# Building Skills 4.0 through University and Enterprise Collaboration

# SHYFTE 4.0

## WP4: Dissemination & Exploitation

## D4.7: Report of publication

## vs:2.5.0

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**Contributing Partners:** ALL

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**Dissemination:** Public

**Status:** <~~Draft¦~~ Consortium Approved ¦ ~~EU Approved~~>

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## Status

This deliverable is subject to final acceptance by the EACEA.

## Further Information

http://www.shyfte.eu/

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SHYFTE 4.0

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# Project Partners:

UNIVERSITÉ LUMIÈRE LYON 2

Università degli Studi del Sannio

UNIVERSIDADE NOVA DE LISBOA
OMNIS CIVITAS CONTRA SE DIVISA NON STABIT

COGNITUS
The builder of next generation experts

ATTANAM DAMAYANTI PANDITA
CHIANG MAI UNIVERSITY 1964

KASETSART UNIVERSITY
1943

CHENGDU UNIVERSITY
1978

CUIT
Chengdu University of Information Technology

# Table of Contents

# 1. Executive Summary

This document describes the dissemination strategy of the Shyfte project regarding:

- The publication strategy and plan

- The publications in national and international journals and conferences.

It also describes the list of publications with information on the types of conferences, the audiences, the papers presented, the partners involved...

# 2. Introduction

The purpose of this document is to report the balance of scientific publications that allow the continuous dissemination of SHYFTE project achievements, specifically conference papers, journals, and books. It includes a specific section dedicated to synthesis the already published publications. Additionally, in terms of dissemination it is also reported the scientific publications plan.

Conference papers are good opportunities to disseminate scientific work and present those results to academic community. During the project, 20 publications in International Conferences were presented. We also organized a special session in the international conference "IEEE – 15th China-Europe International Symposium on Software Engineering Education" which was held in 2019 in Lisbon-Caparica, Portugal.

This session focused on "Skills for Industry 4.0", Five papers were presented. SHYFTE papers participation and contributions in international conferences, which have been carefully planned, are next summarily described

All the partners participated to the publication plan, the scientific results can be summarized as following, **28 publications**:

- **1** Keynote Speaker in an international conference

- **1** Special session in an international conference

- **20** publications in international conferences

- **7** publications in international journals:

    All the journals are indexed (Web of Science and/or Scopus) and related to Industry 4.0: *Frontiers in Computational Neuroscience; Int. Journal of Manufacturing Technology and Management; Int. Journal of Advanced Manufacturing Technology; Journal of Physics: Conference Series; Production & Manufacturing Research; Int. Journal of Product Development*

# 3. Publications Plan

Shyfte scientific publications are disseminated at National and International conferences, journal and books, that allows to disseminate the project results. The initial Shyfte publication plan is synthesized in different content tables:

- First table is dedicated to scientific publications on national and international conferences, it specifies the details for each publication: in which conference will be published the paper, what is the related deliverable, and intervenient partners.

- Second table, follows the similar structure, however dedicated to journal publications. Last table is dedicated to Shyfte book and its chapters.

This plan aimed to involve all project partners in the publication strategy. In view of the deadlines, we aimed to publish at least 10 articles in international conferences and at least 3 articles in journals:

- After one year of work on WP1, we wanted to be able to submit 2 articles in journals,
- 2 other articles could be submitted at the end of the 2nd year of the project, on the work of WP2
- At least, 1 to 2 articles will be submitted to journals at the end of the project to highlight the results obtained.

SHYFTE Publications:

Responsible = Res.  And Contributor = Con. Tha

| Conference Details | Source of Publication | Part of Deliverable | ULL | UNL | CMU | UPM | KU | CDU | CUIT | UTM | UNS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D1.1 | State of the art | Res. | | | Con. | | | | | |
| | D1.2 | Skill Model | Con. | | Res. | | | | | | |
| | D1.3 | Framework | | Res. | | | | | | | |
| | D2.1 | Pilot in Domain1 | Con. | | Res. | | Con. | | | | |
| | D2.2 | Pilot in Domain2 | | | | | | Con. | Res. | | |
| | D2.3 | Pilot in Domain3 | | Con. | | Res. | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| | D2.4 | Pilot in Domain4 | | | | | Con. | Con. | Res. | |
| | D2.6 | Implementation | Con. | Res. | | | | | | Con. |

| Journal Details | Source of Publication | Part of Deliverable | ULL | UNS | UNL | CMU | KU | UPM | COGNITUS |
|---|---|---|---|---|---|---|---|---|---|
| | D1.1 | State of the art | Res. | | | | | Con. | |
| | D1.1 | Survey | | Res. | | Con. | | | |
| | D1.2 | Gap Analysis | | | Res. | | Con. | | |
| | D1.2 | Maturity Model | Con. | | | Res. | | | |
| | D2.5 | Develop Skill 4.0 Center | Con. | Con. | Res. | | | | Con. |

| Book/Book Chap. | Source of Publication | Part of Deliverable | ULL | CMU | KU | CDU | CUIT | UPM | UTM |
|---|---|---|---|---|---|---|---|---|---|
| | D1.2 | Gap Analysis | Res. | | | | | | |
| | D1.2 | Skill Model | | Res. | | Con. | | | |
| | D1.2 | Maturity Model | | Res. | | | Con. | | |
| | D1.2 | Ontology | | | | Res. | | | |
| | D1.3 | Framework | Res. | | Con. | | | | |
| | D1.4 | Curriculum | | | | | | Res. | Con. |

