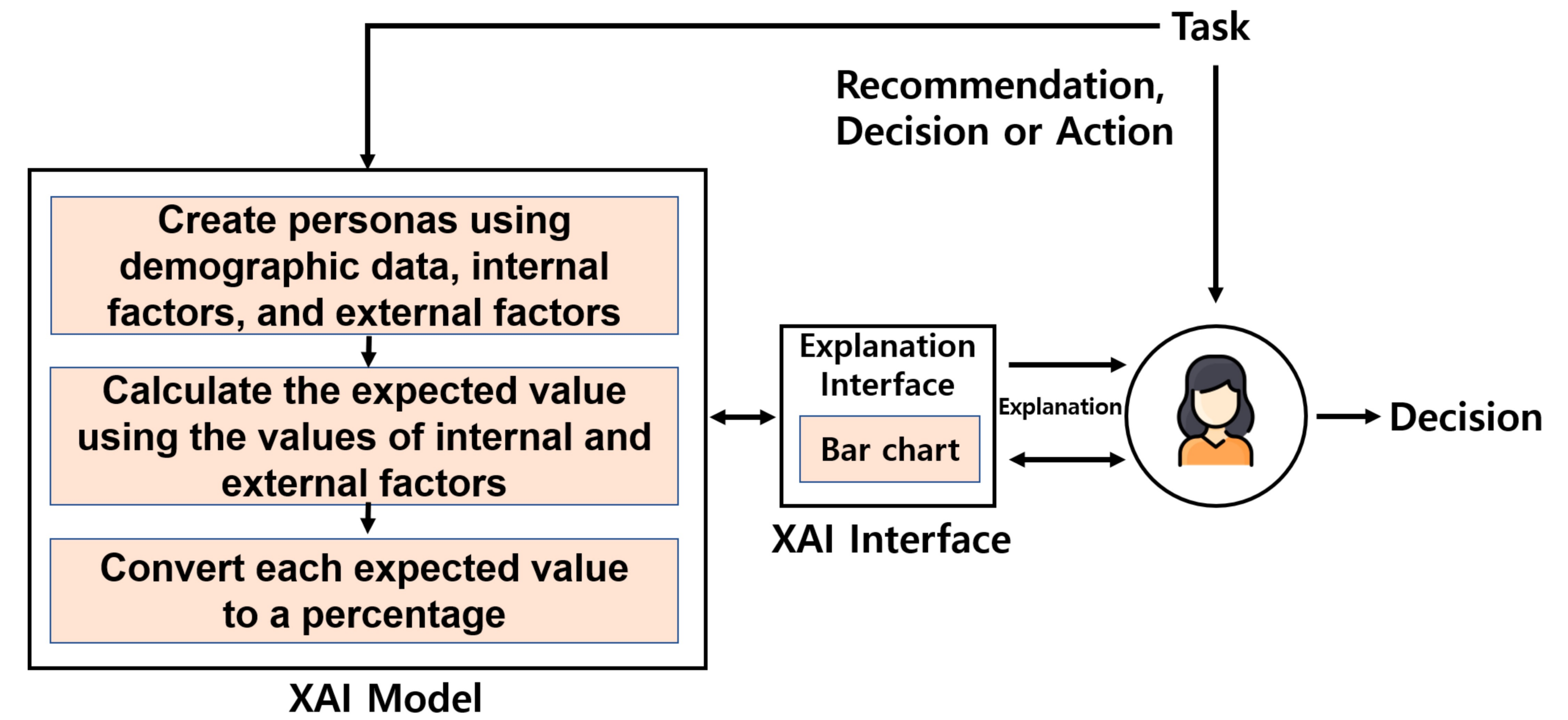


## INTRODUCTION

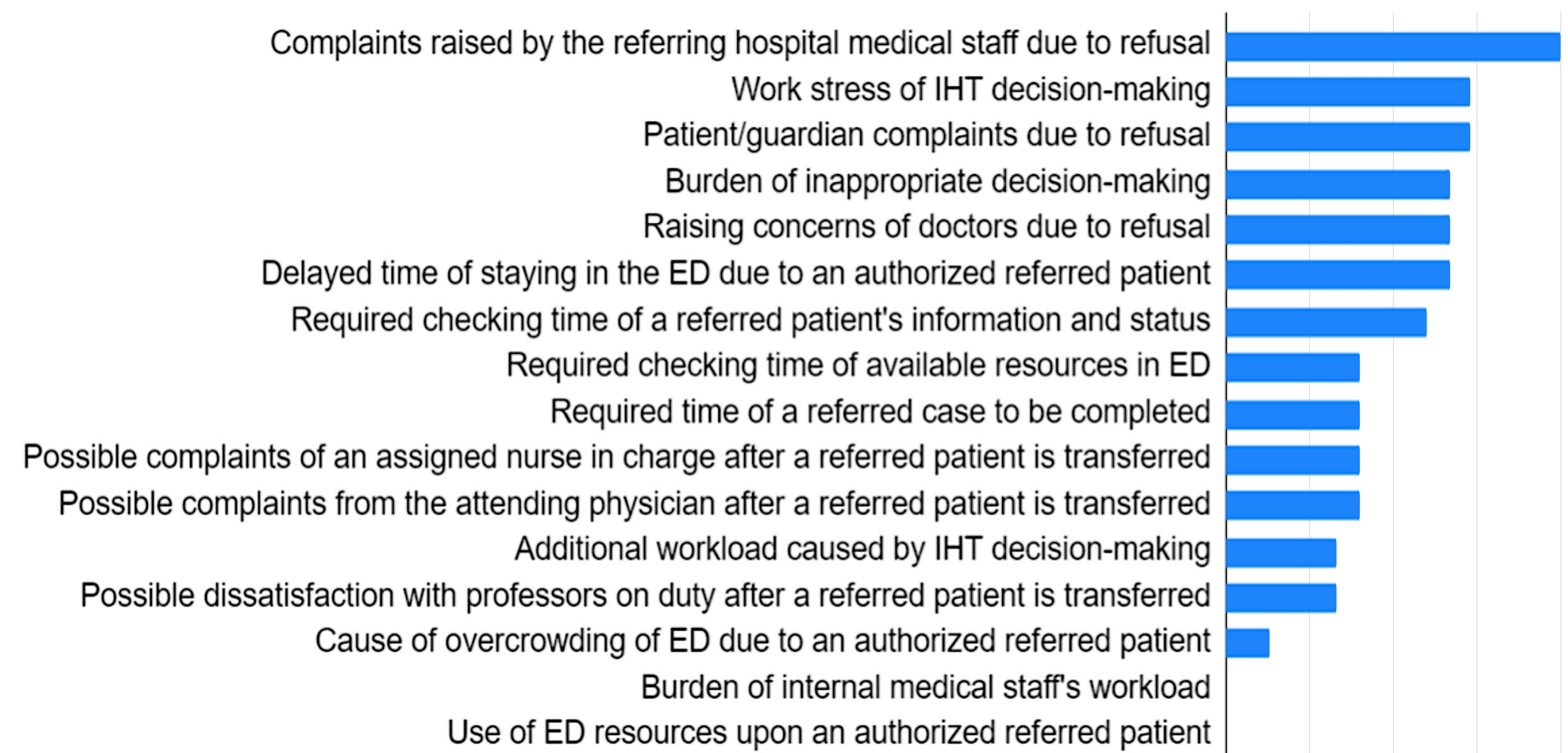
- In the modern healthcare system, interhospital transfer (IHT) of emergency patients is inevitable to secure specialized care and minimize any potential risks of adverse clinical outcomes and overcrowding of the transferred emergency department (ED).
- Experienced ED patient flow nurses consider various influencing factors to determine if a referred patient is authorized.
- While AI prediction models reveal a high accuracy of decision-making, little is known about how much each model can explain the decision-making process in an understandable way.
- It is questionable whether such models would provide health providers with clear rationales about why the decision from the AI system is worth considering.

## OVERVIEW OF OUR PROPOSED XAI FRAMEWORK

- Our proposed XAI framework aims at enabling ED nurses to decide with high confidence under the time-sensitive emergency scenario by interacting with an AI system using the XAI approach we propose.
- The explainable artificial intelligence (XAI) framework consisting of an XAI model and an XAI interface allows ED nurses to understand the AI system's reasoning with their own reasoning through explainability features (see Figure 1).
- The XAI model is generated by performing the following three tasks: (1) creating personas using demographic data, internal factors, and external factors, (2) calculating the expected utility value using the values of internal and external factors, (3) converting each expected utility value to a percentage (see Figure 3).
- Each converted expected utility value is then used to generate a bar chart on the XAI interface (see Figures 2 & 3).






