2018 European Control Conference (ECC)
June 12-15, 2018. Limassol, Cyprus

Guidelines for a systematic review in systems and automatic engineering. Case study: distributed estimation techniques for cyber-physical systems

Carmelina Ierardi[1], Luis Orihuela[1] and Isabel Jurado[1]

Abstract— **This paper presents some guidelines for conducting a systematic review SR (also referred to as a systematic literature review) in the field of systems and automatic engineering. Inspired by the available literature in SR in other fields, this paper presents an adaptation of this kind of review. In particular, we provide the advantages and limitations on the most used databases in this area and some advice on defining the boolean function for the search and the inclusion and exclusion criteria of the selected publications. The paper proposes some recommendations to extract and synthesize the data collected and, finally, some guides to create the final report. This methodology is applied to a practical case: distributed estimation techniques applied to cyber-physical systems (CPS).**

Index Terms— **Systematic review, Automatic and systems engineering, Distributed estimation, Cyber-physical systems.**

I. INTRODUCTION

Nowadays, with the development of new information and communication technologies, the amount of information available and its ease of acquisition has increased enormously, perhaps surprisingly implying that it is increasingly difficult to make an accurate and selective research on a specific topic to prepare a bibliographic review. The systematic review (SR) is presented in this context as a solution to this problem. In [10] an SR is defined as a means to evaluate and interpret all available research relevant to a particular research question, thematic area or phenomenon of interest. The SR's aim is to present a fair evaluation of a research topic using a reliable, rigorous and verifiable methodology.

An SR is a form of secondary study, whereas individual studies contributing to the review are termed primary studies [10]. Briefly, a SR is a very useful study when there is a concrete question of research generally related to different subjects, with several primary studies, perhaps with divergent objectives and/or results that can generate an uncertainty about the process.

Many are the areas in which this methodology is commonly used. Among them, medical, psychology, biology, economics or software engineering stand out. In the area of systems and automatic engineering, literature reviews are usually made without following a certain methodology, so that they can not be replicated by other authors or may be biased by the reviewer's criteria. Normally, these revisions are usually made by long-experienced researchers who provide a global view of the subject in question, such as the reviews [3], [19].

[1]Authors are with Departamento de Ingeniería, Universidad Loyola Andalucía, Sevilla, Spain {cierardi,dorihuela,ijurado}@uloyola.es

The methodology to elaborate the SR that will be used in this work is inspired on the guide proposed in [10], accordingly modified to suit the particular requirements of our field, and follows the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analysis) method [16]. The objective of this research is to clearly explain the different stages to follow to achieve an SR in systems and automatic engineering. As a contribution, this research proposes some modifications to the aforementioned guidelines to adapt them to considered field: available engineering databases, with the kind of search that can be done and their coverage, adapted inclusion and exclusion criteria, booleans operators for the search, definition of the boolean function, etc.

In addition, a practical case on the execution of an SR on the techniques of distributed estimation of cyber-physical systems is presented in parallel. Cyber-physical systems are complex systems composed of entities of different nature that interact with a given physical medium, and which can simultaneously have communication, computation and control capabilities, through which they can involve humans, animals and biological process [11]. The aim of this SR is to get to know and compare all the techniques related to distributed estimation that has been successfully applied to any kind of cyber-physical system. To be considered for inclusion in the review, the primary studies must deal with some sort of dynamical CPS and the distributed estimators or observers must share some sort of information (excluding pure decentralized estimators). Among others features, we are interested in the amount of information that those methods require to transmit, the type of communication protocol that needs to be implemented, and whether the design of the estimator is made in a centralized or a distributed way. This paper presents a table including all this information so that the reader may get a quick perspective on the available results.

This paper is organized as follows. Section II summarizes the steps of the SR. The planning of the review is discussed in Section III. Finally, the stages for the conducting and reporting of the review are presented respectively in Sections IV and V. The conclusions and pending work are discussed in Section VI.

978-3-9524-2699-9

II. SYSTEMATIC REVIEW

Most research commonly starts with a review of the literature to define and focus the current state of the art. Mainly, narrative (or traditional) revision and systematic review are used. The former is more appropriate when there are few primary studies on the subject of research and these have important similarities between them. It is based on the interpretation, analysis and personal discussion about what other authors have said. However, it does not fit the scientific paradigm, since it does not report on the number of sources, nor on the search methods, does not make explicit the inclusion/exclusion criteria of the studies, nor does it speak about the relevance of the same with respect to the rest of the literature, nor does it provide the reason objective evidence of reasoning, among others.

