

Video Game Sales Analytics

Historical Trends and Predictive Modeling

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NSF-ATE Summer Internship 2025

Supervised by Prof. Blamey

Project Overview

Objective

Analyze video game sales data from 2017-2024 to identify market trends and develop predictive models for future sales performance.

Key Goals

- Create comprehensive data visualizations
- Identify genre-based sales patterns
- Develop regression models for sales prediction
- Provide actionable market insights

Methodology

- **Descriptive Analytics:** Historical pattern analysis
- **Inferential Modeling:** Predictive forecasting
- **Time Period:** 2017-2024 historical data
- **Forecast:** 5-year predictions through 2029

[Python](#)[Pandas](#)[Matplotlib](#)[Scikit-learn](#)[GitHub](#)[Replit](#)

Complete Project Timeline - 8 Weeks

Week 1-2

Jun 2-15

Setup & Research

Week 3-4

Jun 16-29

Proposal & Development

Week 5-6

Jun 30-Jul 13







Implementation & QA

Week 7-8







Jul 14-27

Documentation & Delivery

Phase 1: Foundation (Weeks 1-4)

-  GitHub Projects setup and tool selection
-  Data source identification via UHMC resources
-  AI-assisted development workflow
-  Local + Replit environment configuration
-  Project scope refinement to video game analytics
-  Complete proposal delivered on schedule

Phase 2: Execution (Weeks 5-8)

-  Repository creation with professional structure
-  Interactive analytics dashboard development
-  Code review and optimization
-  Live server deployment and sharing
-  Comprehensive documentation creation
-  Final deliverables and presentation

Focus: Infrastructure & Planning

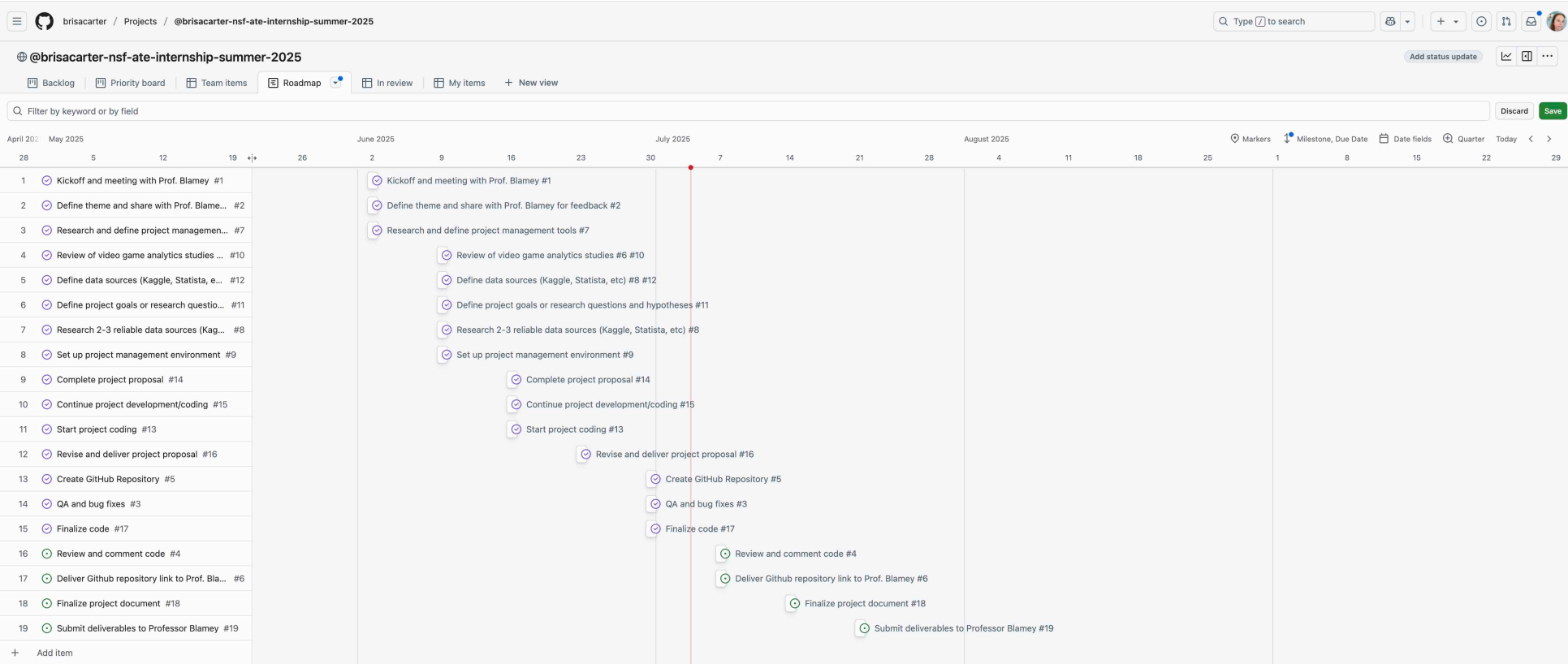
Establishing solid foundation for project execution with proper tools and clear objectives.

