

Towards assessing the risk of the effect of augmented reality on human failures

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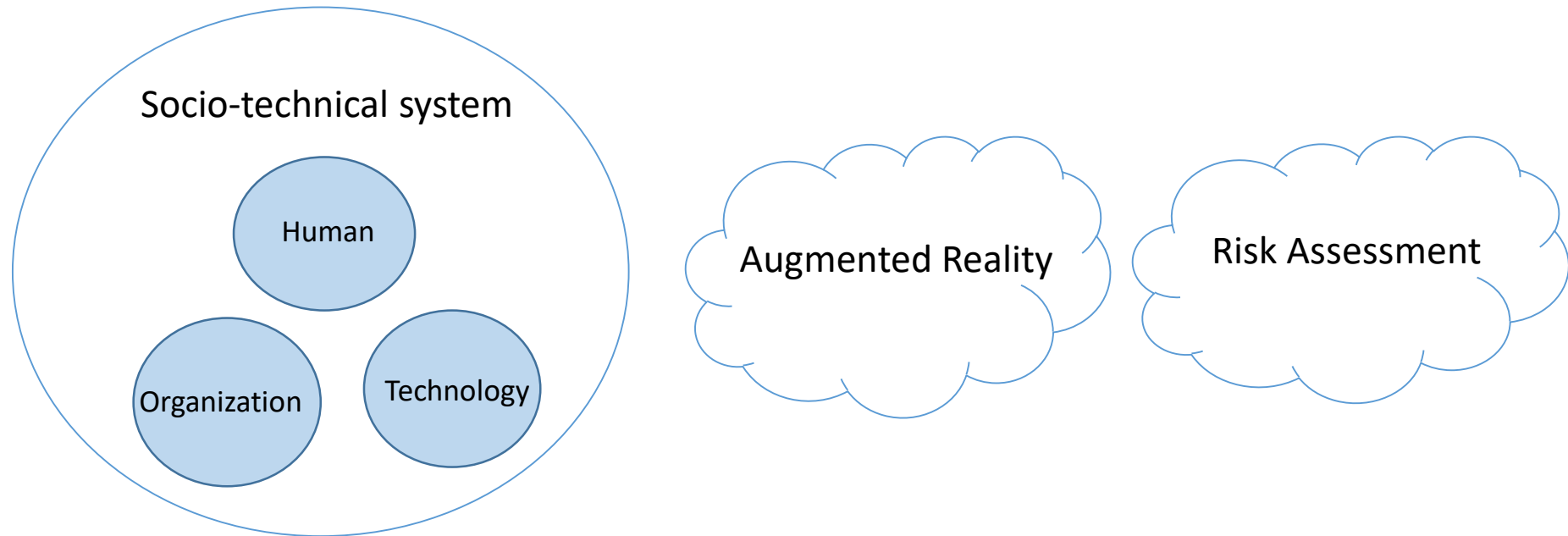