On the other hand, a systematic review follows a scientific methodology, which ensures objectivity, rigor and reliability: it follows a predefined search strategy to allow an exhaustive evaluation of it [13]. The main objectives of a SR are [16]:

- Defining what is known about the topic, concept or problem in general.
- Identifying gaps and coherences of past and current literature on the chosen topic.
- Promoting the development of protocols and directives that can serve as a model.

For all these reasons, undertaking a systematic review entails considerable work in order to achieve a good result. The preparation of a review comprises three sequential phases, namely **Planning**, **Conducting**, and **Reporting** the review, that can be subsequentely divided into sub-phases, as illustrated in Figure 1. The drafting of the review's protocol takes place in the Planning, but concerns all phases of the systematic review, as it organizes and establishes all the methods to undertake an SR [21].

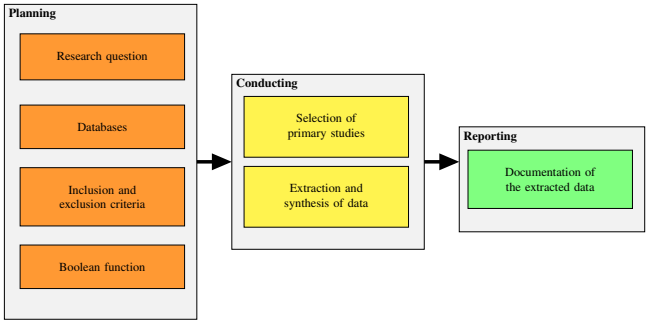


Fig. 1. Phases y sub-phases of the systematic review

III. PLANNING THE REVIEW

Once the research topic has been defined and the need to initiate an efficient SR is found it is highly recommended to follow the different stages that constitute it. The most demanding and most significant phase, due to the influence of subsequent steps, is the planning of the review, which consists of: 1) Definition a clear and precise research question; 2) Choice of the databases; 3) Establishment of inclusion and exclusion criteria; 4) Definition of the boolean search function.

A. Research question

Choosing the subject, delimiting the problem and clearly stating the research question is fundamental when conducting the SR. It is essential that the objective of the search be consistent with the hypothesis formulated. In many fields, such as psychology or medicine, there is a battery of questions that are used to facilitate this stage. In those sectors it is also considered the use of standard methods to frame the research questions, such as the PICO (Population, Intervention, Comparison, Outcome) criteria [16]. In the field of systems and automatic engineering, it is not so obvious to formulate a collection of questions and/or criteria following the PICO, since the areas of research are very different from each other and do not follow particular patterns.

Case study: In this paper, in parallel with the guidelines, we are conducting a SR on the following topic: **Distributed estimation techniques that are applied to cyber-physical systems.** The following research question has been identified with sub-questions that would be addressed by this review:

RQ.1: What distributed estimation techniques are used in cyber-physical systems, heterogeneous systems or system of systems?

RQ.1.1: What are the limitations and advantages of each technique?

RQ.1.2: In applications that include humans, animals or biological systems, which estimator obtains better results?

B. Choice of the databases

The review should be documented with sufficient detail so that the readers can evaluate the completeness of the research. In addition, all digital libraries that have been consulted, typologies of the publication (included journals, conferences, etc.), and the kind of search (electronic or manual searches, or a combination of both) must be specified. When choosing the databases to conduct the search, it is important to be sure that they cover, at least, the content of the most important publishers. However, the coverage of each database is, sometimes not easy to discover, since the databases do not provide it in an exact way.

In the authors' opinion, for the field of automatic and systems engineering it is advisable to choose between the databases listed in Table I. Regarding the search fields that these databases allow, in this table some acronyms have been used, namely: A = abstract, T = article title, K = keywords, F = full text. Depending on the database, the set of "abstract", title and keywords (A + T + K) which is a very common choice is called differently: for example, in Web of Science this field is named "Topic"; in IEEE Xplore, "Metadata".