Focus: Implementation & Delivery

Building complete analytics solution with professional presentation and documentation.



Project Management with GitHub Projects



GitHub Project Board: Timeline view showing 8-week internship progression

Project Management Tool Selection

GitHub Projects was chosen as the primary project management tool for this internship, combining powerful task tracking with seamless code repository integration.

Why GitHub Projects?

Tool Selection Rationale

Selected GitHub Projects for its seamless integration with version control, free access for academic use, and adequate timeline visualization capabilities. This choice enabled comprehensive project tracking while maintaining direct connection to code repository.

Project Organization Benefits

- **Visual Timeline:** Clear progression across 8-week internship
- **Task Dependencies:** Logical workflow from planning to delivery
- **Academic Integration:** Perfect for university-supervised projects
- **Professional Development:** Industry-standard project management experience

Workflow Advantages

- **Repository Connection:** Direct link between tasks and code changes
- **Status Tracking:** Real-time updates on completion progress
- **Stakeholder Visibility:** Professor and team can monitor progress
- **Documentation:** Built-in history of project evolution

Academic vs. Industry Tools

While exploring alternatives like Asana and ClickUp, GitHub Projects proved ideal for academic projects requiring both version control integration and professional project management capabilities without subscription costs.

⚡ Project Management Implementation

Project Management Features Used

- **Timeline View:** Visual progression across 8 weeks
- **Task Organization:** 19 structured tasks from kickoff to delivery
- **Milestone Tracking:** Clear deliverable dates
- **Integration:** Seamless connection with GitHub repository
- **Progress Monitoring:** Real-time status updates and completion tracking

Task Management Strategy

Each task was carefully planned with specific deliverable and deadlines to ensure smooth project flow and stakeholder alignment.

Key Project Tasks Tracked

- Kickoff meeting with Prof. Blamey
- Research and define project management tools
- Data source identification and access
- Project proposal development and delivery
- Code development and testing
- Repository creation and organization
- Final documentation and deliverables

GitHub Projects Advantage: Free tool with excellent repository integration, perfect for academic projects requiring version control and task management.

Project Management Impact

Planning

Structured approach

Tracking

19 tasks monitored

Integration

Code & tasks linked

Delivery

On-time completion

Technical Implementation

Data Sources

- **Primary:** Video game sales datasets (2017-2024)
- **Records:** 16,000+ video games
- **Platforms:** 30+ gaming platforms
- **Regions:** North America, Europe, Japan, Others

Analysis Components

- **Sales by Genre:** Bar charts showing genre performance
- **Platform Performance:** Console vs platform comparisons
- **Publisher Rankings:** Top performing publishers
- **Regional Analysis:** Geographic sales patterns

Predictive Modeling

- **Linear Regression:** Sales forecasting model
- **5-Year Forecasting:** Predictions for 2025-2029
- **Trend Analysis:** Growth vs declining patterns
- **Statistical Inference:** Confidence intervals and significance testing