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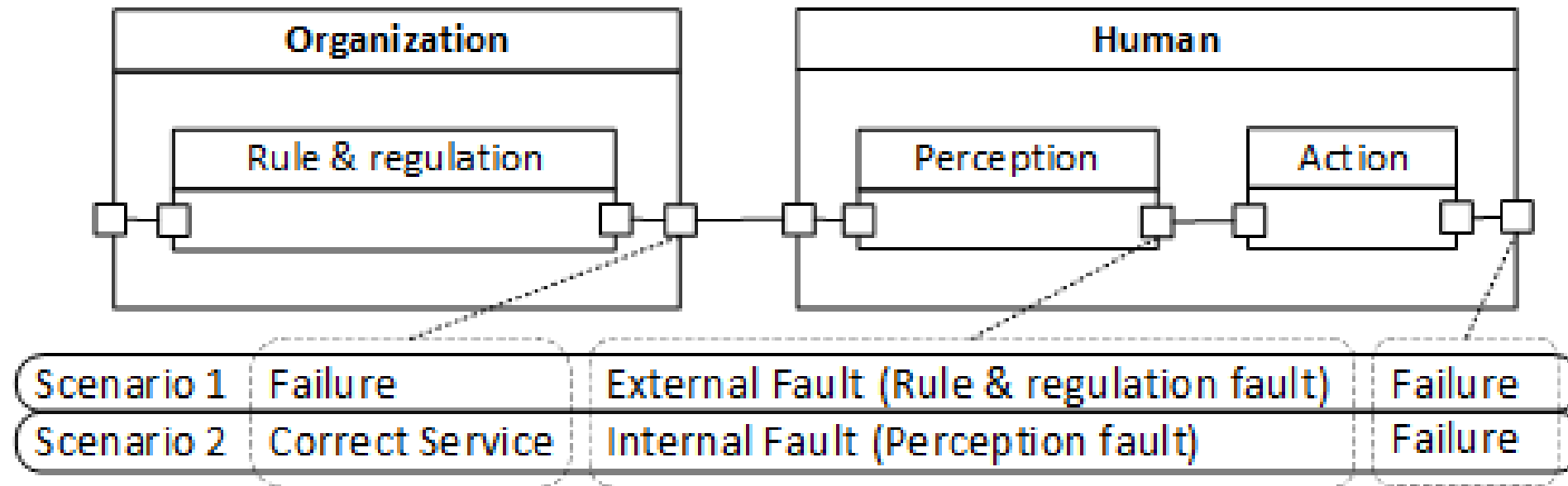
Context

- Assessing risk within augmented reality-equipped socio-technical systems
- What is effect of augmented reality?
- What kind of new faults leading to human failures would be introduced to the system because of using augmented reality ?



