Search for a Spanish Partner for a Bilateral R&D Project

Organization	
Date of Request:	January, 2023
Company name:	University of Sharjah, Sharjah, United Arab Emirates
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SECTION 1: Entity launching the partner search *(Please give brief / to the point explanations. For more explanation on any point below, you may add a short paragraph as an annexure, with this document.)*	
Sector	Robotic process automation application, intelligent automation, and software BOTs
Entity mission or core functions	University of Sharjah Research Institute of Sciences and Engineering OpenUAE Research and Development Group
Date of establishment	1997(university of Sharjah) 2016 (OpenUAE research and development)
Ownership (if public and traded, add stock exchange and ticker symbol)	Semi Government
Total number of employees	Around ~ 2423
Number of employees in R&D	Around ~ 995 In OpenUAE R&D Group we have more than 95+ members

Key products sold or services provided	• Higher Education Institution • Research & Development • Patenting and Industrial Product Development • Training and workshops • Software and Hardware Developing solutions • Technical awareness seminars • Provide training and consultancy services to UAE government entities. • Develop, apply and evaluate OSS solutions in many sectors in the UAE. Our research group will play a vital role and take the lead in many OSS projects such as ▪Security application: using artificial intelligence in advance persistent threat, face registration detection, IoT security testbed, Remote attestation of Cyber-Physical Systems, and firmware distribution ▪Medical applications: applications of machine learning in metastatic breast cancer Detection, wearable biosensors intelligent system for early detection of COVID-19 using data science techniques, and automated detection and grading of retinopathy using computer vision. ▪Environmental applications: a comprehensive disaster management framework for smart cities, smart monitoring and control of water quality in residential water tanks, and drone ranger for endangered animals in the UAE using artificial intelligence on the edge device. ▪Blockchain application: IoT-blockchain system design and implementation, improved blockchain infrastructure with IoT for smart government application, and design and implement inter-blockchain communication between heterogeneous blockchain networks. • Contribute to the research world by sharing our findings locally and internationally through workshops, conferences, and journals. The OpenUAE published more than 20 research articles in journals and 16 in conferences. Delivered more than 29 workshops and trained 9 individuals through internships. Raised 21 awareness seminars. • Design of Blockchain reference model, and development of information security management assurance guidelines and security recommendations. (see reference) • Report findings to research partners, and local, regional, and international organizations. Some of OpenUAE strategic partners are

	▪ General Civil Aviation Authority (GCAA) ▪ Aviation Australia ▪ Dubai Electricity & Water Authority (DEWA) ▪ Dubai Electronic Security Center (DESC) ▪ Dubai Police ▪ Telecommunications And Digital Government Regulatory Authority (TDRA) ▪
(Entity core technical competences	• RPA and Fintech, we aim to always support the open-source community by employing RPA solutions that are open and available to everyone. For instance, the following list of opensource RPA frameworks: ○ Taskt ○ Robot Framework ○ TagUI ○ UI.Vision ○ OpenRPA • Artificial Intelligence • We have a strong team with high qualifications in several aspects. For instance in security, Prof. Qassim is a certified information system security professional. As in the Blockchain field, we have Ms. Takua with ConsenSys certification as an Ethereum developer. Additionally, Dr. Manar is specialized in software engineering and many others.
Key R&D programs and activities	The University of Sharjah believes in the crucial role of scientific research in the development of the modern United Arab Emirates. Since its establishment in 1997, the university has put research at the top of its list of priorities. Part of the university's strategy is to promote research among faculty members in all colleges, with the aim of attracting outstanding faculty with impressive research accomplishments. This stems the university's understanding of scientific research as the basis of economic, social, humanitarian, and medical developments. With scientific research we construct knowledge, and within this knowledge lies the solution to many problems. The OpenUAE Research & Development Group established in 2016 is the first of its kind in the country, providing new research opportunities related to the successful adoption of Open-Source Software (OSS) in the region. The group engaged students (undergraduate and graduate at universities and other interested parties) to conduct research on the deployment of OSS in many sectors to serve multiple purposes such as Blockchain, Artificial Intelligence cyber security, smart cities, Internet of Things, …etc. The group provides the necessary training, develops ICT solutions based on OSS, evaluates and assesses these

