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# DEVELOPING A SYSTEM SIMULATION MODEL FOR DISPATCHING MASS CASUALTY INCIDENT

***Chia-Hsin Cheng***
*Graduate Institute of Data Science, Taipei Medical University, Taiwan*

**Abstract**

I have been working with Dr. Chuang's research team that is a unique group applying resilience engineering (RE) for resilience studies in Taiwan since my first year in the Institute of Data Science. At the beginning, I was assigned to conduct literature review on the Formosa Fun Coast Dust Explosion (FFCDE) disaster and RE theory. Next, my research in RE had two phases, participating the FFCDE research team to understand how the local command post distributed the mass burn casualties in disaster scene, developing a system simulation model of distributing mass burn casualties caused by compound disasters scenario i.e. fires after earthquake.

In the first-phase, we published a conference proceedings paper titled "Coping with communication challenges after the Formosa Fun Coast Dust Explosion". My job was to collect data and understand how communication and coordination acted among actors to deal with relocating and distributing mass casualties (MC) in the disaster scene. I had learned the knowledge of communication challenges faced by the local common post and how they adapted to cope with the challenges, as well as the difficulties that the initial receiving hospitals faced in the secondary distribution of severe burn patients. These experiences build up the foundation of my study in the second phase.

In the second phase, my master thesis research focuses on developing a system simulation model for efficient and effective distribution of MC to hospitals following disaster events. The simulation will allow for assessment of multiple scenarios that vary in terms of how disaster events create medical needs and those factors that are crucial in emergency medical response to manage potential overwhelming injuries in severity and number, and produce an overall picture of casualty distribution plan from the disaster scene to initially receiving hospitals and follow-up patients transfer between the hospitals overtime.

My thesis research adopts machine learning and uses the real data for building a simulation model. Data collection includes hospitals' geographic location, medical care capacity, and medical care capability level that is generated by another research study of Dr. Chuang. The simulation could support decision makers for preparing resilient casualty distribution in the disaster scene, and provide the mass casualty information to the hospitals that they could expect during the disaster scenario. As a result, the simulation model could enhance the emergency medical services system as a whole, and help individual hospitals to speed up their disaster planning for being ready to respond.



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