The search strategy may be different depending on the chosen database, as some are more prepared than others to conduct an advanced search. Some of the databases, as shown in Table I, let us do the search directly in certain fields of

TABLE I

SOME OF THE MOST IMPORTANT DATABASES IN AUTOMATIC AND SYSTEMS ENGINEERING

Databases	Search fields	Manual or automatic search	Supported operators	N^o Terms supported	N^o Maximum download	Citations format	Download with "abstract"
Web of Science (WoS)	A+T+K, T, F	Both	AND, OR, NOT, NEAR, (), *, ""	Not specified	50 citations	bib, RIS, CSV	YES
IEEE Xplore (IEEEX)	A+T+K, T, A, K, F	Both	AND, OR, NOT, NEAR, (), *, ""	Only 15	100 citations	bib, RIS, CSV	YES
ScienceDirect (SD)	A+T+K, T, A, K, F	Both	AND, OR, AND NOT, (), *, ?, "", {}	Not specified	200 citations	RIS, bib, Text	YES
ACM Digital Library (ACM)	T, A, K, F, A+T+K	Both	AND, OR, NOT, (), ""	Not specified	2000 citations	bib, RIS, CSV	NO
Scopus	A+T+K, T, A, K, F	Both	AND, OR, AND NOT, *, ?, "", ()	Not specified	2000 citations	bib, RIS, CSV, Text	YES
SpringerLink	T, F	Automatic	AND, OR, NOT, "", ()	Not specified	2000 citations	CSV	NO
Wiley Online Library	A, T, K, F	Automatic	AND, OR, NOT, "", *, ()	Not specified	20 citations	bib, RIS, Text	YES
Google Scholar	T, F	Automatic	AND, OR, NOT, "", ()	Not specified	1 citation	bib, RIS	NO

text (IEEE Xplore, Web of Science, ScienceDirect, Scopus), others do not (SpringerLink, Wiley, Google Scholar). Some databases allow us to include only a finite number of terms for the search (such as IEEE Xplore that has a limits of 15 terms), while others have no limits. Almost all databases support operators, booleans and of other types. Table I includes the operators that can be used in each database. For a detailed explanation of the supported operators, the researchers should go to the respective database, since not all databases use the same operators in the same way.

The download limits are substantially different, ranging from just 1 citation at a time (Google Scholar) to up to 2000 documents (Scopus and among others). Table I also reflects the format in which the results can be downloaded, which is important to consider if a reference manager (Mendeley, BibDesk, etc.) will be used, since each of them works with a different file format. Finally, the table indicates what information can be extracted from the database after the search has been conducted. In some databases, in addition to the title, the user can download the abstract as well. As we will explain later, this will facilitate the subsequent tasks.

Case study: For the case study, we have decided to exclude those databases that did do not allow to make the search in the abstract, title and keywords. In addition, we have checked that those databases have enough coverage to conduct the planned review. Table II presents this information in a graphical way, using the information provided by each database. The period of interest of the search is from the 01/01/90 to 02/10/2017.

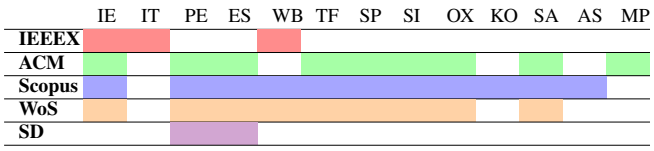
C. Inclusion and exclusion criteria

Once the potentially relevant studies for each chosen database have been obtained, their actual suitability for the research topic has to be evaluated. The study selection criteria aim to identify the primary studies that are those with direct evidence on the research question. In order to reduce the likelihood of bias, the selection criteria should be decided at the outset, although they may be refined during the search process. There are two types of criteria, exclusion and inclusion. The first ones indicate that if the article presents one of the points contained in this criterion will be excluded. The second ones involve all the characteristics that each chosen article needs to have. As it will be explained later, the number of people involved in an SR shall be at least 2. For this reason, the criteria should be clear to ensure that they can be interpreted reliably and the studies can be classified correctly. Many of these criteria are common to all SR's, such as the language of articles, the minimum number of pages, etc. [10], [16].

