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| **CREATIVE COMPUTING**  **Individual research Project Proposal 2022** |
| 1. **Student name: Ewan Smith** 2. **Student number: s4001418** 3. **Date: 25/01/2023** 4. **Course: Computer Games Programming** 5. **Adviser: ?** |
| 1. **Objectives of the proposed study (including provisional title)**    1. **Provisional Title: (Not more than 20 words.)**   Balance in Games: An investigation into utilizing dynamic difficulty adjustment in multiplayer games to maximize enjoyment   * 1. **Research Question:**   Balance in Games: An investigation into utilizing dynamic difficulty adjustment in competitive multiplayer games to maximize enjoyment  How does perceived unfairness effect enjoyment in multiplayer games and is there a way to minimise the effect?  Clearly state a research question that will help you frame your investigation.   * 1. **Objectives:**   List 3 objectives that will help you to answer this question.  Give a detailed list of specific, measurable outcomes. Try to make your objectives tightly focused and clear. Also, remember to ensure that they are achievable in the available timeframe and word limit. Do not be tempted to make your objectives too grand – keep them simple and precise. There is no right number of objectives, but given the limits of the research paper it is wise not to try to create too many goals for your work. As a rule of thumb, developing 3 objectives is appropriate. Consider which part of your research (literature review, compiling recommendations or conclusions will achieve each objective).   * Research and evaluate why ‘fun’ games are ‘fun’. * Evaluate case studies where dynamic difficulty adjustment is used. * Determine the most effective methods of dynamic difficulty adjustment. * Create a generic and a specific algorithm for dynamic difficulty adjustment for multiplayer games. |
| 1. **Justification for the Research**   **(This section should outline the context of the study, identifying some of the principal themes or problems identified by current or previous research and the literature; references must be cited. The analysis of the context should make it clear why the study is considered to be worthwhile.)**  What is the problem?  Who is it important to?  What is the impact or consequence of the problem?  What is your research question that will answer this?  Make sure you support your statements with evidence from journals – we need to see that you have done some reading!  This will be the longest section of your proposal. It should explain why you feel the research paper that you are planning is worth the effort and where necessary clarify terminology used. It may be expressed as a combination of a problem that needs solving, a question that needs answering or something that you find exciting and has aroused your curiosity, perhaps during your work placement year. As part of this you should demonstrate some knowledge of the relevant academic literature and show where your proposal fits into this debate. You will be expected to show a clear link between the main previous research that has been done on your research topic and the content of your proposal. This is not the same as the critical literature review you will present in your final research paper. It will just indicate the key literature sources from which you intend to draw your ideas and provide prima facie evidence that your research topic is grounded in the academic literature.  This section should lead smoothly into a single research question. This should leave your Adviser in no doubt as to precisely what it is your research paper seeks to achieve.  Games are designed to be enjoyable or else they won’t sell and make money.  This is why accessibility is becoming more and more important, games such as The Last of Us 2 and God of War: Ragnarok have accessibility menus to customize closed captions and remap control schemes.  However, accessibility isn’t just for those who are disabled, difficulty can play a large part into accessibility, the average gamers are adults (Statista, 2021) meaning they have jobs and responsibilities that younger gamers such as teenagers and children won’t have. Which means they may have significantly less time to play games and may go long periods between gaming sessions.  In competitive multiplayer games the opposition is comprised of other players, usually of similar skill level through a matchmaking system. Whether the genre is puzzle, strategy or shooter there is usually a winner and a loser in these games, winning or losing doesn’t make a game fun or not fun rather “polarizing” the perception of fun however losing players were more likely to play again (A. Ozok, 2013), this doesn’t mean that games are more fun for losing players, loss aversion is a strong behavioural trait that may lead to games that are hard to win being less popular.  