CSC 468-02: Final Project

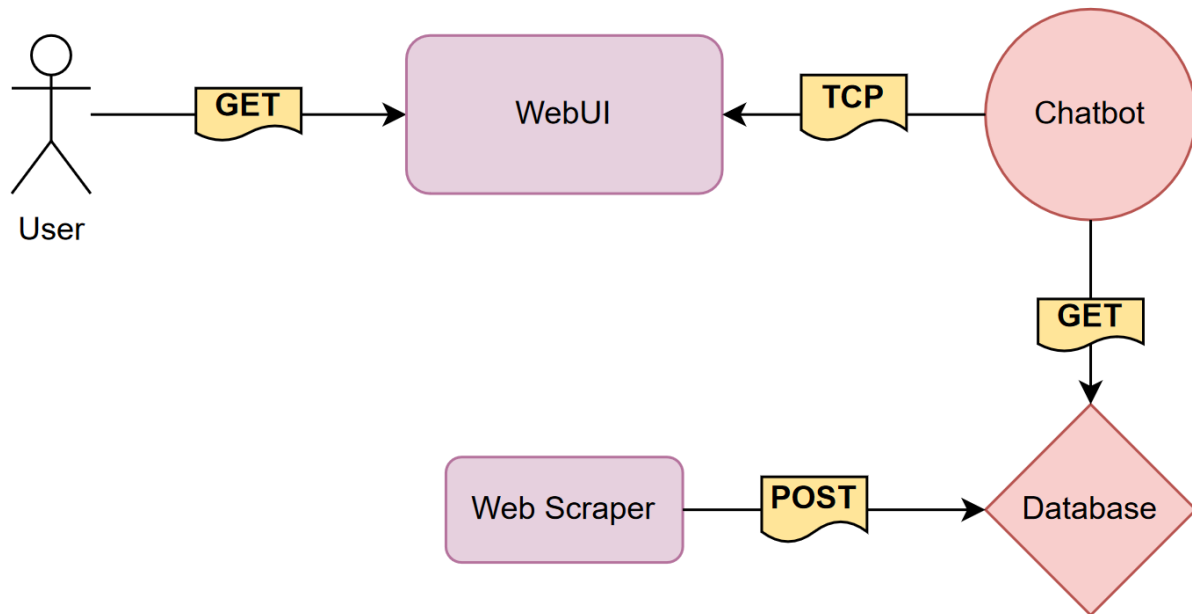# University Chatbot

Nicholas Hines

Jared Miller

Brian Montecinos-Velazquez

Dominic Pisano

Tyler Profitt

Chapter 1

Chapter 2

The University Chatbot is a deep learning project executed over the CloudLab infrastructure. The Chatbot will provide users an interface to make specific queries regarding course information and campus events through natural language chats. This project will be composed of multiple layers: including the APIs, databases, and app layers. Further, it will benefit from the inclusion of CI/CD services such as demonstrated live updates of WebUI. Another useful inclusion is that of a Docker image hub as part of its infrastructure. We intend to rely on existing open-source frameworks for natural language processing in the chatbot. Our project is still in the research phase and we have yet to commit to any specific implementation strategies. However, the following is a tentative outline of how we will meet the implementation hurdles.

The University Chatbot will be composed of four primary components: the Web User Interface, the Chatbot, the Web Scraper, and the Database. As outlined in the diagram in Chapter 1, a typical process flow will involve a user making a query in natural language through the WebUI. This query will be forwarded to the Chatbot for processing. Once the Chatbot has processed the intent of the query it can form an official query to the Database to get the necessary documents to reply with. The Web Scraper will simply populate the database with documents accessible through the university website. Our plan includes use of JavaScript, Python, and MySQL. Each main component will be planned as such:

WebUI - (Web User Interface)

The WebUI will be a streamlined web-based application mimicking standard instant messaging applications available on the market. Through this chat interface, users will be able to make specific university-related queries and receive accurate responses from the chatbot. The application will be hosted on a remote server through the CloudLab infrastructure with the help of Apache2 or Nginx. Further, the

WebUI will be built in JavaScript, with frameworks such as Node.JS or React.JS, and HTML. It will interact with the Chatbot application by sending user inputs and displaying responses from the chatbot.