- All partners will make contribution in Book/Book Chapter

This plan was defined at the beginning of the project, it was partially respected, we finally had more publications in international conferences than initially planned, as well as more publications in journals: *20 articles in conferences against 10 initially planned; 6 articles in international journals against 3 to 4 initially planned*.

On the other hand, a book is being written, the project deadlines did not allow to finalize it before the end of the project.

# 4. Synthesis of National and International Conferences

Scientific publications disseminated at National and International conferences allows to spread the project objectives and results. Next are synthesized those published publications of the years 2019 to 2022. Those publications have been presented in conferences scheduled and organized by partner institutions, other university and related associations in Europe, Asia and America (more information about the scientific papers are described in the deliverable D4.4).

The report of publications in conferences is presented annually:

| Report of SHYFTE Participation on National and International Conferences | 2019 |
|---|---|
| **Conference** | [1] **IEEE – 15th China-Europe International Symposium on Software Engineering Education (CEISEE)** |
| **Publication Title** | *Skills Development for Industry 4.0 of Thai SMEs* |
| **Authors** | **KU**, Ueasangkomsate, P., Boonsiritomachai, W., Thitatorn, P. |
| **Abstract** | This research is aimed at assessing the skills development requirements for Industry 4.0 by Thai small and medium sized enterprises (SMEs). The skills platform for Industry 4.0 is investigated across four domains: 1) Knowledge about ICT; 2) Ability to work with data; 3) Technical know-how; and 4) Personal skills. A questionnaire was utilised to collect the data from nine SMEs in the service sector and 47 students studying a Bachelor of Business Administration degree from top five universities in Thailand. The descriptive statistics with average scores were calculated to describe the situation regarding skills in Industry 4.0. The results show that the highest level of required skills for SMEs was personal skills, followed by knowledge about ICT and ability to work with data. The findings also revealed that knowledge about ICT and technical know-how were the most valued by business administration students for their improvement regarding Industry 4.0. The results could be used to identify what skills SMEs and students need most from higher education institutes for skills development in preparation for Industry 4.0. |
| **Link** | http://shyfte.eu/wp-content/uploads/2019/11/KU_Manuscript.pdf |

| | |
|---|---|
| **Conference** | **[2] IEEE – 15th China-Europe International Symposium on Software Engineering Education (CEISEE)** |
| **Publication Title** | *Discussion on the reform of postgraduate education and tutor system in ordinary undergraduate colleagues* |
| **Authors** | **CUIT**, A. Du, J.H., Zhang, H., Li, D., Xu, Y., Tang, D., Li, D. |
| **Abstract** | More and more undergraduate colleges and universities have obtained the right to grant master's degree with the development of postgraduate education in China's colleges and universities. However, since the ordinary undergraduate college has obtained the qualification for master's degree just a few years, shortcomings are occurred in the training and supervisor systems. In order to improve the quality of postgraduate training in ordinary undergraduate colleges, this paper has detailed the characteristics of postgraduate training in ordinary undergraduate colleges and carried out discussions on the improvement of training and tutor system. A survey has been conducted to comprehend the current postgraduate training process from the aspects of master students and the tutors. Some problems are identified, and some suggestions are given to strength the education quality for master students. |
| **Link** | http://shyfte.eu/wp-content/uploads/2019/11/IEEE-CEISEE2019-303105-056.pdf |

| | |
|---|---|
| **Conference** | **[3] IEEE – 15th China-Europe International Symposium on Software Engineering Education (CEISEE)** |
| **Publication Title** | *Engineering Education in Malaysia for the Fourth Industrial Revolution (4IR)* |
| **Authors** | **UTM**, Azli, N. A., Nordin, N. M., Yusof, S. K. S., Nordin, N. K. |
| **Abstract** | The Fourth Industrial Revolution (4IR) has impacted our lives in many ways through the technological advancements it brings such as robotics, Internet of Things (IoT), Artificial Intelligence (AI), 3D printing and other lifechanging inventions. The landscape of future job market will drastically change and need to be addressed by the Higher Education Institutes (HEIs) for graduate employability. This paper presents engineering education for 4IR in the context of Malaysia. The initiatives taken by the Ministry of Education Malaysia (MoEM) in addressing the challenges of 4IR for the higher education sector is discussed. This is followed by an overview on the approach taken by one of the public universities in Malaysia in addressing the needs of 4IR through its undergraduate engineering programs. |
| **Link** | http://shyfte.eu/wp-content/uploads/2019/11/IEEE-CEISEE2019-303105-057.pdf |

