Computer Science with Games Development

First-Person Stealth Game Prototype

Tayyab Hussain

[Tayyab.Hussain@city.ac.uk](mailto:Tayyab.Hussain@city.ac.uk)

Consultant: Martin Walter

I proposed the project

Word Count = 964

**Problem to be solved:**

Stealth games have been very popular in the last decade. Games like Hitman 3(IO Interactive, 2021), Batman Arkham Knight(Rocksteady Studios, 2015), Metal Gear Solid V: The Phantom Pain(Kojima Productions, 2015) and Splinter Cell: Blacklist(Ubisoft Toronto, 2013) are all exceptional examples of good stealth games. However, these are all third-person games. There is a severe lack of first-person stealth games. Dishonoured 2(Arkane Studios, 2016) is the only relatively recent game that meets the first-person stealth criteria.

There have been many attempts by games such as Call of Duty Modern Warfare(Infinity Ward, 2019) and Battlefield 1(DICE, 2016) to include stealth levels within their FPS games, however, these often feel shoehorned in. A few areas in which these games lack compared to their third-person counterpart include a poor stealth AI, an unintuitive UI design for stealth, a lack of stealth-specific mechanics, limited movement/traversal options and a lack of balance between the player and the enemies.

I am going to create a prototype First-Person Stealth game that will incorporate a few of the features that make third-person stealth games great. The specific areas I want to look at are the stealth AI, stealth UI, stealth mechanics, player movement/traversal and balancing the player and enemies.

The prototype will be one level of the game created using Unity and the scripts will be written in C#. To assist me with the technical side of development I will utilise the Unity Learn website(Unity Learn, 2020), Game Coding Complete(Mcshaffry, 2013) and Artificial Intelligence for Games(Millington, 2019).

**Project Objectives:**

The project’s main objective is to create a First-Person Stealth level using Unity. This will have 5 main aspects, AI, UI, Mechanics, Movement and Balance.

1. Stealth AI
   1. The stealth AI will be designed with a behaviour tree that will have at least 5 different states for the enemy. E.g., Cautious, Search, Attack, etc
   2. The AI will use a pathfinding algorithm to find the player when in the searching state.
   3. The AI will not have a binary detection of the player. The AI should slowly detect the player over time and not instantly go into a state of alert when they spot the player.
2. Stealth UI
   1. There should be a small icon to allow the player to determine the current state of an enemy. E.g., Red for an attack state and amber for a search state.
   2. There should be a UI element that allows the player to determine whether they are about to be spotted or not
3. Stealth Mechanics
   1. There should be 2 different stealth mechanics/gadgets that the player can use in the level. E.g., Binoculars to mark targets, Agent 47`s piano wire(IO Interactive, 2021), and Sam Fisher`s fibre optic cable(Ubisoft Toronto, 2013).
   2. The player should only be able to use the mechanic a finite number of times within the level.
4. Movement/Traversal
   1. The player should have a unique and original way to traverse the level that differs from walking, running, crouch walking and crawling prone. E.g., Batman`s Grapnel (Rocksteady, 2015) and Dishonoured`s Blink ability (Arkane Studios, 2016)
5. Balance
   1. Enemies should be much stronger than the player in terms of health and damage they can do.
   2. The weapons the player can use should be very weak when taking on multiple enemies
   3. The player should not regen health or have any way to replenish health in the level
6. Other Functionality
   1. Main menu and pause menu
   2. Audio and Visual fx
   3. Saving and loading

**Project Beneficiaries:**

The main beneficiary of this project is other developers specifically working on FPS games who want to implement a stealth level into their game. My project should give them a working prototype of how to better implement a stealth level using some of the prominent features used successfully in third-person stealth games.

Another beneficiary of my project is developers who may want to build on top of my prototype to produce a full first-person stealth game.

**Work Plan:**

I will be using an Agile development methodology to develop my project. For each stage of my project, I will design, implement and test the feature. If the feature does not meet the objective, I will redesign, implement and test it again. For each stage, I will also include some time towards the end of the total time dedicated to that feature to complete the write-up of any methods, tests or anything reacted to that feature that needs to go into my Final Project Submission.

I have included a Gantt chart below. It should be noted that where I have put ‘complete the write-up’ below a specific objective involves things such as the methods, code and testing related specifically to that objective. Whereas at the top with the Final Project Submission, the work here is more related to the project as a whole for things such as the literature review or the output summary for the final submission.

Chart

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**Risks to my project:**

I have included a simple risk chart that looks at what the risks to my project may be. How likely they are to happen, how severe the consequences would be if they were to happen, how can I mitigate the risks, how can I mitigate the consequences if the risk occurred and what impact the mitigations would have on my project.

* **Likelihood:** 1(Unlikely) - 5(Likely)
* **Severity:** 1(Insignificant) – 5(Significant)
* **Risk Factor** = Likelihood x Severity
  + Risk Factor 0 - 7: **Low risk**
  + Risk Factor 8 - 17: **Medium Risk**
  + Risk Factor 18 - 25: **High Risk**

A screenshot of a computer

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A screenshot of a computer

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**Risks that my project can cause to others:**

I do not believe my project can cause harm to any end-user. It is a simple prototype level of a single-player offline game and does not pose any obvious threats to any end-user.

