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Super Neat Analytics for Collegiate Esports (SNACE)

Team Ekans Spelled Backwards

Our Project

Project Purpose

Drive improvement of play for collegiate esports players based on data-driven insights

Goal Statement

Providing a UX-focused tool for game data visualization and analysis

Background

Our project aims to fill a void in collegiate Overwatch esports by providing a useful and usable tool for data visualization and analysis. This tool will be web-based and highly accessible, with a focus on user experience and flexibility. Players, coaches, and analysts will use 2D (graphical) and 3D (spatial) visualization of game data to gain insights and improve their play beyond what is possible with simple analysis of replay footage. Our hope is to add an extra tool for collegiate coaches and players to improve their understanding of the game and set their team up to succeed.

Further Goals

1. Provide insights useful to players, coaches, and analysts/casters alike

2. Create a tool user-friendly enough that it can be used by non-players to learn more about the game itself

3. Offer enough customization options that users can discover insights about game data that we didn't envision for them

Novel Contributions

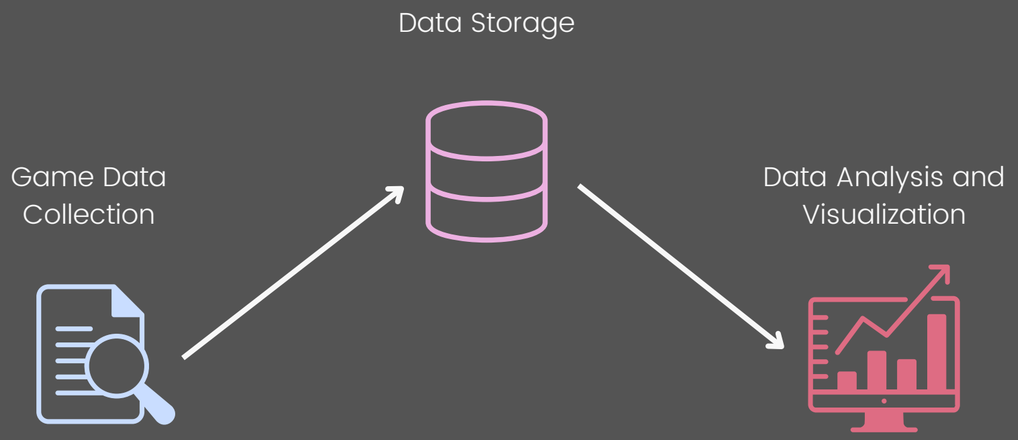
- First significant OW2 data analysis project
  - Somewhat similar to tools developed for other games (ex. BallChasing.com for Rocket League), but previous analysis tools for Overwatch tools have been limited/lackluster
  - Ideally could provide an advantage to UC's own esports teams and any other teams that choose to use the tool
- Platform for data exploration that 3D team-based shooters haven't had before
  - Types of data specific to team-based shooters can be analyzed in ways not yet seen
  - ex. spatial relationships between players, spatial density of statistics on map, comparison of player statistics over time throughout match/game

Broader Impacts

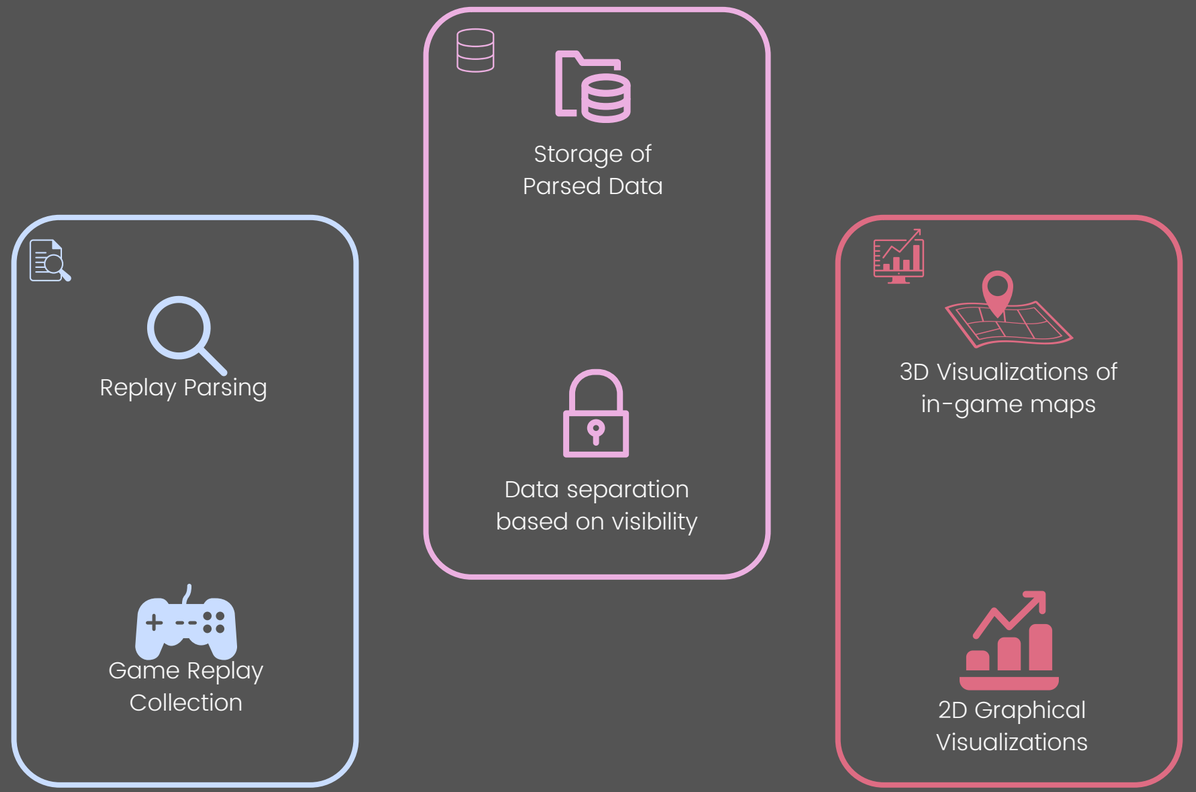
- An approachable app for gameplay analysis could provide a lens through which to view the game like players do (in-game spatial awareness, knowledge of ability cool-downs, status of teammates, etc.; "game sense")
  - People that have never played Overwatch, or any team-based shooter, might gain an appreciation for the value/validity of playing these games competitively
  - Great for esports outreach both inside and outside the university