| Conference | [4] IEEE – 15th China-Europe International Symposium on Software Engineering Education (CEISEE) |
|---|---|
| Publication Title | *Research on the Training Program of Big Data Talents under the Background of Industry 4.0* |
| Authors | **CDU**, Shi, D., He, Y., Yu, X., Mou, L. |
| Abstract | This paper uses text mining technologies, such as data analysis and data mining, to mine and analyse job recruitment information for the talents in the field of Big Data. These source data set is got from mainstream recruitment websites in China. Through modelling and analysing the market demand for Big Data talents, the capacity demand structure of Big Data talents was built. It is then compared with the ability structure of Big Data talents cultivated by Chinese universities. It is found that the existing Big Data talents training system cannot meet the rapidly developing market demands. The curriculum applied in training Big Data talents in universities needs to be adjusted, in order to adapt to and promote the development of the Big Data industry, as well as to be prepared for the upcoming Industry 4.0 era. In the end of this paper, the opinions and suggestions on the revision of the curriculum for Big Data professionals in Chinese universities are given, which might contribute to the improvement of the quality of Big Data talents and the development of Big Data industry. |
| Link | http://shyfte.eu/wp-content/uploads/2019/11/CEISEE-CDU-1.pdf |

| Conference | [5] IEEE – 15th China-Europe International Symposium on Software Engineering Education (CEISEE) |
|---|---|
| Publication Title | *Skill Development for Industrial Engineering in Industry 4.0* |
| Authors | **CMU**, SANTITEERAKUL, S., SOPADANG, A., SEKHARI, A. |
| Abstract | Industry 4.0 refers to the fourth industrial revolution and technological evolution from embedded systems to cyber-physical production systems. A significant challenge for the future lies in the transfer of Industry 4.0 concepts and technologies to the enterprises. Despite the change in a manufacturing system, new skill requirements to work with the changing environment would be required. This study examines the impacts of Industry 4.0 on an industrial engineer's skill. The proposed skill development framework does not enhance only hard skills, which known as specific technical skills, but also identify the requirements of soft and meta-skills too. Research methods include a literature review and a questionnaire survey of industrial engineer's required skills. Results indicate that traditional industrial engineering functions transform to data-driven and cyber-physical system. The soft skills which are significant for IEs are problem solving, |

| | systematic thinking, ability to work with others, presentation, and willing to learn and explore new knowledge. |
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| **Link** | http://shyfte.eu/wp-content/uploads/2020/02/CEISEE_Manuscript-CMU_Final.pdf |
| | |
| **Conference** | **[6] IEEE - 8th International Conference on Industrial Engineering and Systems Management** |
| **Publication Title** | *Knowledge Management in Research Collaboration Networks* |
| **Authors** | **UNL**, Zamiri, M., Marcelino-Jesus, E., Calado, J., Sarraipa, J., Jardim-Goncalves. |
| **Abstract** | Advances in science and research have brought knowledge management and collaboration together around shared goals. Nowadays, they are quickly becoming a hallmark of high-performing corporations. The convergence and integration of knowledge management and networked collaboration has helped to harvest the benefits of diverse research teams. This paper presents a study related to this. It discusses about how creating a dynamic research collaborative network can positively influence the creation and management of acquired knowledge. Additionally, it addresses the role of Living Labs and Digital Innovation Hubs in creating different research fields and projects. Then, as result of such successful research collaboration through the use of an established Living Lab, some improvements in an ontology that has been used in the domain, was made. In relation to this, a scenario of CARELINK project that provides some unique services and technologies for People with Dementia is introduced. |
| **Link** | http://shyfte.eu/wp-content/uploads/2019/11/IESM2019-FINAL.pdf |
| | |
| **Conference** | **[7] ICPR Conference, Chicago, USA, August 9-14, 2019** |
| **Publication Title** | Assessment of isometric pulls strength of industrial cart pullers-An electromyography study from an apparel manufacturing industry |
| **Authors** | **UNS** Rashid, Z., Shafiq, M., Aslam, M.A., Menanno, M., Iqbal, S., Khan, H.B., Ragno. |
| **Abstract** | The current swift pace of development is a reality that is crossing many domains in society demanding specific measures to cope with such scale of development. In the new paradigm of Industry 4.0, new competences and professional skills are needed in the most diverse quadrants of society. The importance of adequately adapt the societal systems and to promote the adequate skills is worth as much as the value we give to present and future generations. Among demanding challenges arising from this changing reality, the transfer of knowledge from academia to industry is probably the most demanding. This reality is present across diverse countries and continents and for that, pilot deployments and lessons learned should be documented and shared to promote better and effective skill development. In this context, the |

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| | SHYFTE project is establishing a computational model for knowledge transfer skills in industry 4.0 |
| **Link** | |

