**CSE 2102: Introduction to Software Engineering**

**Project: Software for Social Good**

The software and data revolution has not benefitted all the members of the society equally. This is because most of the contemporary software applications are written to generate revenue and maximize profit, and not to deliver social good. These applications have failed to fill the massive unmet needs of the social sector on issues ranging from poverty and education to human rights and the environment. The social sector has not yet benefitted from this software and data revolution, mostly because of a lack of viable financial and business model – it is difficult to find entrepreneurs and venture capitalists to support projects that deliver high social impact, rather than high profit.

The Open Data initiative led by the U.S. Government collects massive amount of data on several topics from agriculture, climate, public safety and health [1]. While in theory this data is available to the public, in practice, it is nearly impossible to sift through these volumes to extract relevant and meaningful information. Ironically, this is particularly the case for the most vulnerable members of our society, who actually stand to benefit most from this hidden information.

Through our Software Engineering project, we are going to fill this void. We will explore the “Hospital General Information” data set that includes general information and quality ratings for all hospitals that have been registered with Medicare. The specific fields in this data set, and their values include:

* **Provider ID:** ID of a particular hospital.
* **Hospital Name:** Name of the hospital.
* **Address:** Address of the hospital.
* **City:** City in which the hospital is located.
* **State:** State in which the hospital is located.
* **Zip Code:** Zip code in which the hospital is located.
* **County Name:** Name of the county in which the hospital is located.
* **Phone Number:** Phone number of the hospital.
* **Type of Hospital:** One of -- Acute Care Hospitals, Critical Care Hospitals, Children’s hospitals
* Hospital Ownership: Government - Hospital District or Authority, Voluntary non-profit – Private, Proprietary, Government – State, Voluntary non-profit – Other, Government – Local, Voluntary non-profit – Church, Government – Federal, Tribal, Physician
* **Emergency Services:** Yes/No.
* **Meets Criteria for Meaningful Use of EHRs:** Yes/No.
* **Hospital Overall Rating:** 1-5.
* **Mortality:** One of -- Same as the National Average, Above the National Average, Below the National Average, Not Available.
* **Safety of Care:** One of -- Same as the National Average, Above the National Average, Below the National Average, Not Available.
* **Readmission:** One of -- Same as the National Average, Above the National Average, Below the National Average, Not Available.
* **Patient Experience:** One of -- Same as the National Average, Above the National Average, Below the National Average, Not Available.
* **Effectiveness of Care:** One of -- Same as the National Average, Above the National Average, Below the National Average, Not Available.
* **Timeliness of Care:** One of -- Same as the National Average, Above the National Average, Below the National Average, Not Available.
* **Efficient Use of Medical Imaging:** One of -- Same as the National Average, Above the National Average, Below the National Average, Not Available.

This data could be used to answer a variety of questions such as [2]:

* Which hospital types & hospital ownerships are most common?
* Which hospital types & ownerships are associated with better than average ratings/mortality/readmission/etc.?
* What is the average hospital rating, by state?
* Which hospital types & hospital ownerships are more likely to have not submitted proper data ("Not Available" & "Results are not available for this reporting period")?
* Which parts of the country have the highest & lowest density of religious hospitals?

**References**

1. <https://data.medicare.gov/Hospital-Compare>
2. https://www.kaggle.com/cms/hospital-general-information/home
3. https://www.recode.net/2017/3/22/15011658/social-sector-technology-entrepreneurs-philanthropy-investment