Chatbot

The Chatbot will be a sophisticated deep learning program that can both read and respond to user text input in natural language. The Chatbot will be trained to understand the intent behind a user's request and formulate an appropriate reply in either natural language, image, or url requests. Since we lack much experience with deep learning, we will expedite the development of the architecture needed using accessible natural language bot frameworks such as Rasa or Botkit. The Chatbot will be isolated and interact with the WebUI and Database through TCP requests.

Web Scraper

The Web Scraper will be a simple program to gather documents to populate the Database from the university website. It will be built in Python with the Beautiful Soup framework designed for html scraping. The program would target documents, such as newsletters and course catalog entries, along with indexing information to be added to the Database.

Database

The Database will store University documents to be accessed by the Chatbot. This system will be managed through MySQL. It will directly interact with both the Chatbot and the Web Scraper to send and receive documents.

NICHOLAS HINES

Projects

Designed Website
- Used HTML for structure, CSS for design features
- Created website similar to the official Philadelphia Phillies website with multiple tabs and multiple pages
- Included seamless navigation between all pages
- JavaScript features including input validation, if statements, and a real world clock

Converted Code
- Converted code of a lexical analyzer from C to Java
- Involved testing of a variety of input files

Created Unique Software Development Process
- Created Fake company and outlined its entire software development process including development, release planning, iteration planning, testing, coding standards, and release
- Incorporated the Capability Maturity Model

Relevant Coursework

- Java Programming
- Data Structures and Algorithms
- Database Management Systems
- Programming Language Concepts/Paradigms
- Software Engineering
- Web Design
- Computer Security/Ethics
- Public Speaking

EXPERIENCE

LIFEGUARD

Hershey Entertainment and Resorts   May 2017 - August 2020
Hershey, Pennsylvania

- Learned and maintained proficiency in first responder skills such as First Aid and CPR to offer individuals in distress optimal support

- Demonstrated leadership skills as the most experienced lifeguard and instructed other co-workers when a manager wasn't present

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Hummelstown, PA 17036

EDUCATION

Bachelor of Science (B.S.)
Computer Science Candidate

WEST CHESTER UNIVERSITY
West Chester, PA
GPA: 3.72
Anticipated Graduation: May 2022

Awards & Honors
- Dean's List
  - *Fall 2018, 2020 / Spring 2020, 2021*

SKILLS

Languages (Proficient)
- Java
- SQL
- HTML

Languages (Familiar)
- JavaScript
- Python

Relevant Technologies
- Microsoft Visual Studio
- Git / GitHub
- Linux
- Microsoft Access
- NetBeans

Jared Miller

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📞 (215) 872-9731

📍 Philadelphia, PA, 19154

LinkedIn:
www.linkedin.com/in/jmiller75

GitHub:
https://github.com/jaredm750

EDUCATION

WEST CHESTER UNIVERSITY OF PENNSYLVANIA

GPA: 3.608 / 4.0

West Chester, PA

Bachelor of Science (B.S.) Computer Science (Expected graduation May 2022)

Relevant Coursework
- Java I, II, III
- Computer Security I, II
- Modern Malware Analysis
- Software Security
- Data Communications and Networking
- Software Engineering
- Data Structures and Algorithms
- Cloud Computing

Awards & Honors
- Dean's List 3x

Extracurricular Activities
- Computer Science Club
- Cyber Security Cub
- Competitive Programming Club
- Sigma Phi Epsilon Fraternity
- American Red Cross Club (ARCC)

ADDITIONAL SKILLS

Programming Languages / Software
- Java, Python, JavaScript, CSS/HTML
- Microsoft Office, VMware, Eclipse, Wireshark

CERTIFICATIONS

NSA/ABET Computer Security Certificate from West Chester University (Expected May 2022)

EXPERIENCE

SOFTWARE ENGINEER INTERN

HCL Technologies / January 2022 - Present
- Work in a team-oriented environment for all aspects of product development.
- Work closely with mentors to review problem report solution and implement the solution.
- Participate in software development using Agile/Scrum.
- Utilize frameworks such as Spring Boot, Angular, Node.js.
- Proactively identify and communicate risks and issues to mentors and create plans to mitigate risks.