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|---|---|
| **Conference** | [8] **ASME** <u>IMECE</u> **2019 – International Mechanical Engineering Congress & Exploitation** |
| **Publication Title** | *Computational Model for Knowledge Transfer Skills in Industry 4.0 in an enhanced and effective way* |
| **Authors** | **UNL**, Artifice, A., Luis-Ferreira, F., Sarraipa, J., Jardim-Goncalves, R. |
| **Abstract** | The current swift pace of development is a reality that is crossing many domains in society demanding specific measures to cope with such scale of development. In the new paradigm of Industry 4.0, new competences and professional skills are needed in the most diverse quadrants of society. The importance of adequately adapt the societal systems and to promote the adequate skills is worth as much as the value we give to present and future generations. Among demanding challenges arising from this changing reality, the transfer of knowledge from academia to industry is probably the most demanding. This reality is present across diverse countries and continents and for that, pilot deployments and lessons learned should be documented and shared to promote better and effective skill development. In this context, the SHYFTE project is establishing a computational model for knowledge transfer skills in industry 4.0. |
| **Link** | http://shyfte.eu/wp-content/uploads/2019/11/IMECE2019-11393_V16.pdf |

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|---|---|
| **Conference** | [9] **IFAC 9th annual International Conference on Manufacturing Modeling, Management and Control** |
| **Publication Title** | *Investigating the Role of QMS implementation on customers' satisfaction: A Case Study of SMEs* |
| **Authors** | **UNS**, Usman, M., Shafiq, M., Savino, M., Rashid, Z., Yehya, M., Naqvi, A., Iqbal, S., Menanno, M |
| **Abstract** | Investigating the Role of QMS implementation on customers' satisfaction: A Case Study of SMEs |
| **Link** | |

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|---|---|
| **Conference** | [10] **IEEE 6th International Conference on Information Science and Control Engineering (ICISCE), 2019.** |

| | |
|---|---|
| **Publication Title** | The Research on Detection of Crop Diseases Ranking Based on Transfer Learning |
| **Authors** | **CDU - CUIT**, Yang, M., He, Y., Zhang, H., Li, D. W., Tang, Y, Bouras, A. Yu, X. |
| **Abstract** | Crop diseases are a major global threat to food security. Because the lack of agriculture experts or necessary facilities, it is difficult to determine the type of disease, as well as the degree of disease in time, which became the major factor affecting in crop production. In recent years, with the development of the transfer learning in deep learning domain, the experience of experts can be simulated to detect crop diseases in time. In this paper, we have proposed an improved transfer learning method based on ResNet 50 in crop disease diagnosis. The AI Challenger 2018 dataset has been deeper analyzed, the degree of crops diseases are detected. Comparing with non-transfer learning, the proposed transfer learning method achieved better results, which can significantly improve accuracy results by 5.1%~1.87% with reducing half of the running time |
| **Link** | http://shyfte.eu/wp-content/uploads/2022/09/The-Research-on-Detection-of-Crop-Diseases-Ran.pdf |

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|---|---|
| **Conference** | [11] **XXIV Summer School "Fransesco Turco"), 2019.** |
| **Publication Title** | Analysing the determinants of industry 4.0 technologies in southern Italian industries through structural equation modelling |
| **Authors** | **UNS**, Menanno, M., Savino, M.M., Palmieri, A. |
| **Abstract** | We are in the midst of a profound transformation in the way companies and industrial enterprises produce value. Several sudden transformations are disrupting value chains, bringing new opportunities and challenges. While these transformations require new skills, new business models and new paradigms, we believe that our work as researchers and professors is also challenged to provide these new skills and train a new generation of engineers and managers. This paper presents an analysis of the determinants of industry 4.0 technologies through a structural equation modelling. A case study of industrial SME's in southern Italy is presented. |
| **Link** | http://www.summerschool-aidi.it/edition-2019/index.php |

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| **Report of SHYFTE Participation on National and International Conferences** | **2020** |
| **Conference** | [12] **12th annual International Conference on Education and New Learning Technologies** |

SHYFTE 4.0

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| Publication Title | Big data Mining in Skills 4.0 for ameliorating I4.0 |
|---|---|
| Authors | **ULL**, F. Md Dewan, A. Sekhari, Y. Ouzrout |
| Abstract | I An accretion in Skills 4.0 is one of the major challenges for implementing Industry 4.0 in the developing countries. Industry 4.0 is the fourth industrial revolution that's also known as I4.0/I4. Industry 4.0 is an eclectic mix of following technologies: big data analysis, robotics, simulation, system integration, internet of things (IoT), cybersecurity, cloud computing, 3D printing, and augmented reality. Basically, Industry 4.0 transforms industry into intelligent industry (iIndustry) by connecting Industrial Internet of Things (IIoT), which is the network of machines for sharing information and making decisions without any human involvement to produce high-quality products at low costs and changes the traditional production relations among suppliers, producers, and customers. Industry 4.0 uses advance machine learning and data mining techniques to predict future for optimizing the manufacturing process. Skills 4.0 is a skills model to build up Industry 4.0 that what skills we need to know for Industry 4.0. In this paper, we mainly focus on big data analytics in Skills 4.0, e.g. big data integration, processing, and modelling. We have discussed several important challenges and issues for big data mining in Industry 4.0. We lucid the skills that needed to extract knowledge/informative information from big data for decision making to predict the future of any anomalies is supply chain management (SCM) process. The objective of this study is to find the skills for big data analysis in Industry 4.0, and design and develop learning resources and materials to transfer the knowledge from Europe to Asia. |
| Link | http://shyfte.eu/wp-content/uploads/2020/07/EDULEARN20_Paper_id_83045.pdf |

