WORKSHOP ON AI IN TRIAGE AND EMERGENCY ASSESSMENT

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OVERVIEW

The workshop aims to provide emergency medicine professionals a brief introduction to the use of AI in triage and emergency assessment. Challenges in emergency triaging, the current situation of emergency medicine in the Philippines, and the role of AI as an adjunct tool in improving the triaging efficacy will be discussed. Live coding sessions will also be provided to immerse the participants to the capabilities of AI in triage settings.

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EMERGENCY MEDICINE AND ITS CURRENT SITUATION IN THE PHILIPPINES

- Emergency medicine was recognized as a specialty in the Philippines in **1988** [1].
- Prior to its recognition as a specialty, the emergency department is composed of nurses and doctors who are **tapped on *as-needed* basis** [2].
- Emergency medicine in the Philippines has evolved through the years and helped the improve healthcare system in terms of safety, cost-effectiveness, and efficiency.
- But, **further improvements** are still needed for the emergency medicine to be at par with those in other countries.

[1] Pek, J. H. et al. Emergency medicine as a specialty in Asia. Acute Medicine & Surgery 3, 65–73 (2016).
[2] Peralta, P. G. & Sinon, J. B. Emergency Medicine in the Philippines. Annals of Emergency Medicine 26, 743–745 (1995).

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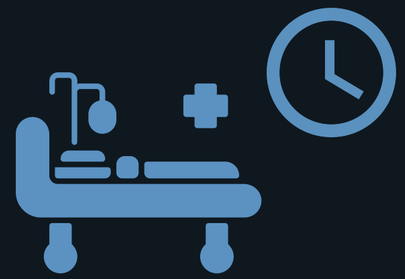
Pain points

ratio of ED doctors and nurses to patients in the Philippines paled in comparison to that of its neighbors such as Taiwan and Japan



waiting times for inpatient beds were also longer compared to countries like India

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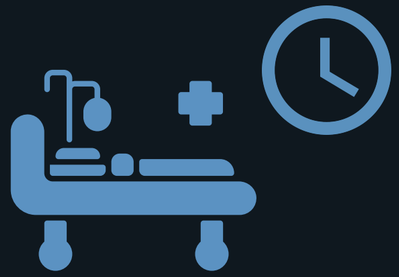
Pain points

clinical competency

Not all hospitals have trained personnel on triaging

Psychological challenges

Decision making may be affected by fatigue and exhaustion



manpower

Some EDs have limited staff to man the triage area; this implies longer waiting times before being triaged accordingly

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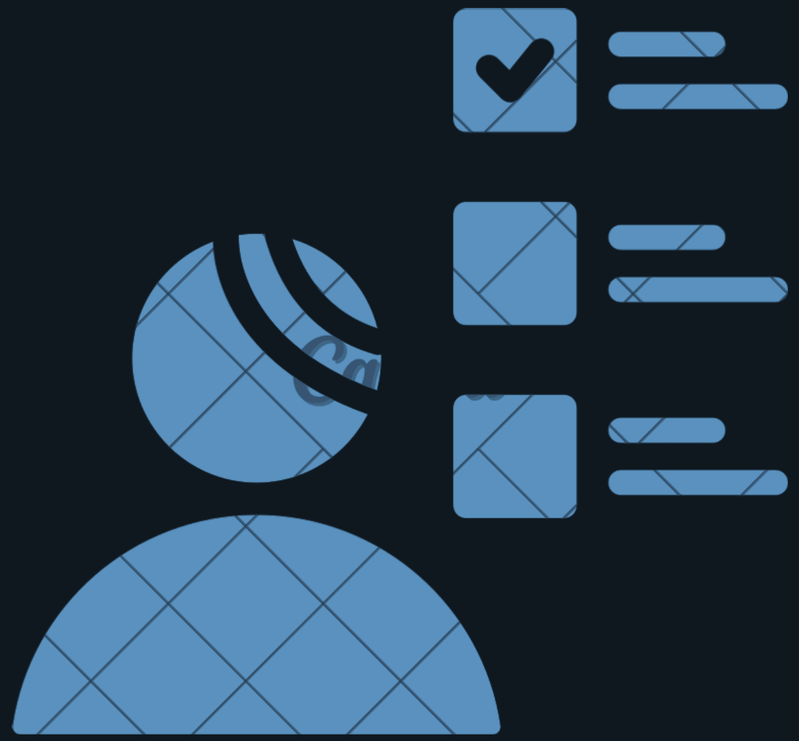

mistriage

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EMERGENCY TRIAGING

- **Triaging targets** to improve the quality of emergency care by **clipping the length of stay of patients** and has been applied to EDs [5]
- Triaging involves rapidly determining the priority of patient treatment using a triage system [6].
- Commonly used triage systems include:
    - Emergency Severity Index (**ESI**) in the US
    - Canadian Triage and Acuity Scales (**CTAS**) in Canada,
    - Australasian Triage Scale (**ATS**) in Australia.

