Motivation

The history of modern PC gaming is a race between the development of new hardware at the pace of Moore’s law and the game requirements required for playing more complex and visually appealing games. This presents a challenge for consumers purchasing PCs and selecting their components. A high-end CPU or GPU might satisfy new game requirements for longer but are typically significantly more expensive than mid-range and low-end counterparts. Gaming magazines and online “experts” offer suggested computer builds but no analysis is ever presented for why specific components are selected. This proposed project uses historical PC video game requirements and hardware information to provide a data-driven analysis of which CPU, GPU, and RAM options should be considered given their gaming preferences. The analysis would suggest component combinations and estimate expected performance over time based on historical trends. This would be of interest to both PC gaming enthusiasts and PC manufacturers targeting the gaming market segment.

Data Sources

Computer game publishers are obliged to release video game requirements to consumers so that they know if their PC is capable of playing a game before purchasing it. The website <https://gamesystemrequirements.com/> was scraped for game requirement information. This dataset required significant cleaning as requirements are written by developers who may use a variety of terms to communicate exactly what component, component family, architecture, or other performance metric is suggested.

CPU and GPU specifications were both scraped from the website <https://www.techpowerup.com/> . RAM specifications were collected manually from Wikipedia. Not yet retrieved are on-demand component price information from either amazon.com or newegg.com .

Analysis

Preliminary analysis found in the linked plots ([here](https://github.com/AkodoD/DI-Project-Proposal/blob/master/Game%20and%20Computer%20Analysis%20DI.ipynb)) shows biannually and yearly historical video game requirements and hardware releases for GPUs and CPUs respectively. The GPU chart shows that the highest end GPU can generally meet game requirements for the most demanding game in the year of its release and for a few following years. The same is true for the average game GPU requirement and average released GPU. This suggests that GPU performance is more important and may be worth a larger portion of a build budget.

The CPU chart shows that CPU hardware capability increases are outpacing game requirements from ~2014 on. This suggests that older or lower-end CPUs are likely to provide sufficient computational power for gaming PCs reducing the require CPU component cost.

The ultimate vision for the project would elicit a user’s favorite games and computer budget. The video games data would be used to perform a regression based on game categories (strategy, MMO, puzzle, etc.) to estimate likely future requirements. The regression would be used to create a projected synthetic sample of game requirements for the user’s desired game categories for the next 5 years. The budget would then be divided among available components to find the CPU/GPU/RAM combination that maximizes the number of games playable with the synthetic set. The top 2 or 3 combinations would be provided to the user.