	solutions, and provides consultancy services to enable government-wide, as well as private sector access, to OSS. In the OpenUAE group, several activities were conducted, including the following: ▪ Machine learning study Jam ▪ Flutter Festival Sharjah ▪ Introduction to Google Cloud Platform ▪ Introduction to Machine Learning using MATLAB workshop ▪ Quick Guide to Open Source Development and Software Development Trends Workshop ▪ The Usage of Machine Learning and Deep Neural Network in the Medical Field ▪ Introduction to ARCGIS System ▪ WiDS (Women in Data Science) ▪ Research Methodology Workshop ▪ Hacktoberfest-The Power of Open Source in Empowering and Shaping our Future ▪ Python & Machine Learning Workshop for Advance ▪ Python & Machine Learning Workshop for Beginners ▪ The Future of Everything is AI @ Sharjah Innovation Week ▪ Drones Cyber Security, Localization and Countermeasures-Workshop for Ministry of Defense ▪ Applications of Machine Learning in Medical Field ▪ Django Web Development Workshop ▪ Cloud-Native IoT based Applications ▪ 2nd OpenUAE Annual Meeting ▪ Mendeley Workshop Reference Manager ▪ Opening Ceremony Byte Lab ▪ OpenUAE for Education with Ministry of Education ▪ OpenUAE Annual Meeting ▪ Dubai Electronic Security Center Workshop More on: https://www.sharjah.ac.ae/en/Research/RISE/OpenUAE/Pages/evt_list.aspx The group will engage students (undergraduate and graduate at universities and other interested parties) to conduct research on the deployment of OSS in many sectors to serve multiple purposes i.e. cyber security, smart cities, Internet of Things, astronomy, blockchains as below 1. RPA for Forex Trading 2. Wearable Biosensors Intelligent System for Early Detection of COVID-19 using Data Science Techniques. 3. Locational Management for Healthcare Facilities during COVID-19 Pandemic: An Artificial Intelligence Approach. 4. Breast Cancer Detection Using Statistical and Deep Learning Techniques. 5. Data-Driven False Data Injection Attacks Detection in Smart Grid using state estimation.

	6. Digital Twin for Building Energy Consumption Forecasting using Deep Learning. 7. Blockchain Networks for Building Integrated Microgrids and Solar PV Electric Vehicles Charging Station to Support and Foster 8. Design and Implement Inter Blockchain Communication between Heterogeneous Blockchain Networks. 9. Remote Attestation of Cyber Physical Systems (CPS). 10. IoT Testbed 11. Blockchain Performance Evaluation 12. Program-Flow Attestation of an IoT Application Software 13. Blockchain Information Security Assurance Framework for Smart Government Internet of Things (IoT) Information Quality Framework for Transportation
Examples of accomplishments	In the OpenUAE research group, we have joint collaboration with several governmental entities in wide aspects of technologies. For example, with Dubai Electricity & Water Authority (DEWA) a joint project in security for the advanced persistent threat was conducted. On the other hand, with Telecommunication Regulatory Authority (TRA) a joint project in IoT-Blockchain System Design & Implementation was developed. Hence, the OpenUAE has several research directions and projects that are presented in *Figure 1* and they consist of 5 main aspects: • Opensource software: Develop, apply, and evaluate open-source software solutions and analyze their effects in communities and industries. Such as MindSpore AI platform evaluation and using open-source frameworks in deep learning, automation, security, and data preprocessing. • Security: Explore different solutions to detect recent security attacks in critical systems. Such as APT detection, digital multimedia security and sensor forensics, cybersecurity for industrial control systems and industrial IoT, and IoT security testbed and program attestation • Blockchain: Evaluate different blockchain platforms for performance, security, and scalability. Studying Ethereum, Hyperledger, and Cardano platforms. Develop blockchain-based authentication and verification systems • Robotic Process Automation (RPA) and Fintech: Explore different automation solutions in the finance field. Such as automation of technical and sentiment analysis by developing a FOREX Intelligent RPA • Artificial Intelligence: Explore and deploy cutting-edge AI techniques in several fields. For example, early cancer detection and grading, federated learning, object detection and recognition, resources consumption prediction, software defect detection, signal processing in the encrypted domains, and other security applications

