Comprehensive Exam - Questions and Answers

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Question 1

Select one of these 2 papers (*Anomaly detection in cyber physical systems using recurrent neural networks*[1] or *Checking is believing: Event-aware program anomaly detection in cyber-physical systems*[2]), and critique it and the work described in it. Then describe how the potential methods and measurements you want to investigate would aide in evaluating the sceptibility of their proposed approach. Then, in one of the real-world domains you want to explore, discuss how the author's proposed approach compares and contrasts to what you are proposing to do.

Anomaly detection in cyber physical systems using recurrent neural networks

Review

asdf

how would my work measure/evaluate the suseptibility of their approach

Using a real-world domain I'm going to explore, how does the author's proposed approach compare/contrast to my work

Checking is believing: Event-aware program anomaly detection in cyber-physical systems

Review

asdf

Question 2

What impact do Real Time Operating Systems have on the vulnerabilities of cyber-physical systems. In other words, what characteristics do RTOSs have that make them more or less vulnerable (than general purpose operating systems), and what are some schemes attempted to mitigate these vulnerabilities.

I need to specifically reference the Formby paper [3]

Question 3

How may evolving computer architectures affect and be affected by future cyber-physical systems? In general consider from low level architecture such as processor, cores, gpu, etc. to higher levels such as cloud, edge, fog computing, etc. and embedded systems like those going into vehicles and sensors. Please limit your response to at most 3-pages as I realize this alone could make a dissertation level discussion.

References

[1] J. Goh, S. Adepu, M. Tan, and Z. S. Lee, "Anomaly detection in cyber physical systems using recurrent neural networks," in *2017 ieee 18th international symposium on high assurance systems engineering (hase)*, 2017, pp. 140–145.

[2] L. Cheng, K. Tian, D. Yao, L. Sha, and R. A. Beyah, "Checking is believing: Event-aware program anomaly detection in cyber-physical systems," *CoRR*, vol. abs/1805.00074, 2018.

[3] D. Formby, A. Walid, and R. Beyah, "A case study in power substation network dynamics," *Proc. ACM Meas. Anal. Comput. Syst.*, vol. 1, no. 1, pp. 19:1–19:24, Jun. 2017.