



Collaborative Research in European R&D Programs

EU projects are venues for different players from industry and academia in Europe to conduct collaborative research activities addressing the European Digital Agenda. NLE continues to contribute to many EU projects and has built a solid reputation in this area. Despite fierce competition, NLE has submitted a significant number of successful proposals and has provided many successful innovative contributions in collaboration with its EU project partners.

Standardization

Many of the technologies we develop require standardization of architectures, data models, protocols and interfaces at increasing pace and in multiple combinations. NLE actively promotes the industry consensus needed for rapid deployment and for interworking in the areas of SDN, NFV, LTE Advanced and 5G, Mobile Edge Computing and IoT/M2M. NLE is driving progress in various Standard Development Organizations (SDOs) by contributing to new technologies and aligning different groups. NLE also holds numerous official positions in key standardization bodies and takes pride in leading rather than following evolving standards.

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Information and Communication
Technologies for a better tomorrow

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NLE's R&D agenda
supports the NEC
Group Vision 2017.

NEC Laboratories Europe (NLE) is based in Heidelberg, City of Science and Culture in southwest Germany. NLE's R&D agenda supports the NEC Group Vision 2017 "to be a leading global company leveraging the power of innovation to realize an information society friendly to humans and the earth".

This flyer presents an overview of NLE's main research activities and participation in collaborative efforts within the research community. NLE has an internationally diverse staff that includes currently over 100 staff members.

Research Topics

NLE's R&D focus is primarily represented by six major technology areas that are linked with standards activities, as shown below:

Data Science

Security

5G Networks

IoT Platforms

Network Softwarization

Smart Transportation



NEC Laboratories Europe (NLE)

Our six major technology areas.

Data Science



We enhance the capabilities of artificial intelligence (AI) systems by combining logic and deep learning. We open up new business and government applications including personalized advertising, health monitoring, and public infrastructure planning. Our research overcomes restrictions of deep learning to low-dimensional data structures. Enhanced with representation learning methods, we apply deep learning to systems of high complexity with improved prediction accuracy, high scalability, and with a performance suited for low-latency applications.

5G Networks



We contribute to the development of fifth generation (5G) mobile networks not just by increasing network performance but also by increasing network flexibility and convergence. Our research focuses on the virtualization and slicing of the 5G infrastructure as well as the orchestration of network functions and computational resources with artificial intelligence (AI). With these technologies, we enable 5G networks to support new vertical service scenarios (e.g., IoT, vehicular, tactile) in a cost-efficient manner.

Security



The adoption of technological innovations is often slow because of a lack of trust and reliability particularly in highly distributed and cloud-based applications. A major application area of our technologies is IoT security where we ensure a trustworthy device execution environment in IoT edge devices. With scalable access control we ensure compliant behavior based on a rich set of security policies. For distributed storage and transactions we use blockchain technologies for which we have achieved unique levels of performance, scalability, and privacy.

Smart Transportation



Our focus is to de-congest cities and increase mobility by applying artificial intelligence to smart urban transportation systems. We optimize transportation using predictive analytics and real-time autonomous control for bus operators, transport authorities, road operators, and automotive companies. For bus operators, we predict demand and travel time, support decision making by staff in real-time and improve schedules using machine learning. We also focus on learning-based, predictive, and cooperative motion control for automated driving and robots.

Network Softwarization



Softwarization is a key element of the new generation of Information and Communication Technology (ICT) platforms. Our research focuses on guaranteeing performance, scalability and programmability in the areas of Software-Defined Networking (SDN) and Network Function Virtualization (NFV). Our technologies provide cloud-native, transparent performance and resource optimization with automatically built custom, high performance operating systems tailored to the needs of specific applications including Industry 4.0.

IoT Platforms



The Internet of Things (IoT) enables new services by connecting physical and virtual objects with the cloud. NLE's IoT platform has become a part of the European Future Internet platform FIWARE. We use our platform in commercial applications to monitor and control Smart Cities. Our platform technologies provide scalability, efficient resource usage, and high data quality. We seamlessly integrate edge computing using our unique FogFlow technology.

