just to send one email with the work that they made by self initiative. This could easily make some users to instantly give up their application to the competition. Then, the lack of feedback that existed, the users could only be aware of the situation when the final results were published. This could massively punish some users by some minor mistake. It is highly important to be able to give some feedback whenever possible even if it was incomplete.

4 Results

I believe I managed to give a good contribution to the project, mostly in the front-end development, even that there were some limitations. Now the files are successfully uploaded to the server's directories directly from the WordPress website and the new pages manage to provide a better and faster feedback to the users. Due to some dependencies to incomplete work in the complex area of automatic compilation and AI agents evaluation, I was not able to make the full connection to the back-end in terms of agents evaluation and results display, but I have create a good skeleton ready to be used and adapted to the new features. Other existing limitations were that the Wordpress File Upload plug-in doesn't allow to specify the directory that the file should be uploaded to, so my suggestion is that in the future it could be created a script that organizes the uploaded files to the desired directories. This future work is highly facilitated now because I added a way to connect to the WordPress server database. In terms of competitors results, it is needed to decide the final database structure and defined how the results should be organized but there is nothing new in this work, since that in terms of code, this is done simply by using code that I made and adapt to desired database tables for example.

5 Conclusion

Geometry Friends website is now ready to be upgraded, all the desired new features are supported by my work during the semester. In my opinion, the group was very closely-knit and everyone had a good contribution. This experience managed to improve my communication and social skills since there was a constant link between the group. The checkpoint dates helped me to organize myself and to be aware of the time that I had to work in this project. Since I did not know any of the other members of the project, I managed to know new people and to work as a team with someone new is always a good challenge. Since I was the only one working directly with the front-end, I had to have self initiative and I start sketching the solution and debate my doubts with the other members. I believe that now I have more self confidence and I am at ease to take responsibilities. With experience comes confidence and motivation to keep working in projects like this one.

Acknowledgments

I would like to thank Professor Rui Prada that oriented us in this project, and also thank student Fábio Almeida that is working in this project as his thesis and helped us a lot in order to familiarize with the existing project and provided us some resources to work with. Finally thank my direct group colleagues Pedro Costa and Edgar Santos that were very available and good team members.

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