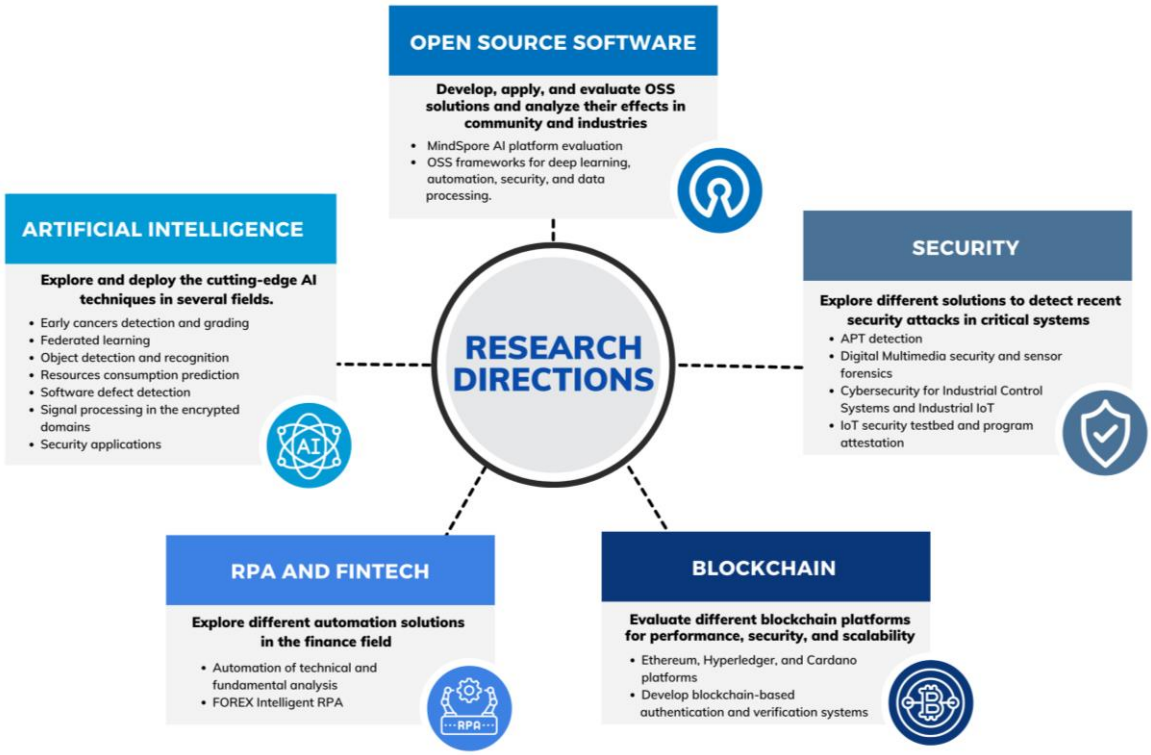

Figure 1. Open UAE Research Directions

Company strategic orientation	The Office of the Vice for Research and Graduate Studies (VCRGS) is the leading administrative entity that organizes and supervises all activities of research, development and innovation at UOS. The VCRGS has extensive responsibility and supervision for the development and implementation of all policies and procedures pertaining to the administration and execution of research across all disciplines at the university. The VCRGS works closely with the chancellor, the institutes' directors and college deans, and others administrative units to identify and ease obstacles to research, as the university pursues its strife for excellence in research and education. The Office of the VCRGS consists of the following institutes and Units: • **The Research Institute of Sciences and Engineering *(Figure 2)*** • The Research Institute of Health and Medical Sciences • The Research Institute of Humanities and Social Sciences • The College of Graduate Studies • The Research Funding Department • The Scientific Publishing Unit • The Technology Transfer Office • The Research Outreach Department

