VETS 2 TECH

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ORGANIZATION: HAL AND INGE MARCUS SCHOOL OF ENGINEERING | SAINT MARTIN'S UNIVERSITY

MEET THE TEAM

BETH GALLATIN

Project Manager

Coordination, stakeholder communication

CONNIE RODRIGUEZ

Development

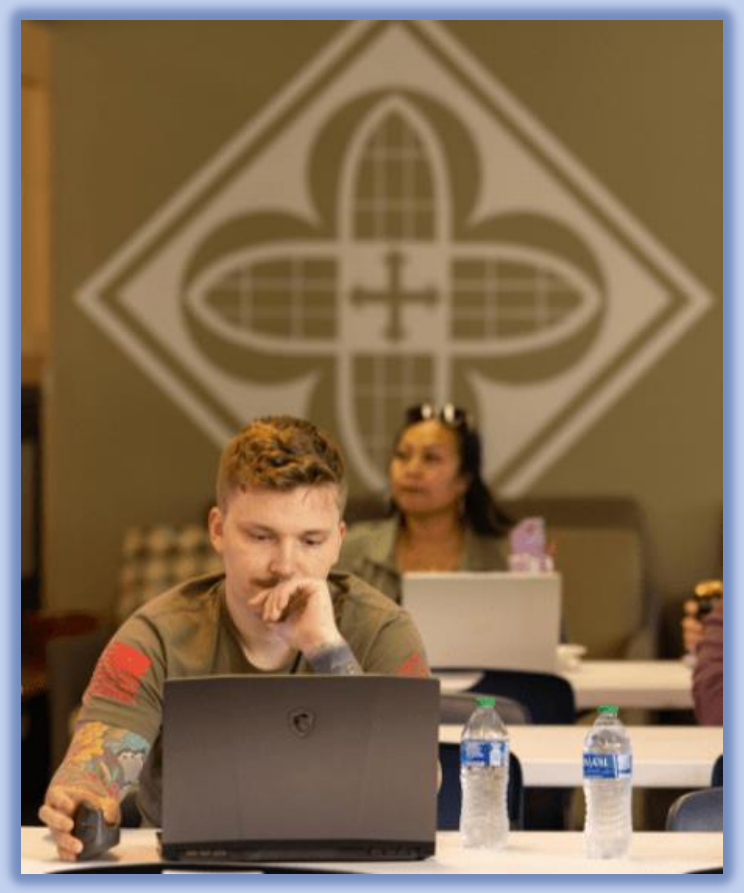
Backend, frontend, AWS integration

JOHN MCDURMON

Design

UI/UX design, user experience

PURPOSE



PROBLEM:

- Veteran's face challenges in transitioning to tech careers
- Accelerated programs require tailored support and resources.

GOALS:

- Provide guided learning paths and interactive study tools
- Enhance engagement through machine learning and AI-powered support
- Deliver predictive insights to improve outcomes

STAKEHOLDERS

Saint Martin's UNIVERSITY

WASHINGTON VETS2TECH

CLIENT DETAILS:

- Accelerated 16-week program for military personnel veterans and military families
- Professional development education and training in Computer Science and Information Technology
- Provides three learning pathways:
- Server Cloud Application (SCA)
- Cloud Application Development (CAD)
- Cybersecurity Administration (Cyber)

OBJECTIVE:

- Create a web platform that guides students to the best-fit program
- Provide real-time AI-powered support using a 'study buddy'
- Leverage Data Analytics for actionable insights to stakeholders
- Ensure Scalability, Usability, and Security

PROJECT CONSTRAINTS

TECHNICAL CONSTRAINTS

- AI Integration Complexity
- Scalability vs. Budget Constraints
- Data Privacy and Security Compliance
- Adaptive Testing Model Development

QUALITATIVE CONSTRAINTS

- User-centric Design
- Cross-platform Compatibility
- Stakeholder Feedback Integration
- Ethical Considerations

ENGINEERING AND COMPUTING PRINCIPLES

- **Modular and Scalable Architecture:**
  - Problem Solved: AI Integration Complexity and Scalability vs. Budget Constraints
- **Interface Segregation Principle:**
  - Problem Solved: Overloaded Interfaces and Complexity in Code Maintenance
- **Loose Coupling and High Cohesion:**
  - Problem Solved: Tight Dependencies and Difficult Maintenance
- **Agile Development and Iterative Feedback Integration:**
  - Problem Solved: Stakeholder Feedback Integration and User-Centric Design
- **Security by Design:**
  - Problem Solved: Data Privacy, Unauthorized Access, and Compliance
- **Robustness:**
  - Problem Solved: Handling Unexpected User Inputs, System Failures, and ensuring performance optimization.

