RESEARCH PROPOSAL:

Please submit a brief description of a maximum of two paragraphs which addresses the following points. Your proposal should be stated in your own words, and written for an audience of non-experts. Ask your faculty mentor to review your responses before submission. Faculty and Student application responses should be distinct. (Maximum size: 350 words/2800 characters.)

The resources inside a country or region’s health care system are always limited and precious. Serving the purpose of maximizing the utilization of such limited resources, what are the features of the patients’ wants and how to adjust the health care resources accordingly are the problems that are raised and studied. The general objective of the project is to understand the demand of the Ontario State Health Care System. By analyzing the recorded MIMIC-III (“Medical Information Mart for Intensive Care”) data of the 38,597 patients in Beth Israel Deaconess Medical Center in Boston, Massachusetts, the objective may be reached by making inference and analogy since the MIMIC-III data’s scale is reasonable enough to be somehow representative for a large-scale health system.

Main approaches utilized in the research process would be machine learning, statistical learning and other relevant data science tools. Specific tasks we intend to accomplish are: manipulation of co-related data files so that they become more understandable in the forthcoming analysis; visualization that gives intuitive assumptions or rigorous indication of significant features of the data sets; regression model fittings and categorizations that allow the data produce a predictable pattern; generate relatively credible conclusions the analysis about the distribution and features of the patients’ and their demand of the health care resources. Regarding the current situation of pandemic COVID-19, data of coronavirus patients in the state will be specifically introduced to run parallel with the MIMIC-III data in order to understand the trend and change that the system is facing besides the normality. For instance, patients with relatively severe medical history may be more vulnerable, while the sharp increase in testing, hospitalization, emergency process and ICU occupation may stress the system out even faster than usual. In terms of practical application, the research’s outcome may be introduced to the State Health Care System when decisions about resources distribution are made. Valid statistics may help patients get treatments like hospitalization or medication which they will benefit more from, as well as keeping the balance of and avoiding the overwhelming of the health care system.

PERSONAL STATEMENT

Please submit a brief statement of a maximum two paragraphs which addresses the following points. (Maximum size: 300 words/2400 characters.)

Your academic strengths and weaknesses.

Your objectives for participating in the project.

Your technical skills and relevant experience; i.e., machining, construction, laboratory instrumentation or techniques, programming

I’m a sophomore in ORIE department in College of Engineering. My academic strengths include my enthusiasm in learning and the ability of effectively searching for and accepting knowledge. Academic weakness may include that I’m not a biology or pre-med subjects related major, therefore, a lot of the health care related terminologies and information may be completely new to me and I need to study for certain these subjects. Also, considering that I’m an underclassman, my current knowledge and skills in CS may not be sufficient to carry me through the entire research process. Thus, I would actively utilize the online resources and seek help and instructions from peers and the PA. My objectives for participating in this project include: gaining experience in conducting academic research in my major field, solving questions that are being raised in the health-care project, and learning new knowledge and techniques as much as possible.

Technical skills include fluency in Python and previous programming experience. The programming part of this project will be conducted on Jupyter Notebook based on Python, while MIMIC-III data is downloaded and saved on far-end server. I have taken Cornell courses in math, CS, ML, and data mining, which provide me academic support.

WAGES REQUEST STATEMENT: If you are requesting funding to support a wage for yourself, in order to receive monetary compensation for your time and effort on this project, please explain how this financial assistance will facilitate your progress toward your educational goals. You must also specify the approximate number of weeks, and hours per week, that you intend to spend working on your project during the semester(s) or summer of the proposed award. Your wages request statement will be carefully reviewed before funding decisions are made. Please be clear about your need for the wages in relation to your other sources of financial support. If you are eligible for Federal Work Study (FWS), or for the Foreign Student Employment Program (FSEP), please state this and work with your faculty mentor and the department office to adjust your wages request to reflect the contribution from FWS (50%). [Note for summer applicants: If you are eligible for FWS/FSEP during the academic year, and you were registered full time in the Spring semester and intend to register full time for the following Fall semester, and you will not be enrolled for six or more summer session credits, then you are eligible to receive a summer FWS/FSEP award, which will cover 50% of your wages during the summer as well.]

I’m requesting funding to support a wage due to the special accommodation circumstances this summer. Since I have left my apartment in Ithaca due to the school’s moving to virtual instruction and the COVID-19 situation, I’m currently starting in a new renting lease near my hometown. Being able to get a wage support would ease my pressure on the rent or the daily catering expense. Thus, I may not need to urgently seek for a summer internship or I may turn to a less demanding position, so that I could focus majorly on the research and put full energy in working on it. The approximate number of weeks I intend to spend on the project during this semester (SP20) is eight, while in the summer that will be no less than four. Hours per week during the semester is approximately 7 hours (partially dependent on the regular academic workload). During the summer, if I could work on the project full time, intended hours per week is no less than 20. Regarding this request, I would be very grateful if I could receive wage support. Though if not, I’m still very appreciative and will dedicate as much effort as possible to the project.