Case study: Tables III - IV list the chosen criteria for the selection of an article. The so-called secondary studies and the gray literature include books or book chapters previously or subsequently published in journal papers, poster presentations, abstracts, reviews and surveys, conference paper that have given rise to journal articles, or doctoral theses. It has to be highlighted that the doctoral theses have been included in the gray literature because they usually give rise to journal articles. Mainly we are including novel results which has passed a peer-review process. In systems and automatic engineering, the realization of experiments and/or simulations could be required. The proposition or just usage

TABLE II

DATABASES COVERAGE WITH RESPECT TO PUBLISHERS: *IE=IEEE, IT=IET, PE=Pegamon-Elsevier, ES=Elsevier Science, WB=Wiley Blackwell, TF=Taylor & Francis, SP=Springer, SI=SIAM Publications, OX=Oxford University Press, KO=Korean Inst. Electrical Eng., SA=Sage Publications, AS=ASME, MP=Microtome Publications*



of a certain technique could be distinguished as well.

TABLE III
INCLUSION CRITERIA

• Full paper available (through search engines or by contacting the authors) • Use or propose a distributed estimation technique on cyber-physical systems, heterogeneous systems or system of systems or make specific reference to humans, animals or biological systems • Use a distributed estimator with some sort of communication between local estimators • The system to be estimated must have dynamics

TABLE IV
EXCLUSION CRITERIA

• Secondary studies and gray literature • Non English written papers • Duplicated studies • Studies clearly irrelevant to the research • Focused only on control • It does not present experiments nor simulations

D. Boolean function

The search begins with an adequate formulation of the keywords of the boolean function and with the research in the electronic databases of each sector. In order to refine the search and develop a better strategy, it would be better to identify synonyms, acronyms, truncated words and/or alternative terms that have been used to ensure that the reference found is independent of synonyms, variants, etc. At the point, we recommend the potential reviewers to read several survey or key papers on the topic to find all the terminology involved. The boolean function represents a string consisting of several combinations of terms derived from the research question. Once the keywords describing the research topic are found, boolean operators are used to combine the different terms. Finally, the search strategy is launched and the result obtained is reviewed. If necessary, the search is modified and restarted. At this point it is convenient to have a set of papers that either you know that they should be included in the review or you know that they should not be. In other words, a set of papers that let us confine the topic. This increases the confidence in the effectiveness of the search.

Case study: The boolean function for this study is:
{Estimator OR Estimation OR Filter OR Filtering OR Observer OR Observability OR Sensing} AND
{"Cyber Physical System" OR "Human in the loop" OR "Human Robot" OR "System of systems" OR "Heterogeneous System" OR "Human Machine" OR "Canine Machine" OR "Heterogeneous Multiagent System" OR "Humanoid Robot" OR "Animal Robot"} AND
{Distributed OR Decentralized OR Decentralised OR "Sensor Fusion"}

The results of the search obtained using this boolean function in the title, abstract and keywords are shown in the Table V. We have obtained 1788 potential studies.

TABLE V
STUDIES OBTAINED IN EACH DATABASE

WoS	IEEEX	SD	ACM	Scopus	Total
221	727	40	223	577	1788

IV. CONDUCTING THE REVIEW

Once the results are obtained for each database, they will have to be analyzed and evaluated to verify if they are really good candidates for the review. The first filter will be the application of the inclusion and exclusion criteria mentioned in Subsection III-C. In a first inspection, the criteria will be applied to the title and abstract. Only when there is doubt whether to include it or not, a full text reading will be made.

A. Selection of primary studies

As it was explained before, the search will not have to include secondary studies or gray literature. Most databases allow you to directly perform this first filtering, not including some or all secondary studies. In order to guide this process, an international group of experts has developed the PRISMA method, which is a framework for the realization of SR [16]. It consists of 27 points and a flow diagram in four stages, presented in Figure 2 that summarize the selection process. The number of studies included in each step in given in brackets. We will come to this later in the case study.

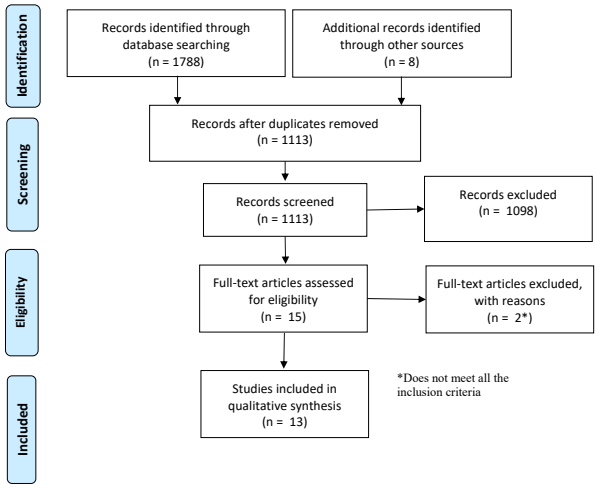


Fig. 2. PRISMA flow diagram

In order to reduce the bias, the results will be evaluated by two different people, considering the title and the abstract. Only in the case when the two people claim that an article is adequate, it goes to the next stage[1]. If they disagree, a third person will have the final decision. This step considerably reduces the number of items considered

