Veteran Military Center
Tracking and Analytics Program

CS 425 Software Engineering

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Team 20, Assignment 1

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1 Abstract

This paper discussion Team 20's project. The plan is to develop an analytical program for the Veteran Military Center (VMC) here at the University of Nevada, Reno. This program will help make reports and graphs based on data the center collects through scanners and the Office of Analytics. Team 20 will also build a database that can store all of the collected data. The paper also describes the market potential of the project. There is a lot of need for scanners to collect information from bar-codes and have this information stored in a database. Having a company build a new database from scratch can be expensive. Our team can provide free services that will be the same quality as the other companies.

2 Project Description

The Veteran Military Center Technical Analytical Platform (VMC-TAP for short) is intended to be an easy to use data ingestion and analytical platform for the Veteran Military Center (VMC for short) at the University of Nevada, Reno. Team 20 was approached by the administrators of the VMC to create reporting and analytics. The task of reporting and analytic used to be the responsibility of a single individual hired by the center. Due to budget constraints, the VMC could not afford to keep this individual. This was a problem for the center as they had to use their limited man hours. Attendance and utilization reporting are extremely important for the center as it informs administrators how the center is doing.

Team 20 created a couple of goals for this project. The first goal is to make the application easy to use via an intuitive and simple interface. Our thinking was that if the interface was clunky and hard to navigate, the VMC and/or other potential clients would be less inclined to use VMC-TAP. The second goal was to provide meaningful reports. An example would be a report showing how many students haven't visited the VMC in over 30 days. With this information, the VMC could reach out to the student to see how they are doing and/or how the VMC could better meet their needs.

The main function of VMC-TAP is to provide actionable information based on the attendance data that the center currently collects. Attendance data is collected by the center through an iPad at the front desk and through portable scanners for events that occur outside the center. This data only collects the card number on the Wolf Card. The scan data is then sent off to the office of Data and Analysis who then returns an excel file to the VMC administrators. This excel file contains the demographic data of scanned students. The VMC administrators would then upload the data from office of Data and Analysis into VMC-TAP via the program's desktop application. VMC-TAP will then to parse the data, organize it, store it in the database. The program will store the ingested data over time allowing the center administrators to preform trend analysis. VMC administrators will then be able to generate reports based on the stored data.

There is a lot that can be done to extend the project in the future. A web interface, for instance, can be built to make the project more accessible from mobile devices. At the moment we only plan on making a desktop application. A web interface would also allow VMC admins to have a unified dashboard that's consistent across all environments (desktop and mobile). The project can also be extended by allowing users to create custom reports. Currently, VMC-TAP will only be able to run a pre-defined list of reports. Functionality could be added to allow VMC administrators to change the criteria of the reports without having to add new functions to the code-base.

One limitation we face is that we won't have access to real data to test against due to FERPA. Team

20 is able to get around this by testing with data collected from each team member's information. Another limitation is the skill level of the team. Some have dabbled in both Python and SQL separately. But they've never created a working program using those two technologies together. The team is brushing up on those skills through online tutorials and textbooks.

VMC-TAP will be built in Python 3.7 due to its long-term support cycle and ease of use. The project will also be using SQLite for the database. This was decided because Team 20 didn't want to worry about administering a database management system. For libraries, the project will use matplotlib for data visualization, tk for UI, openpyxl for data ingestion, and sqlite3 for database interaction.

Current advisors for VMC-TAP include Nikkolas Irwin who is mentoring Team 20 and Dr. Harris who is our faculty advisor. Project sponsers include Chai Cook, the Assistant Director of Veteran Services at UNR and John Pratt, a VA School Certifying Official. Devrin Lee is the advising professor in CS 425 for Team 20.

Members of Team 20 include Autumn Cuellar, Joseph Yott, and Brandon Freshour. Autumn Cuellar is a hard working student that works in a Robotics Lab at the University of Nevada, Reno. She has a little experience with Python, and is good at making sure assignments and tasks are done on time. Brandon Freshour is an IT professional with 5 years of experience in the field. His experience ranges from managing servers across the globe in diverse environments, managing databases, and creating web applications for clients. Joseph Yott is a U.S. Army veteran with experience in software and video game development. With skills in team management, Joe motivates and guides his team through the process of making software.

Members of Team 20 will be able to work in a team in a professional software engineering project by completing this project. In addition, members of Team 20 also gain hard skill of front end and back end development.

3 Market Potential

The project plan involves using a bar code scanner, to scan the bar codes on student identification cards. Bar codes are a mainstream technology that almost every business uses, and in this project bar code scanners are provided by the stake holders. In most cases of bar code use, the business has to spend money producing the bar codes. Think of how the post office prints a bar code for every piece of mail. However in VMC-TAP's case, the bar codes are already produced, at no cost to either the developer or the client. VMC-TAP will be making software and a database software that uses bar code products. Software and database service for bar code technology has tremendous worth, as the software to operate identification card database can cost well over a hundred dollars [1].

