Scientific Report

First name / Family name	Javed AHMED
Nationality	Pakistani
Name of the *Host Organisation*	NTNU, Norway
First Name / family name of the *Scientific Coordinator*	Sule Yildirim and Raghavendra Ramachandra
Period of the fellowship	01/04/ 2019 to 31/03/2020

I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

During the ERCIM fellowship period, I researched the interdisciplinary domain of blockchain-based GDPR compliance for online social networks. With the enforcement of GDPR gives rise to new challenges for data controllers and processors. GDPR changes the way personal data is obtained and processed. Online social networks are handling a massive amount of personal data of European users and lack transparency with respect to the collection, processing, and sharing of such personal data. Compliance with GDPR requires consent management and transparent usage of the personal data as per given consent. Transparent usage of personal data requires maintaining provenance traces that can demonstrate how the data was collected, used, stored, and shared. At present, consent mechanisms in OSNs are either non-existent or not GDPR compliant. Blockchain offers novel security, trust, and interaction features that add value to the consent management model for the processing of personal data. On the one hand, the blockchain-based model can offer advantages towards regulatory compliance for the data controllers and data processors. On the other hand, this model provides greater transparency to users regarding their personal data.

I started with a depth scientific literature review conducted based on key journals and conferences in the area of information science, computer science, and law. I performed this

review in the initial three months of the fellowship and developed a review paper that was submitted in a springer conference held in San Francisco, USA. Apart from this review paper, I also conducted a survey of existing online social networks for their efforts to meet the challenges of GDPR. Online social networks made necessary changes to their interfaces to accommodate consent management features to comply with GDPR. I developed a paper that demonstrates that existing consent management features offered by OSNs are in contradiction to the basic definition of valid consent under GDPR. This paper was also published in the IEEE conference in San Jose, USA.

I was advised by my supervisor to initiate a project proposal for Erasmus capacity building for a higher education grant. As per the requirement of the grant, we developed a consortium of seven universities involving two European universities and five non-European universities. The joint proposal was designed to create a master curriculum in industry 4.0 for underdeveloped countries such as Pakistan. NTNU was leading the consortium, and the project required ethical clearance from the NTNU rector. The project was put on hold for next year's call due to some knowledge export restriction on one of the partner countries.

I also worked in collaboration with another ERCIM fellow under the supervision of one of my supervisors. We developed three papers and successfully published in good conferences. Some of the research collaborations are still active, and we are preparing a research paper.

II – PUBLICATION(S) DURING YOUR FELLOWSHIP

1. **Ahmed, Javed**; Yildirim Yayilgan, Sule; Nowostawski, Mariusz; Abomhara, Mohamed Ali Saleh; Ramachandra, Raghavendra; Elezaj, Ogerta. (2020) *Towards Blockchain-based GDPR-compliant Online Social Networks: Challenges, Opportunities and Way Forward.* Advances in Intelligent Systems and Computing. vol. 1129.

2. **Ahmed, Javed**; Yildirim Yayilgan, Sule; Nowostawski, Mariusz; Ramachandra, Raghavendra; Elezaj, Ogerta**;** Abomhara, Mohamed Ali Saleh. *GDPR Compliant Consent Driven Data Protection in Online Social Networks: A Blockchain Based Approach*. The 3rd International Conference on Information and Computer Technologies. March 9-12, 2020 - Silicon Valley, San Jose, United States

3. Elezaj, Ogerta; Yildirim Yayilgan, Sule; **Ahmed, Javed**; Kalemi, Edlira; Brichfeldt, Brumle; Haubold, Claudia (2020). *Crime Intelligence from Social Media Using CISMO*. "Fifth International Congress on Information and Communication Technology, London, UK, 20-21 February 2020

4. Elezaj, Ogerta; Yildirim Yayilgan, Sule; Kalemi, Edlira; Wendelberg, Linda; Abomhara, Mohamed Ali Saleh; **Ahmed, Javed**. (2019) *Towards Designing a Knowledge Graph-Based Framework for Investigating and Preventing Crime on*

Online Social Networks. Communications in Computer and Information Science. vol. 1111.

5. Elezaj, Ogerta; Yildirim Yayilgan, Sule; Abomhara, Mohamed Ali Saleh; Yeng, Prosper; **Ahmed, Javed**. (2019) *Data-driven Intrusion Detection System for Small and Medium Enterprises*. IEEE International Workshop on Computer Aided Modeling and Design of Communication Links and Networks, CAMAD. vol. 2019-September.

III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES

Conferences

1. 3rd International Conference on Information and Computer Technologies ICICT 2020, San Jose, USA
2. Future of Information and Communication Conference FICC 2020, San Francisco, USA

Workshops

1. CISaR Workshop, 30-31 January 2020, Gjøvik, Norway.

Organization

1. INTAP: Third International Conference on Intelligent Technologies and Applications (INTAP'20) will be held on 28-30 September 2020, Gjøvik, Norway

IV – RESEARCH EXCHANGE PROGRAMME (REP)

Fraunhofer FIT Blockchain Lab (14-18 October 2019)

I visited Blockchain Lab at Fraunhofer FIT Sankt Augustin, Germany. During my visit, I was hosted by professor Wolfgang Prinz. The primary purpose of this visit was to find future research collaborations with Blockchain Lab. I presented my research work to the team at Lab. I also got the opportunity to learn about some blockchain-based projects carried out in the blockchain lab. The visit was beneficial, and we engaged Fraunhofer in the Erasmus Project, as discussed earlier.