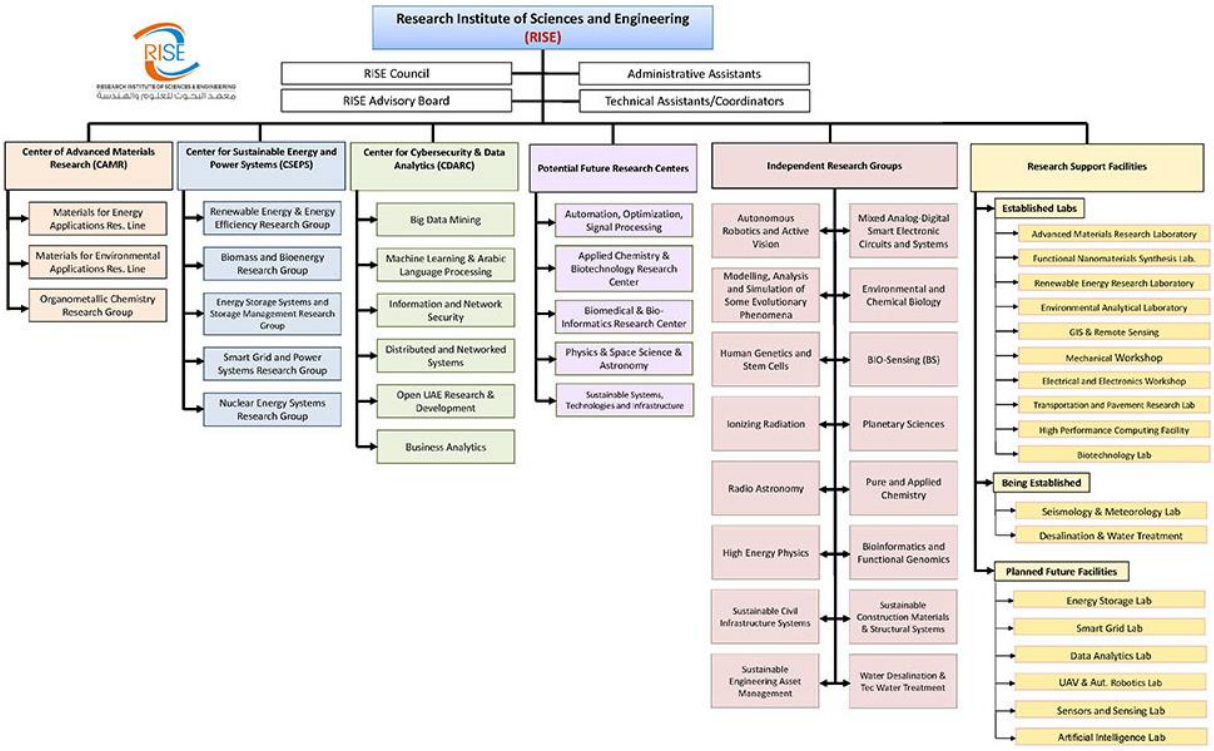

Figure 2. Research Groups

SECTION 2: Spanish Company Profile *(Please provide a brief summary of the prospective partner company or organization. This summary may address some or all of the points below)*	
Profile of ideal technology partner	▪ Strategic planning for RPA ▪ Analytical and problem-solving skills ▪ Identifying the business process and business process management ▪ Building a set of requirements for establishing a process tailored to specific business needs ▪ Experiences in document object models ▪ Designing, developing, and testing automated workflows ▪ Deploying RPA components, such as development tools, bots, code repositories, and logging tools ▪ Supporting RPA project implementation and integration ▪ Maintaining testing and bug fixing during the launch and deployment of bots ▪ Understanding of user experience design ▪ Workflow skills such as constructing decision trees, decision tables, UML diagrams, etc. ▪ Knowledge of programming languages and skills ▪ Software design and implementation knowledge ▪ Machine learning knowledge such as natural language processing, deep learning, data mining, etc. ▪ Building intelligent automation solutions