| Conference | [13] **IEEE International Conference on Informatics, IoT, and Enabling Technologies (ICIoT 2020)** |
|---|---|
| Publication Title | "An Improvement of Support Vector Machine Imputation Algorithm Based on Multiple Iteration and Grid Search Strategies". |
| Authors | **CDU**, Wang, J., Li, D., Zhang, H., Yu, X., Sekhari, A., Ouzrout, Y., & Bouras, A. |
| Abstract | Data missing is a vitally important issue that influences the classification results in medical field. This paper proposes an improved support vector machine (SVM) imputation algorithm by using strategies of pre-imputation, multiple iteration and grid search (IG-SVMI). Based on the experimental performance, nine UCI datasets and two real datasets are used to compare the proposed algorithm with four existing imputation algorithms (RFI, KNNI, CCMVI and orthogonal |

| | coding SVMI). The datasets are considered into two types of originally containing missing value and randomly auto-generating missing of complete dataset. Classification accuracy and NRMSE are used as parameters to judge the efficient of the proposed IG-SVMI algorithm. The experiments have shown that the proposed IG-SVMI algorithm can achieve better results than the benchmark approaches. |
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| Link | https://ieeexplore.ieee.org/document/9089571 |
| | |
| Conference | **[14] JuliaCon International Conference** |
| Publication Title | Julia for Knowledge Mining in Industry 4.0 |
| Authors | **ULL**, F. Md Dewan, A. Sekhari, Y. Ouzrout |
| Abstract | The fourth revolution ameliorates the industries with intelligent computing fueled by data with Machine Learning (ML) and Data Mining (DM) technologies. In this paper, we have addressed several issues for knowledge mining process in Industry 4.0 using Julia programming language. Knowledge mining is the process of extracting hidden information/patters from Industrial Big Data (iBigData) to lucid market trends, customer preferences and other information that's useful to businesses. Industrial Big Data is extremely large that we can't store all the data into a single computer/machine; so, we need more scalable and robust learning approach to deal with iBigData. |
| Link | http://shyfte.eu/wp-content/uploads/2020/07/JuliaCon-2020.pdf |
| | |
| Conference | **[15] ICAIBD 3rd International Conference on Artificial Intelligence and Big Data** |
| Publication Title | The Implementation of A Crop Diseases APP Based on Deep Transfer Learning |
| Authors | **CDU**, Yang, M., Li, D., Chen, M., Bouras, A., & Yu, X. |
| Abstract | Classifying the severity of crop diseases is the staple-basic element of the plant pathology for making disease prevent and control strategies. The diagnosis of disease needs timeliness and accuracy. Thanks to the development and popularity of smart phones and mobile networks, this makes possibly to develop mobile applications that can be widely accepted by users in the agricultural community. This paper provides a system that can detect the severity of crop diseases automatically and intelligently through taking photos. The development of this mobile app is based on deep transfer learning that we proposed an improved method with nearly 92% accuracy based on ResNet 50. The significantly high success rate makes the model a very |

| | useful advisory or warning tool. This project provides a new idea and solution for the detection of crop diseases in agriculture. |
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| **Link** | |
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| Report of SHYFTE Participation on National and International Conferences | 2021 |
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| **Conference** | [16] **22nd IFIP WG 5.5 International Conference on Virtual Enterprises.** |
|---|---|
| **Publication Title** | **UPM**, Jiun Terng Liew, Aduwati Sali, Nor Kamariah Noordin, Borhanuddin Mohd. Ali, Fazirulhisyam Hashim, et al. |
| **Authors** | *Sustainable Peatland Management with IoT and Data Analytics* |
| **Abstract** | Peatland is important to rural communities' livelihood due to its potential for aquaculture and agriculture. Nonetheless, human activities such as slash-and-burn can greatly increase forest fire risk, which can release a great amount of greenhouse gases and carbon dioxide into the atmosphere. To sustainably manage and restore peatlands, the Internet of Things (IoT) system can incorporate with Cyber-Physical System (CPS) for peatland management. In this study, an IoT system is deployed in the peatland to monitor the ground water level (GWL) and upload it to the server for the machine learning (ML) process. The trend of GWL will be modelled, and the CPS using the developed ML model will control the peatland rewatering process. As a result, the peatland condition can be monitored in real-time, and the risk of forest fire can be mitigated through rewatering automation before the GWL drops to a critical level. |
| **Link** | |
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| **Conference** | [17] **2nd Asia Conference on Computers and Communications (ACCC), 2021** |
|---|---|
| **Publication Title** | *"Research on the Unified Capability Structure System of Software Engineering Undergraduate Talents".* |
| **Authors** | **CDU**, D. Shi, X. Yi., L. Mou and J. Gui |
| **Abstract** | With the rapid development of the digital era, the society needs to optimize the training program of software talents according to the changes of market demand. But in reality, the ability evaluation system of software talents is quite different in enterprise recruitment, industry standards, engineering certification and talent training programs of colleges and universities, which makes it difficult for colleges and universities to quickly and accurately evaluate the ability differences of software talents when making talent training programs. This paper deeply studies |