Dynamic difficulty adjustment (DDA) is used in a variety of games such as Mario Kart or other racing games that feature “rubber-banding” in order to make sure the player doesn’t fall too far behind or get too far ahead, Left 4 Dead features an AI “Director” which controls various aspects of the game such as how many zombies spawn, what types spawn and how many health packs/weapons spawn all depending on how the players are faring.  Electronic Arts(EA) owns a patent for DDA which tracks how the user interacts with the game to generate prediction models that adjust the gameplay to keep player retention high. According to EA themselves in a FIFA forum post – “We would never use it to advantage or disadvantage any group of players against another in any of our games.”  I believe that with the frustration some players feel anecdotally in competitive multiplayer games, there is an opportunity to develop new technology that can expand the competition in games and allow it to be more accessible.   * 1. **References: (References must be included. List ALL and ONLY cited work. Use the APA/Harvard style guide.)**   We expect to see at least 4 academic journals cited. Usually there are more as well as other sources such as books and websites.  Jaffe, A.B., 2013. *Understanding game balance with quantitative methods* (Doctoral dissertation).  Andrade, G., Ramalho, G., Gomes, A. and Corruble, V., 2006. Dynamic game balancing: An evaluation of user satisfaction. In *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment* (Vol. 2, No. 1, pp. 3-8).  Andrade, G., Ramalho, G., Gomes, A. and Corruble, V., 2006. Dynamic game balancing: An evaluation of user satisfaction. In *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment* (Vol. 2, No. 1, pp. 3-8).  Volz, V., Rudolph, G. and Naujoks, B., 2016, July. Demonstrating the feasibility of automatic game balancing. In *Proceedings of the Genetic and Evolutionary Computation Conference 2016* (pp. 269-276).  **https://www.statista.com/statistics/300513/gaming-by-demographic-group-uk/** |
| 1. **Output design: (Describe the proposed output design for your research.)**   Answer each point below for your own research; put your answers into sentences for this section.   * What is the scope of your output design? * Is your output suitable for a level 6 project? * What platform will it be delivered on? * Justify your choices   This section outlines how you intend to go about achieving your research objectives and help establish that your proposal is viable. In this section you should explain how you intend to carry out the research and your overall strategy.  In short, you should demonstrate to your Adviser that you have thought carefully about all the issues regarding your method and their relationship to your research objectives.   * Research ‘fun’ in multiplayer games * Research dynamic difficulty adjustment techniques used across the industry * Find pros and cons * Determine what different multiplayer games across genres have in common * Use that determination along with the dynamic difficulty adjustment techniques to create a generic algorithm designed to be genre agnostic and a specific algorithm for one game. |
| 1. **Timetable of main stages of the study: (Include a Gantt chart showing the main activities, stages and targets to be achieved during the project.)**   Give a list of tasks with completion dates, or Gantt chart. Make sure that you put in all the steps needed to read the literature, gather data, analyse data, write up the research, meet with your Adviser. It should normally cover the period from September to January.  This will also help you to assess the viability of your research proposal. It will be helpful if you divide your research paper into stages. Discuss relevant stages for your research paper with your Advisor. This will give you a clear idea as to what is possible in the given time scale. Experience has shown that however well you organise your time the whole process seems to take longer than anticipated. For some research papers you may already be able to generate a reasonably tight framework; for others the process you have chosen to adopt may dictate a looser framework that you will need to tighten as your research unfolds.  Inevitably there may be some aspects of your chosen topic about which you are uncertain at this stage. It is important that you highlight these in your research proposal so that they may be discussed with your Adviser at an early stage. Consider any difficulties you may encounter, with contingency plans for overcoming these. |

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| 1. **Mood Board:**   Create a mood board that summarises your research ideas.  UX Experience  Unity multiplayer  Switchboard of difficulty adjustment  Flow state  Input queueing  Invisible tricks to guide players  Intent of difficulty adjustment |
| ***Signature: Date:***  ***I have read and agree to abide by the ‘University’s ethical principles and guidelines for research’ as outlined in CT6007 UoG Ethics Guidelines. Submission of this form binds you to this requirement.*** |