[1]There exists another methodology that assigns to each paper a grade between 0 and 1 at the choice of the reviewers: if the final grade, which is the average between the grades of each reviewer, is higher than a predetermined threshold, then the article is accepted, otherwise it is rejected.

to be suitable. The next step consist in reading the full document making a final selection. It is worth mentioning that, after finishing all the stages, it is common to review the bibliography of the accepted studies and, even, to contact with the corresponding authors. If any additional papers have to be considered, they will need to go through the whole PRISMA procedure, as it is shown in Figure 2.

Case study: As it is shown, the additional records identified through other sources are 8. These studies correspond to those advised by the corresponding authors of the accepted papers and those included in the bibliography of the accepted documents. We have detected more than 600 duplicates since, as detailed in Table II, the databases share part of their content. In order to facilitate this task, an automatic duplicate detection tool has been used (Mendeley). This results in 1113 papers to be screened. For the first screening, only some of the exclusion criteria have been used (secondary studies, part of gray literature and duplicates have been ruled out). The reason is that some databases allow to exclude part of the gray literature directly. The application of the rest of the exclusion criteria and the inclusion criteria are actually the task that would be necessary to tackle between the 2 people. Concluding this phase of the review, we have a number of studies to read in full text very small respecting the initial number. In particular, 15 papers will have to be evaluated. Of these 15 papers, 2 were excluded with the motivations shown in the Figure 2. The percentage of agreement between the authors has been almost 85%.

B. Extraction and synthesis of data

The validity of a SR is closely related to the quality of the original studies and to the methods used by the reviewers to organize and systematize the information useful for the review. There are different methods that help us organizing the collected information. The conceptual maps or tables of data extraction are the most used, where the most important feature of the study are summarized. The basic information these tables should contain is different for each sector.

Case study: The information gathered from the different papers is detailed in Table VI. In addition to the information relative to the publication, the table provides details of different aspects we think are crucial: the estimator used, the concrete application within CPS, and whether simulations and/or real experiments have been carried out. Particular attention has been paid to the limitations and advantages presented in each paper and whether the design (the implementation must be distributed) of the estimators/observers is made in a distributed or centralized way. Furthermore, we have made a deep study on the communication requirements, focusing on the required amount of data to be transmitted at each sampling time (as a reference level for this data, we denote the dimension of the state vector to be estimated by n) and the communication protocol implemented. The following cases are identified: **All-to-all**, in which every agent communicates to every agent each sampling time; and **Neighborhood**, in which every agent communicates with the agents in its neighborhood at each sampling time.

One quality criterion that deserves to be commented is the fact that the papers included in the SR do not cite the others papers. This means that answering the questions reported at the beginning would not be an accurate task if the researcher just read some of those papers and their citations. This fact strengthens the need of this review, since the whole picture of the topic is grouped.

V. Reporting the review

The final phase of the SR includes the drafting and reporting of all results. As it was already mentioned, the SR does not have to be a simple description of what other authors have published, but a critical, objective and reasoned discussion of the literature examined, showing a deep understanding and awareness of the different arguments and approaches.

A. Documentation of the extracted data

Once the review is organized, the maps and/or tables are completed, a complete overview of the gathered material and an orientation to the logical articulation of the relationships between the different results will be taken. Among other things, this process facilitates the organization of content and, in particular, the selection of key information, explaining what concepts should be developed in the review. The report has to include all the aspects mentioned in Section IV-B, using all the basic information available in each article that is important for the review, highlighting the characteristics of the study and the results obtained. The SR is concluded arguing the results, that is, explaining and proposing an interpretation of the most significant data related to the topic. The final report will have to answer in a clear and precise way to the research questions proposed at the beginning. Some authors raise this last part by developing each question with their respective answer, while others argue the conclusions without necessarily using this subdivision [22], [17].