	Figure 3 illustrates the benefits of utilizing RPA

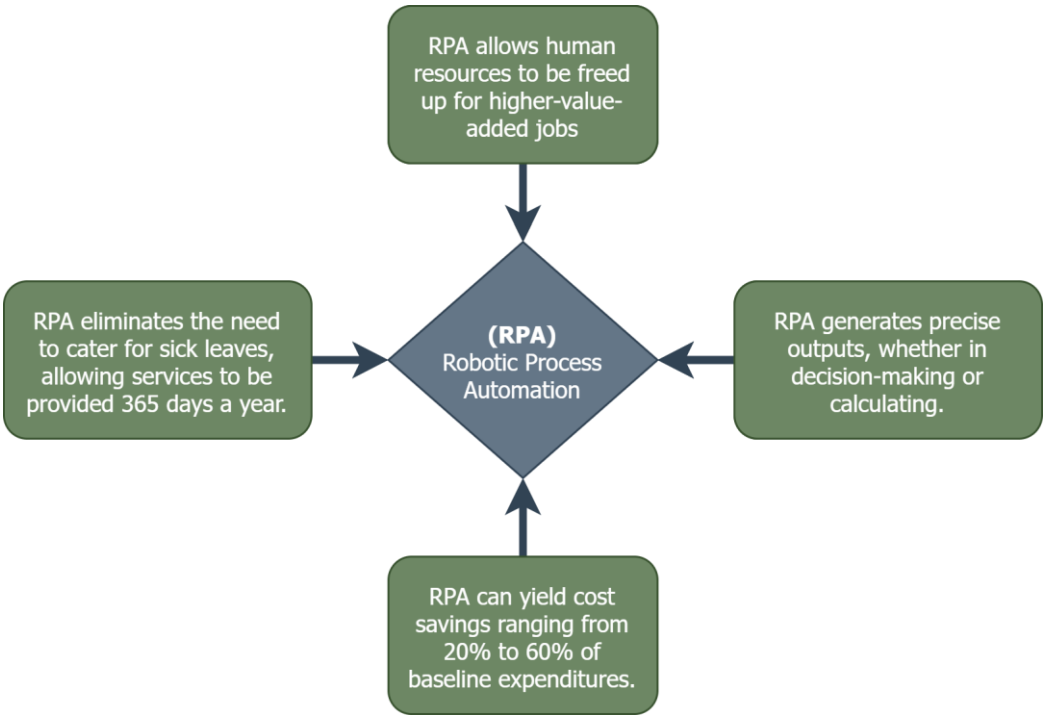

Figure 3. RPA Solution Benefits

Core technological competencies and expertise	▪ Strategic planning for RPA ▪ Analytical and problem-solving skills ▪ Identifying the business process and business process management ▪ Building a set of requirements for establishing a process tailored to specific business needs ▪ Experiences in document object models ▪ Designing, developing, and testing automated workflows ▪ Deploying RPA components, such as development tools, bots, code repositories, and logging tools ▪ Supporting RPA project implementation and integration ▪ Maintaining testing and bug fixing during the launch and deployment of bots ▪ Understanding of user experience design ▪ Workflow skills such as constructing decision trees, decision tables, UML diagrams, etc. ▪ Knowledge of programming languages and skills ▪ Intelligent document processing ▪ Software design and implementation knowledge ▪ Machine learning knowledge such as natural language processing, deep learning, data mining, etc. ▪ Building intelligent automation solutions

Other essential qualifications (e.g.: ownership, track records etc.)	Track record on research and development, product development, and collaboration with universities and government agencies
If you have a list of companies with whom you are in contact or interested in contacting, please provide contact details	The University of Sharjah is interested to collaborate with companies working on robotic process automation and artificial intelligence
If you are interested in collaboration: please specify details and other important information you want to share with a potential company	Prof. Qassim with his team from the University of Sharjah are interested in collaborating on research projects related to designing automated solutions with artificial intelligence: supporting RPA project implementation and integration, workflow designing and deployment of bots, intelligent document processing, etc…
Interested areas of collaboration	▪ Research evaluation on robotic process automation solutions ▪ Robotic process automation projects ▪ RPA and Optical character recognition (OCR) technology ▪ Intelligent automation document processing methods
Specific R&D contribution you are seeking/offering	INDUSTRIAL PROJECTS: • Project leader for ADSL Modem Firmware at NORTEL Networks – Canada. (1999-2001) • Project Leader for OC-12 express (optical switch) at NORTEL Networks – Canada (1998-1999) • Project Leader for OC-192 express (optical switch) at NORTEL Networks – Canada (1996-1998) • Project Leader for Physical Router Management Software at Prior Data Sciences – Canada (1996-1996) • Operation Manager computer centers at Ministry of Finance (IRAQ). (1978-1996)

- Project leader for computerized irrigations system – Iraq. (1991-1994)
- Robotics Process Automation (RPA) or BOTs applications and enhancements in different areas
- Data and Network Security
  - Quantum Computing in AI and QKD
  - Real Time Encryption Systems
- Blockchain and IoT
  - Blockchain performance
  - Blockchain security
- Machine Learning Application in Security
  - Anomaly Detection in IDS
  - Attack classifications and Clustering.
  - APT – Advanced Persistent Threats
- Digital Communications
  - Software Defined Radio platform for Cognitive Radars
  - Modulations detections.
  - Quantum Radar
  - Signal Intelligence
- Computer Networks
  - Power, Security and QoS aware MAC and routing protocols in mobile ad-hoc networking.
  - Haptic applications layer protocols.
- Programming Languages
  - Python in AI and security application
  - Network programming with python, C, C#, and Java network programming.
  - e-automation, PLC ladder programming, and SCADA.