[5] Pines, J. M. et al. International Perspectives on Emergency Department Crowding. Academic Emergency Medicine 18, 1358–1370 (2011).
[6] Lāhdet, E. F., Suserud, B.-O., Jonsson, A. & Lundberg, L. Analysis of triage worldwide. Emergency Nurse 17, 16–19 (2009).

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BRIDGING EMERGENCY TRIAGING AND AI

- **Prediction models** in medicine aim to **improve patient care** and **increase logistical efficiency** in hospital settings [7].
- Promptly identifying ED patients who are likely to require admission helps optimize hospital resources through understanding of ED patient compositions [8].
- **Triage scores** can be used as proxies for patient acuity [9,10].

[7] Obermeyer, Z. & Emanuel, E. J. Predicting the Future — Big Data, Machine Learning, and Clinical Medicine. N Engl J Med 375, 1216–1219 (2016).
[8] Hong, W. S., Haimovich, A. D. & Taylor, R. A. Predicting hospital admission at emergency department triage using machine learning. PLoS ONE 13, e0201016 (2018).
[9] Dugas, A. F. et al. An Electronic Emergency Triage System to Improve Patient Distribution by Critical Outcomes. The Journal of Emergency Medicine 50, 910–918 (2016).
[10] Choi, S. W., Ko, T., Hong, K. J. & Kim, K. H. Machine Learning-Based Prediction of Korean Triage and Acuity Scale Level in Emergency Department Patients. Healthc Inform Res 25, 305 (2019).

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BRIDGING EMERGENCY TRIAGING AND AI

- Early works on the use of AI on triaging have been documented [8,10-12].
- Most of these works have focused on the use of **supervised learning algorithms** [8,10].
- **Machine learning** can be an **adjunct tool** in **anticipating patient outcomes**, thereby reducing ED crowding and properly utilize hospital resources [8].

[11] Stewart, J., Sprivulis, P. & Dwivedi, G. Artificial intelligence and machine learning in emergency medicine. Emerg Medicine Australasia 30, 870–874 (2018).
[12] Berlyand, Y. et al. How artificial intelligence could transform emergency department operations. The American Journal of Emergency Medicine 36, 1515–1517 (2018).

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LIVE CODING SESSION

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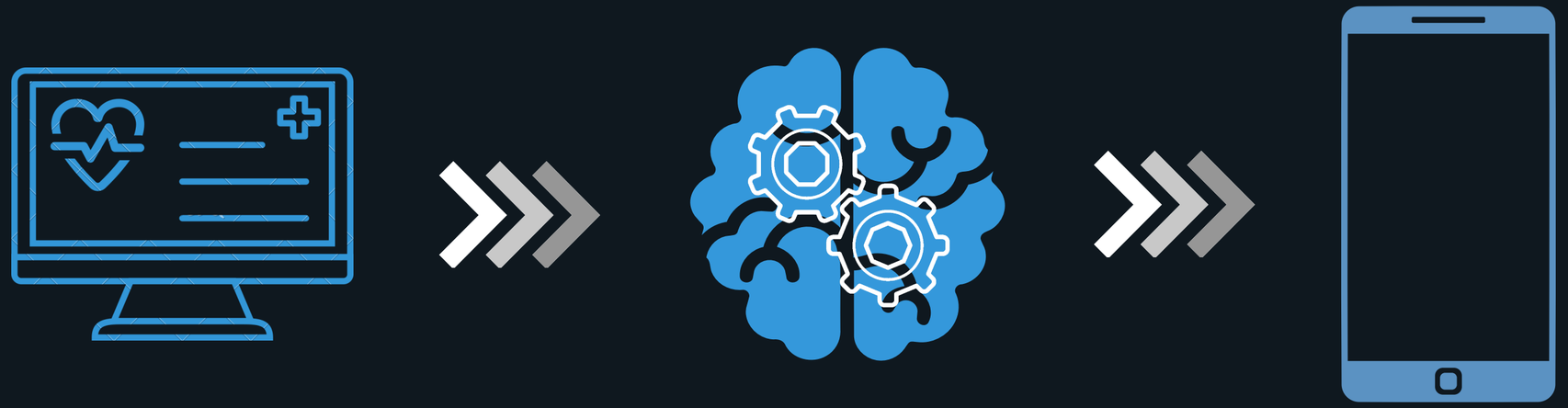
POTENTIAL WORKFLOW



DATA

(Constantly updated with incoming hospital patient data)

MACHINE LEARNING MODEL

APPLICATION (web/mobile)

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