IT TECHNICIAN INTERN

County of Chester, *West Chester*, *PA / May 2021 - Present*
- Devise solutions to issues related to Microsoft Office before deployment to hundreds of government employees.
- Patch software and install new versions to eliminate security problems and protect data.
- Diagnose, troubleshoot, and resolve hardware, software, or other network and system problems, and replace defective components when necessary.
- Follow up with clients to verify optimal customer satisfaction following support engagement and problem resolution.

INTRAMURAL SUPERVISOR

Student Recreation Center, *West Chester*, *PA / May 2019 - May 2021*
- Explained and taught regulations and rules to players.
- Worked as a team to ensure a safe environment for players.
- Trained new referees on safety regulations and game rules.
- Collected daily reports for improved efficiency during games.

PROJECTS & NOTABLE COURSEWORK

MODERN MALWARE ANALYSIS

MALWARE ANALYSIS TOOL
- Built a dynamic heuristic analysis tool for the detection of unknown malware.
- Downloaded a ransomware sample in a Windows XP environment and a monitor program in VirtualBox.
- Constructed a runnable program using Python to read through the file and determine if the activities are malicious.

SOFTWARE SECURITY
- Participated in 6 labs throughout the semester using Unix/Linux, including the command-line shell, and writing Python code to exploit certain vulnerabilities.
- Exploited attacks such as buffer overflows, SQL injection, and session hijacking by using advanced testing and program analysis techniques.

BRIAN MONTECINOS-VELAZQUEZ

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github.com/bmv016

OBJECTIVE

Determined computer science and cybersecurity student. I have developed a firm grasp on the critical concepts with a greater desire to learn more. I am always ready to adapt given the fleeting nature of plans.

EDUCATION

Computer Science BS | West Chester University of Pennsylvania

AUGUST 2019 – MAY 2022 (EXPECTED)

Minor in Applied Statistics • NSA/ABET Computer Security Certificate

GPA of 3.91/4.0 • **Deans List** from Spring 2020 to Fall 2021

Relevant Coursework:

Computer Science I - III • Software Engineering • Computer Systems

Malware Analysis • Data Structures and Algorithms • Cloud Computing

Computer Science MS | West Chester University of Pennsylvania

AUGUST 2021 – MAY 2023 (EXPECTED)

Relevant Coursework:

Software Security • Networking • Database Systems

EXPERIENCE/ACTIVITIES

General Merchandise Expert | Target Corporation

JUNE 2019 – CURRENT

- Required efficient time management to complete duties
- Developed strong communication skills for guest and team member interaction
- Discovered significance of creating collaborative environment

Computer Science Club

SEPTEMBER 2021 – CURRENT

- Worked on game development with a group of peers
- Worked with Unity builds and GitHub

Cyber Security Club

SEPTEMBER 2021 – CURRENT

- Participated in NSA Codebreaker Challenge 2021
- Wireshark packet analysis and program debugging

PROJECTS

Graduation Planner: led a small team of peers to develop a Java/Python project to find quickest graduation plan from graph of course catalog applying topology sort

SKILLS

Programming Languages:

JAVA • C • PYTHON

Technical Knowledge:

Object Oriented Programming • UML

Functional Programming • Assembly

Software Security • GNU Debugger

Windows Terminal • Linux Shell

Wireshark • IntelliJ • Eclipse • Vim

Statistical Analysis:

R • SAS • SPSS • Excel

Model Building • Data Frame Handling

Digital Communication:

Office Suite • Adobe Creative Suite

Spoken Languages:

English (Fluent) • Spanish (Fluent)

Dominic Pisano

(610) 719 7331 - Thorndale, PA - pisano.dominic@gmail.com

Experience

Wegmans   June 2021 – Present
Instacart Shopper   Downingtown, PA
- Utilize Instacart app to communicate with and fulfill customer orders.
- Properly handle product, use necessary equipment, and bag items to ensure they reach their destination safely.
- Accurately and efficiently scan items, make appropriate substitutions as needed, and process payments.
- Accurately and efficiently fulfill customer orders and stage them in fulfillment area.

CVS Pharmacy   June 2019 – July 2021
Shift Supervisor   Thorndale, PA
- Serve as manager and perform managerial duties in the manager's absence.
- Addresses all customer complaints in a professional and timely manner.
- Operate cash registers, stock shelves, and keep the store clean and organized.
- Supervise associates on shift and ensure the daily task list is completed.
- Reconcile cash register at the end of the shift and lock the store.

Rite Aid   May 2017 – June 2019
Shift Supervisor   West Chester, PA
- Removing outdated merchandise products from the shelves for damages/outdated.
- Set planograms for aisles, endcaps, and side wings according to the set layout.
- Pull merchandise from stock room to sales floor.
- Assist customers with the lottery machine, printing photos, and taking passport photos.

Cracker Barrel   June 2016 – May 2017
Server   Downingtown, PA
- Write guests' food orders on order slips and enter orders into computers for kitchen staff.
- Serve food or beverages to patrons.
- Perform food preparation duties such as preparing salads, appetizers, and cold dishes, portioning desserts, and brewing coffee.
- Clean tables or counters after patrons have finished dining. Stock service areas with supplies such as coffee, food, tableware, and linens.

Education

West Chester University | Bachelor of Science in Computer Science   Expected December 2022
   Relevant Coursework: Calculus II, Discrete Mathematics, Data Base Management Systems, Data Communications and Networking, Data Structures and Algorithms, Introduction to Cloud Computing, Software Engineering, Software Testing

Delaware County Community College | Associate of Science in Computer Science   2021

Skills

- Proficient in Java, HTML, CSS, JavaScript
- Familiar with C, C++, Python
- Customer service skills
- Leadership skills

TYLER **PROFITT**

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Profitized5@gmail.com · https://www.linkedin.com/in/tyler-profitt-361818223

Dedicated student leveraging studies in Computer Science to seek real-world experience. Strongly determined to learn and understand more throughout the opportunities that I may be given.

EXPERIENCE

JANUARY 2022 – PRESENT

NETWORK SUPPORT TECHNICIAN, CHICHESTER SCHOOL DISTRICT

- Maintain network connectivity of workstations, servers, and network devices.
- Provide faculty and staff with security software and network configuration support.
- Diagnose and execute resolution for network and server issues.
- Perform laptop diagnostics and physical disassembly while providing replacements of internal components of a laptop.

EDUCATION

AUGUST 2020 – FALL 2022 (EXPECTED)

BACHAELOR'S: COMPUTER SCIENCE, WEST CHESTER UNIVERSITY

Dean's List Honoree:
- Fall Semester 2020
- Spring Semester 2020
- Cumulative GPA: 3.736

JANUARY 2018 – MAY 2020

ASSOCIATE'S: LIBERAL ARTS, DELAWARE COUNTY COMMUNITY COLLEGE

Dean's List Honoree:
- Fall Semester 2018
- Spring Semester 2019
- Cumulative GPA: 3.11

AUGUST 2013 – JUNE 2017

HIGH SCHOOL DIPLOMA, CHICHESTER HIGH SCHOOL

SKILLS

Languages (Familiar)
- Java
- Python
- HTML and CSS
- SQL

Programming Software
- Eclipse
- Jupyter Notebook
- Spyder
- Pycharm