| | the international standards of software talents' knowledge domain, the engineering certification of software specialty and the similarities and differences of software talents' ability evaluation system in the employment market, explores and establishes a unified knowledge and ability system of software talents, and further establishes a unified knowledge (ability) structure model of software talents, so as to lay a good foundation for the optimization of software talents training program in Colleges and universities, So that colleges and universities can further improve the quality of software undergraduate training, better meet the needs of the market. |
|---|---|
| **Link** | https://ieeexplore.ieee.org/document/9681372 |

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|---|---|
| **Conference** | [18] **2021 World Engineering Education Forum/Global Engineering Deans Council - WEEF/GEDC** |
| **Publication Title** | *YACHAY - A fully integrated system to promote a flexible and personalized learning in HEI* |
| **Authors** | **UNL**, E. G. y. Restrepo, R. Morales; A. Serrano-Mamolar; O. Lachner; F. Luis-Ferreira; J. Sarraipa, et al. |
| **Abstract** | The YachaY project proposes to establish a unified electronic portfolio system, a portable profile system to facilitate the personalization of learning, create guidelines and virtual courses aimed at teaching staff on the creation of customizable content in order to make it easier for students to choose their learning format and way that suits their needs and preferences, also providing a monitoring system to increase the quality level of university education; promote the flexibility of university curricula, facilitating the empowerment of students in the design of careers adapted to their needs and preferences in synergy with the productive system and labor market through a learning path recommendation system, and establishing a unified credentialing system, fostering university / labor market interoperability. This system will be used in Shyfte project. |
| **Link** | https://ieeexplore.ieee.org/document/9657242 |

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|---|---|
| **Conference** | [19] **IEEE Conference on Technology Engineering Management and Innovation TEMAN 2021** |
| **Publication Title** | *"Green Human Resource Management and Green Organizational Culture: Improving Environmental Performance".* |
| **Authors** | **KU**, Nattaneeya Pongpitak and Pittawat Ueasangkomsate |
| **Abstract** | |

| Link | |
|---|---|
| | |
| **Conference** | **[20] 2021 International Conference on Computational Intelligence in Machine Learning (ICCIML 2021)** |
| **Publication Title** | *Industry Revolution 4.0 Knowledge Assessment in Malaysia* |
| **Authors** | **UTM**, Sharifah Kamilah Syed Yusof, Usman Ullah Sheikh, Norjulia Mohamad Nordin, Naziha Ahmad Azli, Aida Ali & Nurul Mu'azzah Abdul Latiff |
| **Abstract** | The impacts of the Fourth Industrial Revolution (IR4.0) on our life is well noted. The future job market landscape will drastically change and needs to be addressed by the Higher Education Institutes (HEIs) for graduate employability. This paper presents engineering education for IR4.0 in the context of Malaysia. The initiatives taken by the Ministry of Education Malaysia (MoEM) in addressing the challenges of IR4.0 for the higher education sector is discussed. This work assessed the IR4.0 knowledge amongst industries, the adoption, the readiness and the skill sets required for future-ready engineers. This is followed by an overview on the approach taken by one of the public universities in Malaysia in addressing the needs of IR4.0 through its undergraduate engineering programmes. |
| **Link** | https://link.springer.com/chapter/10.1007/978-981-16-8484-5_16 |
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# 5. Publication in International Journal

| Report of SHYFTE Publication in International Journals | 2021 |
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| **Journal** | **[1] Frontiers in Computational Neuroscience** |
| **Publication Title** | *"Stability Evaluation of Brain Changes in Parkinson's Disease Based on Machine Learning"* |
| **Authors** | **CDU**, Song, C. G., Zhao, W. D., Jiang, H., Liu, X. J., Duan, Y. M., Yu, X. D., Tang, Y. Q |
| **Abstract** | The YachaY project proposes to establish a unified electronic portfolio system, a portable profile system to facilitate the personalization of learning, create guidelines and virtual courses aimed at teaching staff on the creation of customizable content in order to make it easier for students to choose their learning format and way that suits their needs and preferences, also providing a monitoring system to increase the quality level of university education; promote the flexibility of university curricula, facilitating the empowerment of students in the design of careers adapted to their needs and preferences in synergy with the productive system and labor market through a learning path recommendation system, and establishing a unified credentialing system, fostering university / labor market interoperability. This system will be used in Shyfte project. |
| **Editor** | Frontiers, Online, October 2021, doi:10.3389/fncom.2021.735991, 2021 |
| **Link** | http://shyfte.eu/wp-content/uploads/2022/09/stability-evaluation-of-brain-changes.pdf |

