**Potential Capstone Research and/or Development Projects Spring 2025 T. A. Yang**

1. **Build an information system that takes course information from a database and provides the following services to the users (faculty, students, staff)**

Version A (70%)

* 1. It generates a pre-requisite diagram that clearly shows the pre-requisite relationship between courses.
  2. When a user enters the name of a course, it returns its pre-requisite and the pre-requisites of all the courses listed in its pre-requisite. Note: The result is a chain of pre-requisite courses.

Version B (80%)

* 1. In this version, the program provides a user interface for other colleges and universities to port their course information into the database. NOTE: The service should be automatic or semi-automatic and does not require time-consuming data input to build the database.

Version C (90% or more)

* 1. In this version, some sort of ‘intelligence’ is built into the system such that it provides a ChatGPT-like user interface for the users to interact with and get useful answers from the system.

1. **Build a system that, given an organization’s computing assets (hosts, servers, files, devices, network diagrams, and so on), it automatically searches the National Vulnerability Database (NVD) housed at** <https://nvd.nist.gov/> **or other similar vulnerability databases to generate useful information**
   1. It generates a list of top 30 vulnerabilities that the organization must pay attention to.
   2. For each of the vulnerabilities, it generates a list of potential attacks.
   3. For each of the attacks, it generates a list of mitigations.
   4. …
2. **Based on the report, “**[**Integration of Generative AI and Blockchain**](https://uhcl0-my.sharepoint.com/personal/yang_uhcl_edu/Documents/Documents/Data/pages/teaching/CSCI6838spring2025/finaldraft-ver1.docx)**”, extend that project by choosing one of the ‘future projects’ and either build an experimental system to test the idea or expand the survey as shown in the existing report to produce more research results in integrating GAI and Blockchains.**
3. **Integrate various ‘smart’ devices deployed in a home or at an organization’s site (temperature sensors, surveillance cameras, door bells, humidity sensors, motion sensors, fire detectors, etc.) by proposing and building a computer application that generate useful reports and, if applicable, alerts.**
4. **Build an early warning system that, given input from various organizations (weather reports, disaster records, topology, terrorist activities, etc.), analyze the data and generate reports about potential disasters.**
5. **Any other projects you might be interested in exploring or build?**