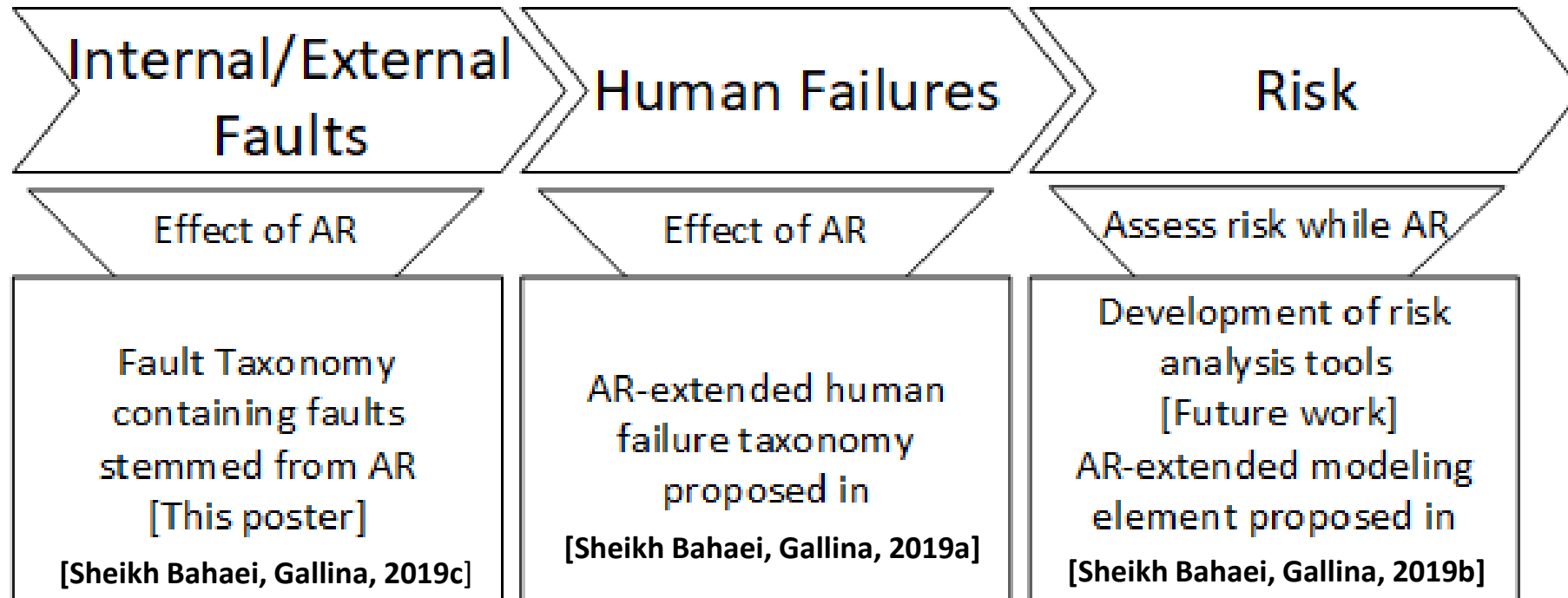
Problem

- If we consider a human as a composite component, within a component-based system, representing a socio-technical system:
 - a **human failure** is a deviation in human functioning from correct to incorrect functioning and
 - the cause for the human failure is/are **fault(s)**, which would be internal or external. Internal fault is failure in another subcomponent of the human component itself. External fault is failure in another component, which its output is input for the human component.