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| **Journal** | **[2] International Journal of Manufacturing Technology and Management** |
| **Publication Title** | *"Decision-Making Methods for Selecting the best Strategy for Industry 4.0"* |
| **Authors** | **CMU, ULL**, Nilubon Chonsawat, Apichat Sopadang, Yacine Ouzrout |
| **Abstract** | Emerging Industry 4.0 creates a critical challenge when an organization decides to reform and adapt to developing technologies. The decision-maker must be aware of the elements prior to implementing Industry 4.0 strategies and technologies. Following the research approach, this article presents the decision-making framework for SMEs in Industry 4.0 implementation decisions. This research begins with Industry 4.0 aspects and readiness maturity levels that identify SME capability. This model is a hybrid multi-criteria method: the fuzzy DEMATEL was used to evaluate the direction of the aspect, and then the fuzzy Best-Worst method analyzed the weighting of aspects. After that, the prioritization of strategies was ranked. The result concluded the priority of SMEs to select the suitable strategy toward Industry 4.0. Moreover, human skills are the core organizational aspects that embrace adaptation. Finally, the research |

| | not only highlights the best strategies selection but also presents the human skills that support organizational implementation. |
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| **Editor** | Indersciences, accepted July 2022 |
| **Link** | |
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| **Journal** | **[3] International Journal of Advanced Manufacturing Technology** |
| **Publication Title** | **ULL**, B. Dafflon, N. Moalla, and Y. Ouzrout, |
| **Authors** | *"The Challenges, Approaches and Used Techniques of CPS for Manufacturing in Industry 4.0: A Literature Review"* |
| **Abstract** | This work aims to review literature related to the latest cyber-physical systems (CPS) for manufacturing in the revolutionary Industry 4.0 for a comprehensive understanding of the challenges, approaches, and used techniques in this domain. Different published studies on CPS for manufacturing in Industry 4.0 paradigms through 2010 to 2019 were searched and summarized. We, then, analyzed the studies at a different granularity level inspecting the title, abstract, and full text to include in the prospective study list. Out of 626 primarily extracted relevant articles, we scrutinized 78 articles as the prospective studies on CPS for manufacturing in Industry 4.0. First, we analyzed the articles' context to identify the major components along with their associated fine-grained constituents of Industry 4.0. Then, we reviewed different studies through a number of synthesized matrices to narrate the challenges, approaches, and used techniques as the key-enablers of the CPS for manufacturing in Industry 4.0. Although the key technologies of Industry 4.0 are the CPS, Internet of Things (IoT), and Internet of Services (IoS), the human component (HC), cyber component (CC), physical component (PC), and their HC-CC, CC-PC, and HC-PC interfaces need to be standardized to achieve the success of Industry 4.0.. |
| **Editor** | |
| **Link** | |
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| **Journal** | **[4] in Journal of Physics: Conference Series** |
| **Publication Title** | *"Facial Expression Recognition Based on Transfer Learning and SVM"* |
| **Authors** | **CUIT**, "Lei Yang, Haiqing Zhang, Daiwei Li, Fei Xiao, and Shanglin Yang |

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| **Abstract** | The facial expression datasets always have a problem: data with small amount or large amounts of data but also with large noisy. Both problems will affect the facial expression recognition accuracy of the model. A transfer learning method for facial expression recognition is proposed by combining the Convolutional Neural Network (CNN) and Support Vector Machine (SVM). SVM have good performance on small data sets and CNN based on transfer learning have better ability of feature extraction for large noisy data set. This method reduces the training time of model and increase the facial expression recognition accuracy. The experimental results show that the accuracy of the proposed method on the CK+ and FER2013 data sets has reached 99.6% and 68.1%. |
| **Editor** | IOPScience Online, Volume 2025, 2021 |
| **Link** | https://iopscience.iop.org/article/10.1088/1742-6596/2025/1/012015 |

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| **Journal** | **[5] International Journal of Product Development** |
| **Publication Title** | *"Exploring continuous improvement for safety management systems through artificial neural networks"* |
| **Authors** | **UNS**, Menanno, M., Savino, M.M., Ciarapica, F.E. |
| **Abstract** | The present work investigates safety assessment in Safety Management Systems with the twofold objective of (i) developing safety audits with objective definition of risk levels for workers' activities and (ii) concurrent prioritising the corrective actions. The work is developed within a firm producing automotive components, where safety audits have been managed through a management approach able to (i) define the risk factors for each activity and (ii) quantify the corresponding risk level that may require corrective actions. Risk prediction matrices have been conceived to assess the risk levels. Then, each matrix has been the training set of an Artificial Neural Network used to quantify the values of risk levels. The findings of this study provided some general principles to integrate safety assessment within the continuous improvement and some outcome relative to the use of artificial intelligence for safety assessments. |
| **Editor** | Inderscience Online, pp 213-241, October 2021 |
| **Link** | https://ieeexplore.ieee.org/document/9681372 |