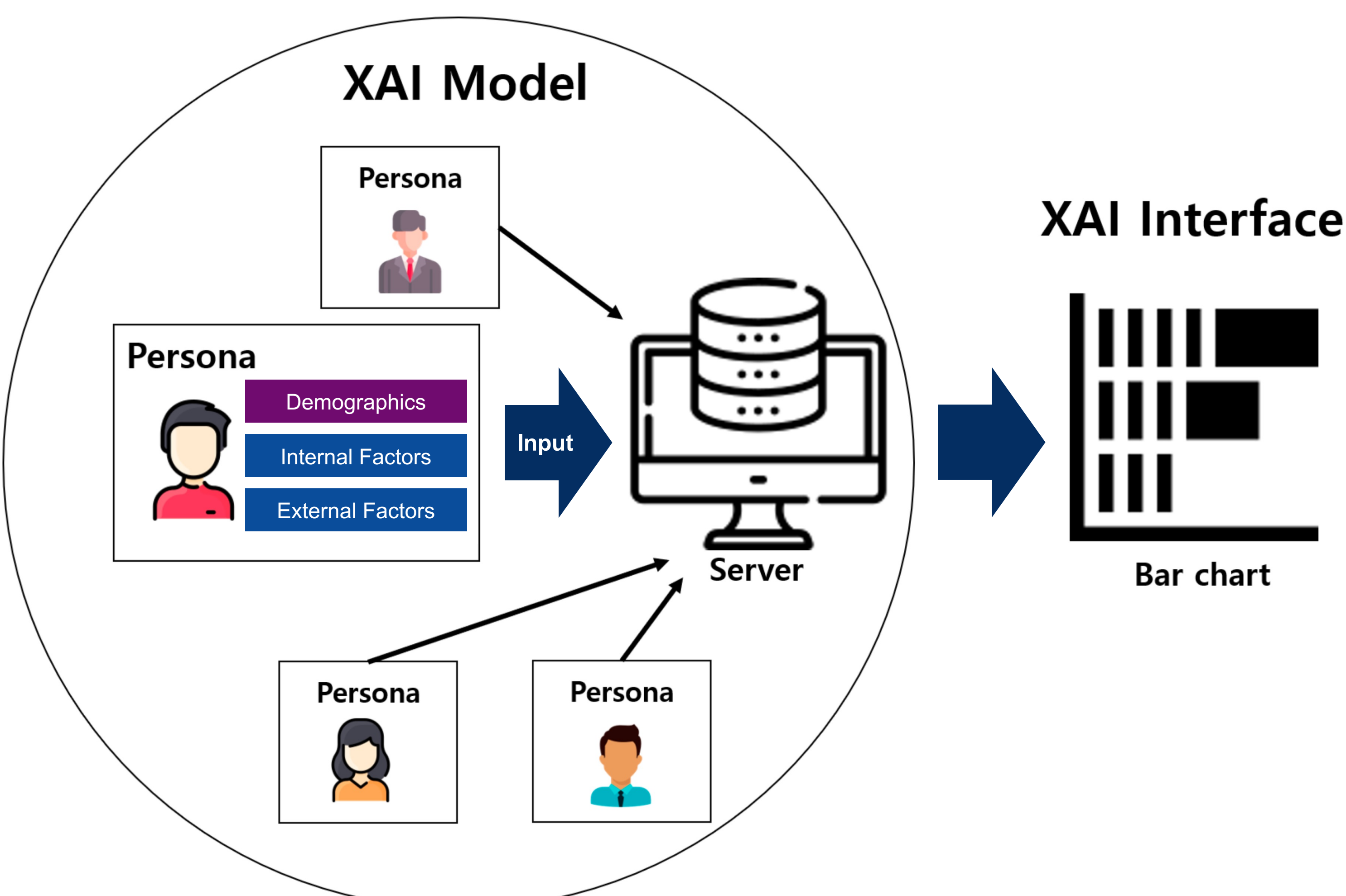
**Figure 1.** Our proposed XAI framework allows an ED nurse to interact with an XAI interface so that the ED nurse makes his/her decision in a way that reduces stress and anxiety in our ED scenario by obtaining explanation of a decision-making process from our proposed XAI framework.



**Figure 2.** Persona A was considered to accept the patient due to multiple factors. The primary factors that had a significant impact on him include work experience but were being afraid of evaluation and criticism from other health providers.

## PERSONAS TO DEMONSTRATE VALUE OF OUR PROPOSED XAI FRAMEWORK

Persona A	Persona B	Persona C
 <b>M/39</b> He has 13-year ED experience and is currently in the 4th year of an ED patient flow nurse. He is also very satisfied with his work but is sensitive to the evaluation and criticism of others.	 <b>F/32</b> She has 8-year ED experience and is currently in the 1st year of an ED patient flow nurse. She is also very satisfied with her job but under a lot of stress lately. She is principled and stubborn.	 <b>F/29</b> She has 4-year ED experience and is currently in 3 months as an ED patient flow nurse. She is still adjusting to the role of the flow nurse. She is overloaded with work and very stressed out.
The burden of external complaints & the civil complaints raised when all members were rejected showed a high impact.	The complaints and the burden of complaints showed a low impact since persona B tended to be usually principled and stubborn.	The processing time for the requesting patient had a high impact on her decision making due to her limited work experience.



**Figure 3.** The XAI model is a process in which the factors of a persona are input to the server and go through a process within the server. The values from the XAI model are visualized in the form of a bar chart through the XAI interface.

## CONCLUSIONS & FUTURE WORK

- The goal of this study was to demonstrate what specific types of explainability are helpful to ED patient flow nurses in a time-critical emergency scenario with an IHT setting.
- We presented a simulation using personas of three virtual ED nurses who are likely to be in a real-world scenario.
- The XAI framework has a potential to increase the confidence of ED patient flow nurses in a hospital decision scenario.
- Future work remains to confirm the usability and feasibility of the XAI framework in various hospital decision scenarios with participants involving multiple stakeholders (e.g., health providers, patients).

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