Design Diagrams

D0 Diagram



D1 Diagram



Design Diagrams

D2 Diagram

Technologies Used

1. D3 - JavaScript data visualization API
    - The backbone of our application; used for all 2D visualizations

2. **OverPy** - Python library for writing custom "workshop codes" without using the game's built-in UI
    - Used to more easily write/edit workshop code(s) to collect in-game data; enabled editing existing workshop code when in-game UI was not yet available for OW2

3. **OverTools** - data mining tool for extracting assets from the game's source
    - Extracted maps used to generate high-fidelity 2D layout images using Blender
    - Map assets may be used for future 3D visualizations via WebGL

Milestones, Results

1. Research game data collection capabilities and survey possible users
   - Conducted background research into methods of collecting data from a variety of competitive games (Valorant, CS:GO, Rocket League, Overwatch) before deciding on which game to focus on
   - Wrote and distributed a survey to potential users for OW2 - players, coaches of collegiate esports teams - to inform our planned data collection and analytics
   - **Completed October 2022**

2. Collect/parse game data using an existing or custom tool
   - Preliminary data collected using existing “workshop code” - script written using the in-game workshop API
   - Workshop code modified using OverPy to expand data collected
   - Python script used to parse, pre-process data as .JSON files
   - **Initial data collected November 2022, script improvement ongoing**

3. Implement 2D visualization of data
   - 2D visualization implemented using D3 library
   - Variety of visualizations designed for interactivity, data exploration
   - **First visualizations made January 2023, expansion/refinement in progress**

Milestones, Results (Continued)

4. Implement 3D visualization of data
    - 3D visualization will be implemented using Unity and/or WebGL, with an initial focus on basic functionality such as plotting player position on a 3D rendering of the in-game map
    - **Implementation postponed until after v1.0**

5. Combine data collection and visualization into a functional app v1.0
    - With basic data collection and 2D visualization implemented, combine everything together into a web application that can be deployed on a live website
    - Site development underway in parallel with 2D visualizations
    - **Expected completion 03/06/23**

6. Refine app based on user feedback and expansion of functionality
    - Provide access to our app to UC's Overwatch teams, gather feedback on our visualizations and their value to the teams
    - Decide on next steps in terms of helpful visualizations based on feedback
    - **Expected completion 03/31/23**

7. Stretch/post-graduation goal: implement database for storage of user-uploaded data

Overall Expected Spring Accomplishments

- Working prototype including data collection and 2D visualization
  - Positional + time data paired with wide range of in-game statistics (damage done/taken, abilities used, etc.) to enable user-driven exploration of data
  - More tailored visualizations provided to highlight key gameplay insights
- v1.0 demoed to survey respondents who expressed interest in final product, initial feedback gathered
- v1.0 of tool made available to UC's OW teams to freely use

Challenges Faced So Far

- Survey data was somewhat inconclusive - difficult to get many responses
  - Key takeaway: gameplay (and particularly data) analysis is not currently a focus of many players
  - Primary audience may be casters/analysts and more curious casual players, rather than competitive players like we planned initially
  - Will need to "sell" the app to competitive players less interested in in-depth analysis
  - Have to make it clear how our tool can improve play tangibly
- Lack of in-game workshop code editing on initial release of OW2
  - Had to turn to separate 3rd-party Python library (OverPy) to be able to modify our data collection at all
  - Small workshop bugs, changes are ongoing due to how new the game is