DESIGN EXPLORATION AND ALTERNATIVES

HOSTING PLATFORM

- **AWS**
- AZURE
- Google Cloud Platform

DATA ANALYTICS

- **R**
- Python
- Tableau

QUIZ SYSTEM DESIGN

- **Custom Development**
- Learning Management System
- Open-source Quiz Libraries

ADAPTIVE LEARNING

- **AI Driven Adaptive Learning**
- Static Quiz Questions

AI POWERED

- **ML-powered AI**
- Basic Rule-based AI

USER EXPERIENCE

- **Inclusive and Intuitive UX**
- Minimal UX

PLANNING WITH TRELLO

Vets 2 Tech | Board | Filters | CR B JM JO KT +1 | Share

Sprint 2: Detailed Requirements Gathering and Refinement

- Gather detailed functional and non-functional requirements from WAV2T staff.
- Refine and prioritize features for minimum viable product (MVP) based on feedback.
- Develop initial user stories for key features (client management, project/task management).
- Create a project roadmap based on the refined information from WAV2T staff and their priority list.
- Finalize project timeline for the MVP and beyond 30% completion end of semester mark, aligning with our expectations.

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Backlog

Backlog

[Example task]

+ Add a card

Design

Design & Research

[Example task with designs]

ASP.Net Resources

1

AWS Resources

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To Do

To Do

1

Server specs:

Research with students

Research with mentors

Test questions for program exploration

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Doing

Doing

[Example task]

https://github.com/JohnMcDu

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ACM/FERPA/IEEE/ADA CODES, GUIDELINES, AND REGULATIONS

ASSOCIATION FOR COMPUTING MACHINERY

- Fairness
- Transparency
- Privacy
- Integrity

FAMILY EDUCATION RIGHTS AND PRIVACY ACT

- Data Protection
- Consent
- Confidentiality
- Student Rights

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

- Reliability
- Safety
- Professionalism
- Quality

AMERICAN'S WITH DISABILITIES ACT

- Accessiblity
- Inclusivity
- Usability
- Compliance

RISKS: ARTIFICIAL INTELLIGENCE

RISKS FOUND	MITIGATION
• Content Overlap or Redundancy	• Dynamic Content Creation
• Training Data Quality	• Regularly Updating Training Data
• Integration Complexity	• Using Modular Design for Isolation
• Real-Time Response Challenge	• Implementing Load Balancing
• Security	• Access Control, Tracking and Monitoring

RISKS: MACHINE LEARNING

RISKS FOUND	MITIGATION
• Algorithm Bias • Model Accuracy • Overfitting • Security of Machine Learning	• Using Diverse training datasets and regular bias audits • Appliied supervised learning algorithms with extensive validation • Using cross-validation and regularization • Employ adversarial training to make model resilient against malicious input

RISKS: DATA ANALYSIS

RISKS FOUND	MITIGATION
• Data Breach/Data Loss • System Security Vulnerablities • Misinterpretation of Data • Algorithmic Errors	• Implementing strong encryption protocols, secure data access control, regular security audits, and penetration testing • Enforcing secure user authentication and maintain transparency and data usage • Employing data validation checks • Executing testing and validation of all data

RISKS: GENERAL

RISKS FOUND	MITIGATION
• User Adoption and Engagement	• Conducted user engagement campaign
• Cross-Platform Compability	• Applying responsive design principles
• Unforseen Budget Overruns	• Implementing real-time budget tracking
• Proprietary Content	• Subject matter expert (SME's) used for intellectual property and content development
• Long-Term Maintenance Challenges	• Thoroughly documenting of all coding processes
• Operator Error in System Managment	• Recursive comprehensive training, having Standard Operating Procedures (SOP's) and role based access controls.

ACTION PLAN

2024

Sep

- Team Onboarding
- Defined project scope and objectives
- Gathered requirements and stakeholder input
- Researched platform architecture and technology stack

Oct

- Bi-weekly client meetings
- Finalized platform architecture and technology stack
- Researched AWS infrastructure setup and configuration
- Planned developmental sprints and created sprint roadmap utilizing Trello

