IntelliCare - Intelligent Hospital Triaging System

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Problem and solution identification

An Ontario hospital Emergency Room is not a fun place to be. Wait times are brutally long - the average patient waits 1.5 hours to be seen by a doctor, with some hospitals' average wait times reaching close to 3 hours [1]. Health Quality Ontario also reports that patients with more serious illnesses actually wait longer than those with less serious ailments - suggesting the hospital triage system is in desperate need of a revamp [2].

As a solution, we present IntelliCare. IntelliCare is a deep learning-powered automatic triaging system that works alongside nurses to produce accurate triage scores for patients. IntelliCare ensures optimal triaging and bed allocation, resulting in the most efficient doctor allocation possible.

Stakeholders

Nurses

Nurses are the primary operators of IntelliCare. As outlined in "Solution design" below, IntelliCare is a text-based computer program that allows nurses to interact with a database of patients waiting in the emergency room. IntelliCare is designed with the nurse's perspective in mind: it is clean and easy to use. Additionally, IntelliCare works with the nurse, and not against them; IntelliCare generates triage scores according to the Canadian Triage and Acuity Scale (CTAS), but always checks with the nurse to ensure that he or she has the final say in the patient's score.

Patients

Patients will benefit directly from IntelliCare by being assigned more accurate triage scores, ensuring that they get the care they need at the appropriate time. Additionally, the patient will benefit from the increased efficiency in hospital bed allocation by IntelliCare through shorter wait times.

Solution design

Intellicare is made up of three components working in harmony: a intuitive text-based interface, an deep learning triage score prediction algorithm, and a hospital resource allocation algorithm.

Interface

The interface was designed with its primary stakeholder in mind: the nurse. The interface provides an easy means for nurses to interact with the powerful algorithms behind it.

Triage prediction algorithm

When a nurse finishes using the interface to input a new patient's data (age, heart rate, body temperature, etc.), the triage prediction algorithm takes in this data and predicts what it thinks

the patient's triage score is. This information is immediately presented back to the nurse, who may then make a decision as to what they feel the patient's triage score is.

Hospital resource allocation algorithm
After a patient's information and triage score are in the system, the bed allocation algorithm dynamically allocates beds are varying levels of care in the hospital to new patients. Additionally, the algorithm keeps track of maintenance time requirements. Optimal distribution of beds ensures minimal wait time is achieved.

References
[1] Time spent in emergency departments. *Health Quality Ontario.* Online: https://www.hqontario.ca/System-Performance/Time-Spent-in-Emergency-Departments?utm_source=Ontario.ca&utm_medium=Referral&utm_campaign=WT%20Referral

[2] Under pressure: emergency department performance in Ontario. *Health Quality Ontario.* Online: https://www.hqontario.ca/portals/0/Documents/system-performance/under-pressure-report-en.pdf