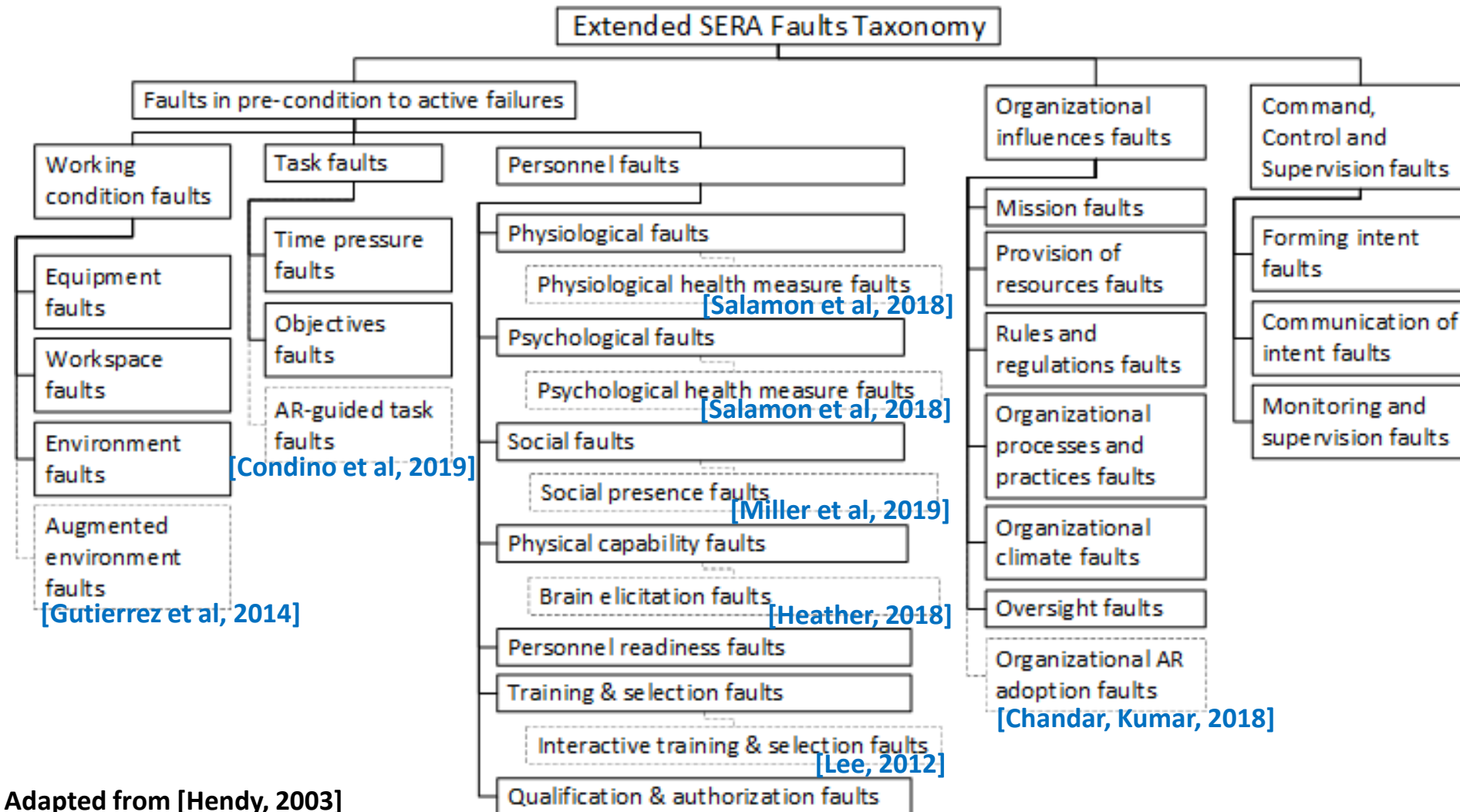
Problem

- Current state-of-the-art fault taxonomies do not consider augmented reality effects and new types of faults that would cause human failures because of using these new technologies.



Risk-related causality chain in socio-technical systems.

Extension of faults taxonomy towards assessing risk



Adapted from [Hendy, 2003]



Next steps

- As an ongoing work, we considered other state-of-the-art fault taxonomies and prepared a classification to have the extension on that [Sheikh Bahaei, Gallina, 2019c].
- In the future, this taxonomy can be used for extending modeling elements of influencing factors on human failures in SafeConcert [Montecchi, Gallina, 2017], which is a metamodel for modeling technical and socio entities in socio-technical systems.
- Extended modeling elements can be used as the foundation of risk analysis tools such as Concerto-FLA [Gallina et al, 2014], which is a risk analysis tool for socio-technical systems.

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Thank you

- The poster is presented outside.


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Context

- Assessing risk within augmented reality-equipped socio-technical systems
- What is effect of augmented reality?
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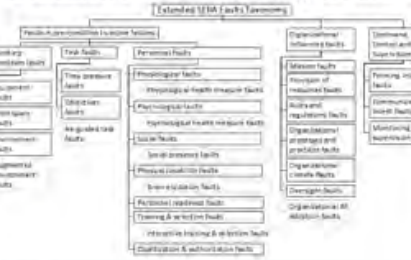
Problem

- Current state-of-the-art task taxonomy does not consider augmented reality effects and new types of faults that could cause human failures because of using these new technologies.
- If we consider a human as a component, or even better as a composite within a composite-based system, representing a socio-technical system.
- A **human failure** is a decision in human functioning from correct to incorrect functioning and
- the cause for the human failure (or **faults**), which would be internal or external.

Internal/External Faults	Human Failures	Risk
<ul style="list-style-type: none"> • Faults associated with the system (e.g. software) • Faults associated with the human (e.g. fatigue) 	<ul style="list-style-type: none"> • Human error • Human failure • Human mistake 	<ul style="list-style-type: none"> • Safety risk • Performance degradation • System failure

Risk-related causality chain to socio-technical systems.

Extension of faults taxonomy towards assessing risk



- **Task faults:** are experienced (failures) that could lead to human failures (Gallina et al., 2016)
- **Working conditions faults:** represent environmental factors that cause human failures (Gallina et al., 2016)
- **Psychological and psychological faults:** are mental and psychological faults that cause human failures (Gallina et al., 2016)
- **Social faults:** are social factors that cause human failures (Gallina et al., 2016)
- **Physical capability faults:** are physical faults that cause human failures (Gallina et al., 2016)
- **Training and selection faults:** are training and selection faults that cause human failures (Gallina et al., 2016)
- **Organizational faults:** are organizational faults that cause human failures (Gallina et al., 2016)

Next Steps

- In the future, this taxonomy can be used for identifying existing elements of failure taxonomy for human failures and for identifying new elements that could be added to the taxonomy.
- This taxonomy can be used for identifying existing elements of failure taxonomy for human failures and for identifying new elements that could be added to the taxonomy.


References

Gallina et al., 2016; Gallina, S., Bahaei, S., & Gallina, B. (2016). Towards a taxonomy of faults in augmented reality systems of socio-technical systems. In Proceedings of the 2016 ACM SIGCHI conference on Computer-Human Interaction (CHI 2016), April 28 - May 2, 2016, San Jose, California, USA. ACM Press.


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