Database creation and analytical data analysis is another cost that can be compared to the work done by Knack. Knack is a software development company, with over 15 employees that specializes in database software and tools. They even provide a database service, that anyone can buy starting at forty dollars a month. They have some high profile customers like the Seattle Seahawks and the Salvation Army, as well as thousands of other clients. Knack and Barcodes, Inc claim to have an incredibly large customer base, clearly showing the market interest in customizable databases and software services that analyze data [2].

As a team of three, VMC-TAP provides a detailed and highly customizable service, that directly caters to the client's needs and request. No other company can relate to the VMC's customers better, while companies like Knack might be able to create a system faster, the VMC gains an invaluable insight by involving it's own customer base into developing important information gathering software.

4 Time Worked On Project

Table 1 shows how many hours each member spent of the project so far. Some hours include attending lab meeting with our external advisor, talking with stakeholders, and gathering tools that will help the team later in the project.

Table 1: Hours spent so far on the project for each team member.

Team Member	Hours Spent
Autumn Cuellar	9.5
Joseph Yott	7
Brandon Freshour	7

5 Project Related Resources

2019 OCTOBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	01	02	03	04	05
06	07	08	09	10	11	12
13	14	15	16	17	18	19
20	21	22 JLP/CC Deadline for scanners to be up + highlight columns red in master Excel sheet	23 corresponding to data unavailable from D.A.	24	25 Nevada Day - campus closed	26
27	28	29	30	31 JLP/CC "Dummy data" - 15 people will be John Smith to test the scanners	01	02
03	04	05	06	07	08	09

Figure 1: A calendar of tasks being completed by Veteran Services for VMC-TAP.

University of Nevada, Reno

Veteran Services

Tracking Analytic Program (TAP) Team Meeting
September 20, 2019
2:30 – 3:30 PM
Ansari Building, Room 632

Problems to be solved:

- Expand the veteran community on campus outside of the Veteran and Military Center (VMC)
- From a demographic perspective, who is using the VMC?
    - Age, gender, marital status, veteran status, do they have dependents, majors, how far from campus
- From a demographic perspective, who is not using the VMC?
- Why are they using the VMC?
    - Study, hang out, eat, appointment
- How long are they using the VMC each visit?
    - 2 minutes, 15 minutes, 3 hours
- Why are they not using the VMC?
    - Not a good place to study, do not need a place to hang out, studying in the ENGR lab,
- What is the retention rate for the VMC?
- Frequency of use in the VMC
    - How far into the semester did they visit the VMC
    - Did they persist to the next semester?
        - Both at UNR and the VMC
- What is the university retention rate for the participants using VMC?
- What do they need/want to achieve their goals for UNR?

Potential Solutions:

- Identify who is using the VMC.
    - Age, gender, marital status, majors, how far from campus,
- Identify how long they are staying in the VMC
- Generate data of daily, weekly totals
    - How frequently they come per day
    - Monitor their attendance patterns
- Retention Data
    - How far into the semester did they visit the VMC
    - Did they persist to the next semester?
        - Both at UNR and the VMC
    - Did they graduate?
- Create programs for students using the center
- Identify needs of the students using the center
- Create funding, programing and partnerships opportunities that meet the needs of the students.

Surveys, Questionnaires, and assessments

Figure 2: An initial list of problems that Veteran Services would like VMC-TAP to solve.

Veteran Services
University of Nevada, Reno

Tracking Analytic Program (TAP) Team Meeting
October 11, 2019
2:30 – 3:30 PM
Ansari Building, Room 632

Analytic Requirements

1. How many students use the VMC throughout the day (and at a specific time)
2. How many students use the VMC per day, week, month
3. How many times to they per day do the visit the VMC
4. How long do they stay
5. How many individual students use the VMC
6. How many different Types of people use the VMC

Business Requirements Priorities

1. Link QR code to data
2. Sort Data
3. Compare data to past timeframes
4. Automatically generate reports
5. Implement assessments & surveys
6. Track retention rates for the VMC, UNR

Purpose of Project

1. Expand the veteran community
2. Identify who is or is not using the VMC
3. Identify what the students need to persist and achieve their goals
4. Create funding, programming and partnerships opportunities

Figure 3: An initial list of business requirements provided by Veteran Services.

References

[1] I. Barcodes, “Barcodes.” ”https://www.barcodesinc.com/cats/id-card-software/”, 2019. Accessed on 2019-10-08.

[2] Knack, “Knack.” ”https://www.knack.com/customers”, 2018. Accessed on 2019-10-07.