VI. Conclusions and future work

In this paper we have presented the main stages of an SR for the field of automatic and systems engineering. The paper presents, from the authors' point of view, an important set of guidelines, advices and organized information that will help those researchers that feel the need to conduct a SR within this field. A case study has been presented on the techniques of distributed estimation of cyber-physical systems. It is pending to complete the reporting the review, which is left as future work. In conclusion, future research is intended to provide deep insights on the evolution of these techniques from the $90'$ to 2017 in order to improve understanding and clarify the evolutionary trajectory by identifying the theoretical trends and gaps that need to be addressed in future studies.

ACKNOWLEDGMENT

We would like to thank A. Rigabert for her advices. This research is supported by grant TEC2016-80242-P (AEI/FEDER).

TABLE VI

FEATURE TABLE

Title	Year	Estimator used	Application	Real Experiments or simulations	Limitations and advantages	Design	Exchanged information	Communication protocol
[5]	2008	Decentralized Bayesian filtering	**To coordinate a network of humans and robots**	Real Experiment	Lost packets in communication process	Distributed	Vector (n)	Neighborhood
[20]	2010	A distributed detection algorithm based on consensus	Fault detection and isolation (FDI) , applicable to systems of systems	Simulations	Provide high efficiency, scalability and robustness	Distributed	Matrix (nxn)	All-to-all
[4]	2011	Goertzel Algorithm with transmissibility functions	Structural health monitoring	Both	Reduce latency respect to FFT and require a centralized inizialization algorithm	Distributed	Magnitude espectrum (n)	All-to-all
[12]	2011	Consensus-based Luenberger observer	Synchronization of linear heterogeneous multi-agent systems	Simulations	LMI centralized design, structural constraints in the observer matrix	Centralized	State vector (n) Estimated state vector (n) state of ecosystem ($r < n$)	All-to-all
[18]	2012	Annealing particle filters	Body tracking	Real experiment	For 3D model	Centralized	Matrix (nxn)	Neighborhood
[9]	2013	Consensus based estimator	CPS with adversarial attack on the sensed and communicated information	Simulations	With attack on the sensed and communication; Full rank output matrix	Centralized	Estimated state vector (n) Output vector ($r < n$)	Neighborhood
[14]	2013	Extended Kalman filter (EKF)	Multi-robot tracking	Both	The robots have a low capacity processing unit	Distributed	Vector (n)	All-to-all
[15]	2016	Adaptive distributed observer	Tracking a leader with heterogeneous followers	Simulations		Distriduted	Matrix (nxn)	Neighborhood
[6]	2016	Distributed fusion estimator (DFE) (Kalman filtering)	Cyber-physical systems with communication constraints	Simulation	Communication delays and packet dropouts	Distributed	Matrix (nxn)	All-to-all
[7]	2016	Bayesian Estimation	Arrival rates in asynchronous monitoring networks	Simulation	The number of samples at each node are allowed to be highly inhomogeneous	Distributed	Augmented state vector (n)	Neighborhood
[8]	2016	A self-tuning adaptive distributed observer	Multi-agent system	Simulations	Are treated separately handle the leader's signal and the external disturbances	Distributed	Matrix (nxn)	Neighborhood
[2]	2016	Robust distributed nonlinear descriptor observers with neural network approximation of uncertainties	Estimation state and attack simultaneously in the CPS	Real experiment	Robustly with residual signals and require global information for design	Distributed	Matrix (nxn)	All-to-all
[1]	2017	Differents Kalman Filters: the general consensus-based distributed filter and the distributed adaptive filter	**Biological system**	Simulations	Reducing congestion and incrementing the robustness against nodes failures and attacks	Distributed	Estimated state vector (n)	Neighborhood

REFERENCES

[1] D. Alonso-Román, C. Asensio-Marco, and B. Beferull-Lozano. Consensus-based Distributed State Estimation of Biofilm in Reverse Osmosis Membranes by WSNs. In *3rd International Workshop on Cyber-Physical Systems for Smart Water Networks*, pages 7–10, April 2017.

[2] W. Ao, Y. Song, and C. Wen. Distributed robust attack detection and reconstruction for a class of uncertain nonlinear interconnected CPSs. In *12th World Congress on Intelligent Control and Automation*, pages 1819–1824, June 2016.

[3] K.J. Åström and P. R. Kumar. Control: A perspective. *Automatica*, 50:3–43, 2014.

