A Comprehensive Reengineering of the Hospital Emergency Triage System

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Hospital emergency triage and specifically Mass Casualty Incidents (MCIs) are of major concern with regard to treatment and patient outcomes. Traditional emergency department triage models are oversimplified and often lead to over/under triaging of patients. Furthermore, most models do not account for the full spectrum of different MCIs and breakdown, resulting in misclassification. In this thesis, we begin by looking at traditional triage models currently being used in hospital systems and identify several shortcomings of using these models within the context of a chemical related MCI. I will then move to describe a new approach to creating a dynamically adaptive multi-phase triage system capable of managing patients regardless of the MCI scenario. The new system utilizes modern mobile technology and is capable of deploying artificial intelligence algorithms to assist caregivers with decision making. I discuss the data analytics and machine learning techniques necessary to create deployable AI and compare these models to current resources available for emergency decision support, WISER and CHEMM-ist. Finally, I will conclude by describing the HCI design of computational software capable of quickly collecting patient data, performing data analysis and provide caregivers with decision logic and situational awareness. This patient management system has the potential to improve patient treatment and outcomes with the added advantage of being integrated into current hospital EHRs. Current hospital resources and triage models can be easily implemented and should be considered for ED deployment.