Qassim Nasir is currently a professor at the University of Sharjah since 2009 and IT director, and chairman of the scientific publishing unit, and was chairman of the electrical and computer engineering department. In his current position, Dr. Nasir teaches undergraduate and graduate courses in computer architecture, quantum computing, mobile computing, error control coding, telecommunication engineering, computer networks, network programming, and programmable logic controllers. He supervises several master and Ph.D. students working in different research areas. Dr. Nasir's current research interests are in robotic process automation, telecommunication and network security Internet of Things, Artificial intelligence, and blockchain. He also conducted research in telecommunication security, drone detection, localization, and GPS jamming He is a co-coordinator in the OpenUAE research group which focuses on blockchain performance and security, and the use of artificial intelligence in security applications.

Manar Abu Talib is Associate Professor and Chair of Research Outreach Department, Office of Vice Chancellor Office for Research & Graduate Studies at University of Sharjah, UAE. She is also a faculty member at College of Computing & Informatics. Dr. Abu Talib's research interest includes software engineering with substantial experience and knowledge in conducting research in software measurement, software quality, software testing, ISO 27001 for Information Security, and Open Source Software. Manar is also working on ISO standards for measuring the functional size of software, and has been involved in developing the Arabic version of ISO 19761 (COSMIC-FFP measurement method). She published more than 70 refereed conferences, journals, manuals and technical reports, involved in more than 500 professional activities and sponsored research activities and supervised 7 Master thesis, 3 PhD thesis and 35 capstone projects. She received the Best Teacher Award two times, the Exemplary Faculty Award in 2008 and 2010, Google CS4HS Award in 2014, QCRI ArabWIC and Anita Borg Institute Faculty scholarships in 2015, outstanding University & Community Service Award in 2016, Exemplary Leader Award in WiSTEM 2016 and Exemplary Leader Award in ArabWIC 2019. She was the Counselor of IEEE Student Branch at Zayed University, 2012-2013 and founder and former CEO of Emirates Digital Association for Women (EDAW111). She is the ArabWIC VP of Chapters in Arab Women in Computing Association (ArabWIC), Google Women Tech Maker Lead, an executive member in UAE IEEE Section & Women in Engineering (WIE), the Sharjah Google Developer Group Advisor, the UAE representative for the COSMIC-FPP Education Committee, Co-coordinator of OpenUAE Research & Development Group and the International Collaborator to Software Engineering Research Laboratory in Montreal, Canada.

Sohail Abbas is working as an Assistant Professor in the Department of Computer Science, College of Computing and Informatics, University of Sharjah, UAE. He has been involved in academia for more than 17 years and in research for more than 13 years. His research interests include proposing countermeasures of security issues, such as intrusion detection, identity-based attacks and others, in contemporary networking paradigms, such as mobile ad hoc architectures and the Internet of Things. Dr. Abbas is a member of various technical program committees, including IEEE CCNC, IEEE VTC, IEEE ISCI, IEEE ISWTA, etc. He is also serving various prestigious journals as a reviewer, such as IEEE Communications Letters, Security and Communication Networks, IET Wireless Sensor Systems, Mobile Networks and Applications, International Journal of Electronics and Communications, International Journal of Distributed Sensor Networks, etc.

Ali Bou Nassif is currently an associate professor of Computer Engineering, as well as the Vice Dean of Graduate Studies at the University of Sharjah, UAE. Ali is also an Adjunct Research Professor at Western University, Canada. Ali's research interests

	include software engineering, artificial intelligence, deep learning, natural language processing, speech processing, image processing, networking, security and E-Learning. Ali Has over 150 published conference and journal papers. Ali is a registered professional engineer (P.Eng) in Ontario, Canada.

Signature
Name: Qassim Nasir
Date: 3 Jan, 2023