Dashboard Features

- Interactive time period selection
- Multiple visualization types
- Analytical and inferential displays
- Comprehensive results summary

Repository Structure Evolution

Initial Repository (Week 5)

```
root/
├── public/
│   ├── pictur_public/
│   │   └── bri_waikoloa_hat_cropped.jpeg
│   ├── about.html
│   ├── analytical.html
│   ├── index.html
│   ├── inferential.html
│   ├── script.js
│   └── styles.css
├── all_analysis_summary.png
├── genre_analysis.png
├── historical_analysis.png
├── main_analytics.py
├── main_sales.py
├── main.py
├── vgchartz-2024.csv
├── vgsales.csv
└── README.md
```

Issues: Flat structure, mixed file types, poor organization, difficult navigation

Organized Repository (Week 6+)

```
root/
├── README.md
├── data/
│   ├── raw/
│   │   ├── vgchartz-2024.csv
│   │   └── vgsales.csv
│   └── processed/
├── src/
│   ├── python/
│   │   ├── main.py
│   │   ├── main_analytics.py
│   │   └── main_sales.py
│   └── web/
│       ├── js/script.js
│       └── css/styles.css
├── public/
│   ├── index.html
│   ├── about.html
│   ├── analytical.html
│   ├── inferential.html
│   ├── assets/
│   ├── images/
│   └── analysis/
├── docs/
└── config/
```

Improvements: Clear separation of concerns, logical hierarchy, professional structure, easy maintenance

Key Findings & Insights

Top Performing Genres (Global Sales)

- **Shooter:** \$63.9M (Leading genre)
- **Action:** \$62.2M (Close second)
- **Sports:** \$48.2M (Consistent performer)
- **Misc:** \$36.7M (Diverse category)
- **Racing:** \$35.9M (Stable market)

Platform Insights

- PS4 leads with 539.3M total sales
- Xbox One: 289.8M total sales
- Nintendo Switch showing strong growth
- PC gaming maintains consistent performance

Market Trends

- Shooter and Action genres dominate sales
- Regional preferences vary significantly
- Digital distribution impact visible
- Mobile gaming influence on traditional platforms

Challenges & Solutions

Major Challenges

Data Availability

Finding free, recent datasets with comprehensive gaming information proved difficult.

Technical Integration

Syncing between GitHub, Replit, and local repositories presented workflow challenges.

Scope Refinement

Original focus on local co-op games had to be adjusted due to data limitations.

Solutions Implemented

Librarian Collaboration

UHMC librarian Carmen provided access to Statista database for reliable data sources.

AI-Assisted Development

Leveraged AI tools for rapid prototyping, debugging, and code optimization.

Iterative Planning

Adopted agile methodology with weekly adjustments and continuous stakeholder feedback.

Technical Skills & Professional Development

Technical Skills Developed

- **Data Science:** Advanced Python libraries (Pandas, Matplotlib, Scikit-learn)
- **Project Management:** GitHub Projects, agile methodology
- **Data Visualization:** Interactive dashboard development
- **Statistical Analysis:** Regression modeling and forecasting
- **Version Control:** Git workflows and repository management
- **Code Organization:** Repository restructuring and optimization
- **Deployment:** Live server deployment and sharing

Professional Development

- **Academic Collaboration:** Working with Prof. Blamey and UHMC resources
- **Iterative Planning:** Weekly adjustments and continuous improvement
- **Stakeholder Communication:** Regular status updates and reporting
- **Problem-Solving:** Overcoming technical and resource constraints
- **Time Management:** Balancing internship with work commitments
- **Documentation:** Creating comprehensive project records
- **Presentation Skills:** Developing professional deliverables

Development Environment

Python

Pandas

Matplotlib

Scikit-learn

GitHub

Replit

HTML/CSS/JS

Git

Node

Express

Key Insights & Learning Outcomes

Major Insights Gained

AI as a Productivity Multiplier

AI tools significantly accelerated development and debugging processes, but required critical thinking for quality results. Learning to perfect AI usage through effective prompting is a valuable long-term investment.