[4] M. Bocca, J. Toivola, L.M. Eriksson, J. Hollmén, and H. Koivo. Structural Health Monitoring in Wireless Sensor Networks by the Embedded Goertzel Algorithm. In *2nd International Conference on Cyber-Physical Systems*, pages 206–214, April 2011.

[5] F. Bourgault, A. Chokshi, J. Wang, D. Shah, J. Schoenberg, R. Iyer, F. Cedano, and M. Campbell. Scalable Bayesian human-robot cooperation in mobile sensor networks. In *International Conference on Intelligent Robots and Systems*, pages 2342–2349, September 2008.

[6] B. Chen, G. Hu, D. Ho, and L. Yu. Distributed Covariance Intersection Fusion Estimation for Cyber-Physical Systems with Communication Constraints. *IEEE Transactions on Automatic Control*, 61(12):4020–4026, 2016.

[7] A. Coluccia and G. Notarstefano. A Bayesian Framework for Distributed Estimation of Arrival Rates in Asynchronous Networks. *IEEE Transactions on Signal Processing*, 64(15):3984–3996, 2016.

[8] Y. Dong, J. Chen, and J. Huang. Cooperative output regulation for networked multi-agent systems based on the self-tuning adaptive distributed observer. In *2016 American Control Conference*, pages 1918–1923, July 2016.

[9] U.A. Khan and A.M. Stanković. Secure distributed estimation in cyber-physical systems. In *IEEE International Conference on Acoustics, Speech and Signal Processing*, pages 5209–5213, May 2013.

[10] B. Kitchenham and S Charters. Guidelines for performing systematic literature reviews in software engineering. In *Technical report, Ver. 2.3 EBSE Technical Report*, pages 1–65. 2007.

[11] E.A. Lee. Cyber Physical Systems: Design Challenges. *11th IEEE International Symposium on Object and Component-Oriented Real-Time Distributed Computing*, pages 363–369, May 2008.

[12] K.D. Listmann, A. Wahrburg, J. Strubel, J. Adamy, and U. Konigorski. Partial-state synchronization of linear heterogeneous multi-agent systems. In *50th IEEE Conference on Decision and Control and European Control Conference*, pages 3440–3445, December 2011.

[13] R. Mallett, J. Hagen-Zanker, R. Slater, and M. Duvendack. The benefits and challenges of using systematic reviews in international development research. *Journal of Development Effectiveness*, 4(3):445–455, 2012.

[14] R. Marchant, P. Guerrero, and J. Ruiz-del Solar. Cooperative global tracking using multiple sensors. In *RoboCup 2012: Robot Soccer World Cup XVI*, pages 310–321. Springer, 2013.

[15] H.R. Modares, S.P. Nageshrao, G.A. Delgado Lopes, R. Babuška, and F.L. Lewis. Optimal model-free output synchronization of heterogeneous systems using off-policy reinforcement learning. *Automatica*, 71:334–341, 2016.

[16] D. Moher, A. Liberati, J. Tetzlaff, and D.G. Altman. Reprint-preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Physical Therapy*, 89(9):873–880, 2009.

[17] D. Quiñones and C. Rusu. Computer Standards & Interfaces How to develop usability heuristics : A systematic literature review. *Computer Standards & Interfaces*, 53(March):89–122, 2017.

[18] I. Renna, R. Chellali, and C. Achard. Combination of annealing particle filter and belief propagation for 3d upper body tracking. *Applied Bionics and Biomechanics*, 9(4):443–456, 2012.

[19] J. Shi, J. Wan, H. Yan, and H. Suo. A survey of Cyber-Physical Systems. In *2011 International Conference on Wireless Communications and Signal Processing*, pages 1–6, November 2011.

[20] S. Stanković, Ž. Djurović, N. Ilić, and M. Stanković. Consensus based fault detection and isolation for systems of systems. In *World Automation Congress*, pages 1–6, September 2010.

[21] Zlatko Stapic, Luis De-Marcos, Vjeran Strahonja, Antonio García-Cabot, and Eva García López. Scrutinizing systematic literature review process in software engineering. *TEM Journal*, 5(1):104, 2016.

[22] J. Vilela, J. Castro, L. Eduardo, G Martins, and T. Gorschek. Integration between requirements engineering and safety analysis : A systematic literature review. *The Journal of Systems and Software*, 125:68–92, 2017.