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| **Journal** | **[6] Production & Manufacturing Research** |
| **Publication Title** | *"How to front the physical distancing requirement within workforce scheduling: Empirical investigation through an optimization model"* |
| **Authors** | **UNS,** Carlo, R., Marialuisa, M., Savino Matteo, M. |

| Abstract | This work is focused on workforce scheduling for assembly lines with the additional constraint of workforce distancing. The aim is to warrant the necessary safety and health requirements due to COVID-19. The research stems within an industrial case in which a methodology has been developed with the objectives of i) developing a constraint optimization model considering the social distancing of workers as part of the workforce scheduling requirements and ii) investigating how the workforce distancing can affect certain production performances. Through an empirical investigation the impact of distancing on workforce allocation is appraised in terms of daily production capacity. Then, different distancing thresholds are assessed to seek the optimal balance among production performances and safety requirements. The research resulted in a tool able to adapt the scheduling sequence to those health/safety situations where the production manager needs to minimize losses in terms of production capacity, warranting the safest working conditions. |
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| Editor | Taylor & Francis Online, Volume 10, 2022 - Issue 1 |
| Link | https://www.tandfonline.com/doi/full/10.1080/21693277.2022.2097139 |

| Journal | **[7] IEEE Transactions on Fuzzy Systems** |
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| Publication Title | *"Hybrid Missing Value Imputation Algorithms Using Fuzzy C-Means and Vaguely Quantified Rough Set"* |
| Authors | **CDU,** Daiwei Li; Haiqing Zhang; Tianrui Li; Abdelaziz Bouras; Xi Yu; Tao Wang |
| Abstract | n real cases, missing values tend to contain meaningful information that should be acquired or should be analyzed before the incomplete dataset is used for machine learning tasks. In this work, two algorithms named jointly fuzzy C-Means and vaguely quantified nearest neighbor (VQNN) imputation (JFCM-VQNNI) and jointly fuzzy C-Means and fitted VQNN imputation (JFCM-FVQNNI) have been proposed by considering clustering conception and sufficient extraction of uncertain information. In the proposed JFCM-VQNNI and JFCM-FVQNNI algorithm, the missing value is regarded as a decision feature, and then, the prediction is generated for the objects that contain at least one missing value. Specially, as for JFCM-VQNNI algorithm, indistinguishable matrixes, tolerance relations, and fuzzy membership relations are adopted to identify the potential closest filled values based on corresponding similar objects and related clusters. On the basis of JFCM-VQNNI algorithm, JFCM-FVQNNI algorithm synthetic analyses the fuzzy membership of the dependent features for instances with each cluster. In order to fill the missing values more accurately, JFCM-FVQNNI algorithm performs fuzzy decision membership adjustment in each object with respect to the related clusters by considering highly relevant decision attributes. The experiments have been carried out on five |

| | datasets. Based on the analysis of root-mean-square error, mean absolute error, comparison of imputation values with actual values, and classification accuracy results analysis, we can draw the conclusion that the proposed JFCM-FVQNNI and JFCM-VQNNI algorithms yields sufficient and reasonable imputation performance results by comparing with fuzzy C-Means parameter-based imputation algorithm and fuzzy C-Means rough parameter-based imputation algorithm. |
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| **Editor** | IEEE Transactions on Fuzzy Systems, Volume: 30, Issue: 5, May 2022 |
| **Link** | https://ieeexplore.ieee.org/document/9353257 |

# 6. Conclusion

This deliverable described the report of scientific publications in conferences and journals.

Conference papers are good opportunities to disseminate scientific work and present those results to academic community. During the project, 20 publications in International Conferences were presented. We also organized a special session in the international conference "IEEE – 15th China-Europe International Symposium on Software Engineering Education" which was held in 2019 in Lisbon-Caparica, Portugal. This session focused on "Skills for Industry 4.0", 5 papers were presented.

All the partners participated to the publication plan, the scientific results can be summarized as following, **27 publications**:

- **1** Keynote Speaker in an international conference

- **1** Special session in an international conference

- **20** publications in international conferences

- **7** publications in international journals

All the journals are indexed (Web of Science and/or Scopus) and related to Industry 4.0: *Frontiers in Computational Neuroscience; Int. Journal of Manufacturing Technology and Management; Int. Journal of Advanced Manufacturing Technology; Journal of Physics: Conference Series; Production & Manufacturing Research; Int. Journal of Product Development.*

Other publications are in progress: 2 journal articles have been submitted, a book chapter is being written.