Nov

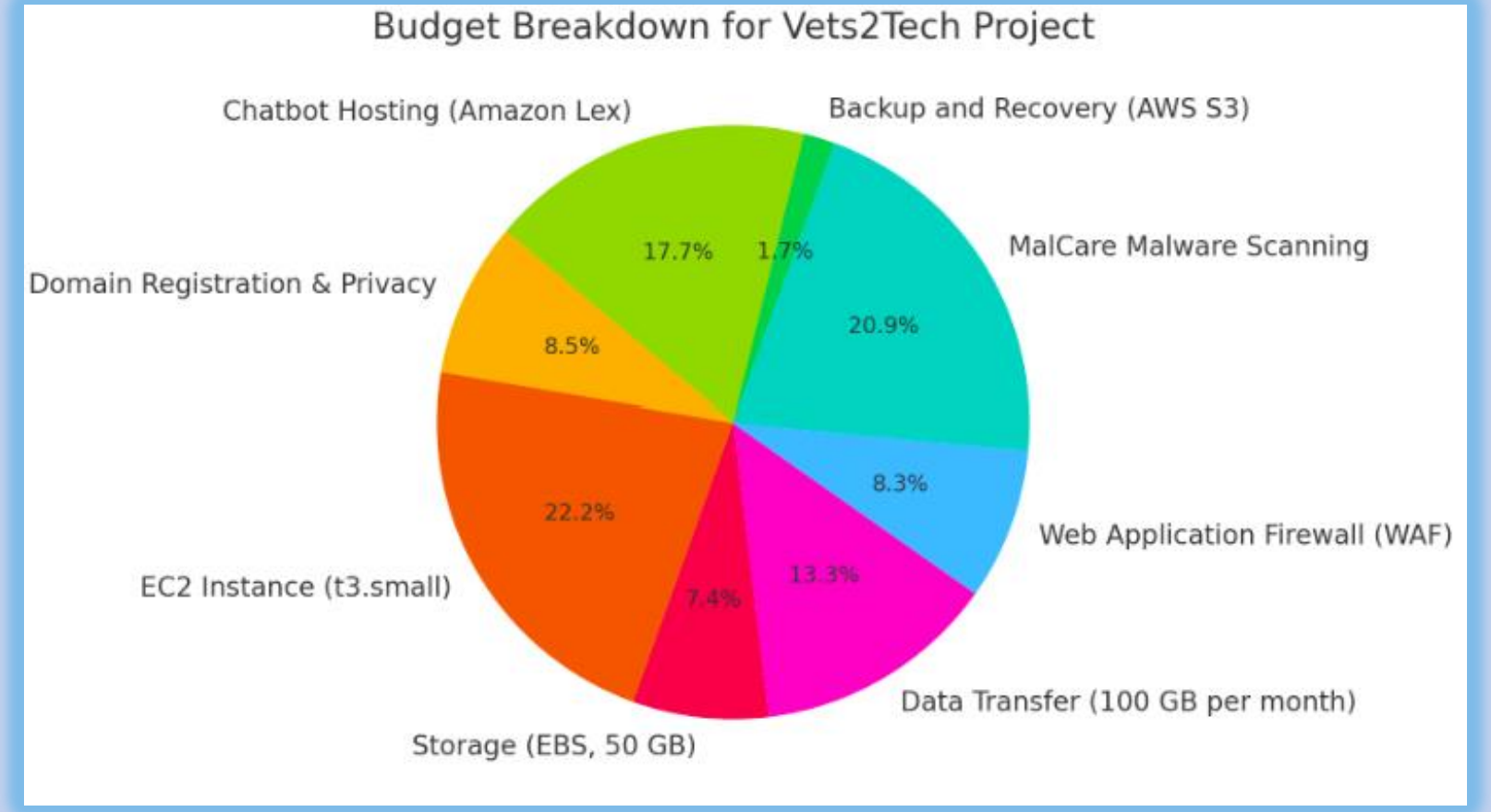
- Initialized version control with GitHub
- Setup development environment
- Completed sections 1-3 of the SRS document
- Create initial UI mock-ups
- Conducted market research and SME interviews
- Initiated question bank development

Dec

- Presentation to the EAB board
- Develop user authentication and registration

BUDGET

Item	Cost
Domain Registration & Privacy	$40.00
SSL Certificate (AWS ACM)	$0.00
EC2 Instance (t3.small)	$105.00
Storage (EBS, 50 GB)	$35.00
Data Transfer (100 GB per month)	$63.00
Web Application Firewall (WAF)	$39.20
MalCare Malware Scanning	$99.00
Backup and Recovery (AWS S3)	$8.05
Chatbot Hosting (Amazon Lex)	$84.00
Email Services (SES)	$0.00
Analytics (Google Analytics)	$0.00
Total	**$473.25**



NEXT STEPS

2025

Jan

- Complete core backend coding
- Finalize the integration of chatbot functionality
- Set up cloud infrastructure
- Begin API testing for backend services

Feb

- Develop initial adaptive testing model and training data
- Implement core security features
- Conduct initial testing of machine learning model
- Finalize data privacy measures to comply with FERPA

Mar

- Design frontend interface
- Integrate the frontend and backend services and machine learning components
- Begin user testing gather feedback
- Refine the user interface based on feedback

Apr

- Conduct full system testing, including functional, performance, and security tests.
- Address any bugs or issues identified during testing
- Set up CI/CD pipeline for automated testing and deployment
- Prepare the platform for launch, including final client review and deployment on AWS

THANK YOU

Vets 2 Tech Program

Engineering Advisory Board

Saint Martin's University

Hal and Inge Marcus School of Engineering

Dr. Dvorak

December 4, 2024