Adaptability is Essential

Project requirements evolved throughout the internship, demonstrating the importance of flexible planning and iterative adjustments. "Flexibility is the name of the game."

Human Skills Still Critical

Despite AI's remarkable capabilities, human expertise remains essential for guidance through prompts, error identification, hallucination detection, and outcome adjustment. "Humans are still needed."

Repository Organization Matters

Restructuring code repositories for professionalism is challenging but crucial for project presentation and long-term maintenance.

Portfolio Enhancement

Professional Data Science Showcase

Complete end-to-end project demonstrating data collection, analysis, visualization, and predictive modeling capabilities.

GitHub Portfolio Piece

Well-organized repository showcasing best practices in code organization, documentation, and project management.

Career Applications

Industry Readiness

Professional development skills directly applicable to tech careers, particularly in data science and analytics roles.

AI Integration Strategy

Proven framework for leveraging AI tools effectively while maintaining human oversight and quality control.

Future Project Opportunities

- **Advanced Analytics:** Foundation for machine learning and AI projects
- **Real-World Applications:** Practical knowledge of data challenges and solutions
- **Research Extensions:** Deeper analysis of gaming industry trends and predictions
- **Technology Integration:** Experience combining multiple development environments

Long-term Impact

This internship has established a solid foundation for continued growth in data science, demonstrated the value of AI-assisted development, and created a professional portfolio piece that showcases both technical skills and project management capabilities.

Deliverables & Next Steps

Project Deliverables

✓ Proposal

Completed 06/29

✓ Repository

Completed 07/06

✓ Dashboard

Interactive Analytics

✓ Documentation

Weekly Reports

Repository Contents

- **GitHub Repository:** nsf-ate-internship-summer-2025
- **Interactive Dashboard:** Analytical and inferential displays
- **Data Analysis Scripts:** Python implementation
- **Documentation:** Weekly status reports and insights
- **Predictive Models:** 5-year forecasting algorithms

Future Enhancements

- Real-time data integration
- Machine learning model optimization
- Expanded genre and platform analysis
- International market deep-dive
- Game development lifecycle correlation

Repository: github.com/brisacarter/nsf-ate-internship-summer-2025

Project Links & Resources

GitHub Repository

github.com/brisacarter/nsf-ate-internship-summer-2025

Complete source code, data files, and documentation

GitHub Project Board

[Project Management Timeline](#)

8-week task tracking and milestone management

Live Dashboard

[Interactive Analytics Dashboard](#)

Live deployment with analytical and inferential displays

Project Documentation

[Complete Project Report](#)

Comprehensive documentation and weekly reports

Click any link above to access the corresponding project resource

Reflection & Learning Summary

Most Valuable Skills Acquired

AI-Assisted Development Mastery

Learning to leverage AI tools effectively while maintaining human oversight and critical thinking. This skill will be invaluable in future projects and career development.

Professional Project Management

GitHub Projects integration with development workflow provided hands-on experience with industry-standard project management practices.

End-to-End Data Science Pipeline

From data collection and cleaning to visualization and predictive modeling, gained comprehensive understanding of the complete analytics process.

Key Takeaways for Future Work

- **Flexibility First:** Project requirements will evolve; build adaptability into planning
- **Tool Integration:** Seamless workflow between development, version control, and project management tools is crucial
- **Stakeholder Communication:** Regular updates and clear documentation prevent misalignment
- **Quality Assurance:** Repository organization and code review processes are essential for professional deliverables
- **Continuous Learning:** AI tools accelerate development but require human expertise for quality outcomes

Personal Growth

This internship bridge academic learning with real-world application, demonstrating the value of structured learning combined with hands-on experience.

 **Thank You**

Questions & Discussion

Brisa Carter

Product Design and Research Leader

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