**Ethics Checklist:**

|  |  |  |
| --- | --- | --- |
| **A.1 If you answer YES to any of the questions in this block, you must apply to an appropriate external ethics committee for approval and log this approval as an External Application through Research Ethics Online - https://ethics.city.ac.uk/** | | *Delete as appropriate* |
| 1.1 | Does your research require approval from the National Research Ethics Service (NRES)?  e.g. because you are recruiting current NHS patients or staff?  If you are unsure try - https://www.hra.nhs.uk/approvals-amendments/what-approvals-do-i-need/ | **NO** |
| 1.2 | Will you recruit participants who fall under the auspices of the Mental Capacity Act?  Such research needs to be approved by an external ethics committee such as NRES or the Social Care Research Ethics Committee - http://www.scie.org.uk/research/ethics-committee/ | **NO** |
| 1.3 | Will you recruit any participants who are currently under the auspices of the Criminal Justice System, for example, but not limited to, people on remand, prisoners and those on probation?  Such research needs to be authorised by the ethics approval system of the National Offender Management Service. | **NO** |
| **A.2 If you answer YES to any of the questions in this block, then unless you are applying to an external ethics committee, you must apply for approval from the Senate Research Ethics Committee (SREC) through Research Ethics Online -**  **https://ethics.city.ac.uk/** | | *Delete as appropriate* |
| 2.1 | Does your research involve participants who are unable to give informed consent?  For example, but not limited to, people who may have a degree of learning disability or mental health problem, that means they are unable to make an informed decision on their own behalf. | **NO** |
| 2.2 | Is there a risk that your research might lead to disclosures from participants concerning their involvement in illegal activities? | **NO** |
| 2.3 | Is there a risk that obscene and or illegal material may need to be accessed for your research study (including online content and other material)? | **NO** |
| 2.4 | Does your project involve participants disclosing information about special category or sensitive subjects?  *For example, but not limited to: racial or ethnic origin; political opinions; religious beliefs; trade union membership; physical or mental health; sexual life; criminal offences and proceedings* | **NO** |
| 2.5 | Does your research involve you travelling to another country outside of the UK, where the Foreign & Commonwealth Office has issued a travel warning that affects the area in which you will study?  *Please check the latest guidance from the FCO -* [*http://www.fco.gov.uk/en/*](http://www.fco.gov.uk/en/) | **NO** |
| 2.6 | Does your research involve invasive or intrusive procedures?  These may include, but are not limited to, electrical stimulation, heat, cold or bruising. | **NO** |
| 2.7 | Does your research involve animals? | **NO** |
| 2.8 | Does your research involve the administration of drugs, placebos or other substances to study participants? | **NO** |
| **A.3 If you answer YES to any of the questions in this block, then unless you are applying to an external ethics committee or the SREC, you must apply for approval from the Computer Science Research Ethics Committee (CSREC) through Research Ethics Online - https://ethics.city.ac.uk/**  **Depending on the level of risk associated with your application, it may be referred to the Senate Research Ethics Committee.** | | *Delete as appropriate* |
| 3.1 | Does your research involve participants who are under the age of 18? | **NO** |
| 3.2 | Does your research involve adults who are vulnerable because of their social, psychological or medical circumstances (vulnerable adults)?  This includes adults with cognitive and / or learning disabilities, adults with physical disabilities and older people. | **NO** |
| 3.3 | Are participants recruited because they are staff or students of City, University of London?  For example, students studying on a particular course or module.  If yes, then approval is also required from the Head of Department or Programme Director. | **NO** |
| 3.4 | Does your research involve intentional deception of participants? | **NO** |
| 3.5 | Does your research involve participants taking part without their informed consent? | **NO** |
| 3.5 | Is the risk posed to participants greater than that in normal working life? | **NO** |
| 3.7 | Is the risk posed to you, the researcher(s), greater than that in normal working life? | **NO** |
| **A.4 If you answer YES to the following question and your answers to all other questions in sections A1, A2 and A3 are NO, then your project is deemed to be of MINIMAL RISK.**  **If this is the case, then you can apply for approval through your supervisor under PROPORTIONATE REVIEW. You do so by completing PART B of this form.**  **If you have answered NO to all questions on this form, then your project does not require ethical approval. You should submit and retain this form as evidence of this.** | | *Delete as appropriate* |
| 4 | Does your project involve human participants or their identifiable personal data?  *For example, as interviewees, respondents to a survey or participants in testing.* | **NO** |

**References:**

IO Interactive (2021). *Hitman 3* [Computer Game]. Available at <https://store.steampowered.com/app/1659040/HITMAN_3/> (Downloaded: )

Rocksteady Studios (2015). *Batman: Arkham Knight* [Computer Game]. Available at <https://store.steampowered.com/app/208650/Batman_Arkham_Knight/> (Downloaded: )

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Ubisoft Toronto (2013). *Tom Clancy’s Splinter Cell: Blacklist* [Computer Game]. Available at <https://store.steampowered.com/app/235600/Tom_Clancys_Splinter_Cell_Blacklist/> (Downloaded: )

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Unity Learn (2020). *Unity Learn* [online]. Available at: <https://learn.unity.com/>

Mcshaffry, M. (2013). *Game coding complete*. Boston, Ma: Course Technology, Cengage Learning.

Millington, I. (2019). *AI for Games, Third Edition*. CRC Press.