Expression of interest

Contact details

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Short description of the organisation

Provide a short description of the equipment available, the relations with the industry, the profile of the main researchers

TÜBİTAK Informatics and Information Security Advanced Technologies Research Center (TÜBİTAK BİLGEM) is the national R&D center that produces innovative and national solutions with its projects in the fields of ICT.

Consisting of around 2.100 staff, more than 80% of whom are R&D personnel, TÜBİTAK BİLGEM operates on information technology, information security and advanced electronics. Based upon its experience exceeding 50 years, the center is now one of the most competent R&D centers of Turkey.

As a research center, the main activities of TÜBİTAK BİLGEM are Research and Development, Testing and Evaluation, Prototype Production, and Training. Our research center consists of 6 specialized institutes. These institutes are National Electronics and Cryptology Research Institute (UEKAE), Institute of Information Technology (BTE), Advanced Technologies Research Institute (İLTAREN), Cyber Security Institute (SGE), Software Technologies Research Institute (YTE) and Artificial Intelligence Institute (YZE).

The works carried out by TÜBİTAK BİLGEM is not limited to but can be defined with the following competencies: Robotic and Autonomous Systems, Cyber Security, Validation and Verification, Real Time OS & Avionic Technologies, Electronic Warfare, Sea Defense and Underwater Acoustic, Electro Optics & Laser, Semiconductor, Cryptology, Communication, Mobility, Sensor & Radar, Data, Public Key Infrastructure, E-Government & Transformation, Blockchain, Metaverse. We can develop tailor fit products and technologies with our collaborative working culture and approach to producing holistic solutions to problems.

TÜBİTAK BİLGEM Technologies are used in 35 countries around the world including NATO member states, as well as European and Asian countries. TÜBİTAK BİLGEM intends to provide maximum contribution to national and international R&D activities.

Specific skills related to the project

HORIZON-CL5-2023-D6-01-02: Generation of scenarios for development, training, virtual testing and validation of CCAM systems (CCAM Partnership)

❖ TÜBİTAK BİLGEM has Software Testing and Quality Evaluation Laboratory which has extensive expertise in software testing. The Laboratory, carries out independent software testing, validation/verification and software quality evaluation services with the aim of increasing the quality, performance and usability of software. The laboratory has gained extensive expertise in various fields by undertaking the tests of many projects. The laboratory also carries out research and development activities on test automation, artificial intelligence-based testing, robotic and autonomous system testing, model-based testing, scenario-based testing, advanced usability testing, performance testing, software reliability, verification and validation metadologies.

Research capabilities of the Software Testing and Quality Evaluation Laboratory:

- Validation and verification of robotic and autonomous systems
- Validation and verification of artificial intelligence applications
- Validation and verification of simulation models
- Development of simulation environments
- Development of software testing tools
- Behaviour tree based task planning
- Test automation
- Fault prediction
- Artificial intelligence based testing
- Scenerio-based testing
- Model-based testing
- Advanced usability analysis with eye tracking tools
- Heuristic usability evaluation

❖ TÜBİTAK BİLGEM has also Robotics and Autonomous Systems Laboratory. Robotics and Autonomous Systems Laboratory has a fully equipped (GPS, RSU, LiDARs, golf cart, battery carts and all necessary tools) autonomous vehicle garage on the Gebze Campus. This garage provides pre-testing of ongoing projects while also serving as an experimental environment for new technologies on the field.

Proposed activities for the project
Indicate which activities you would like to implement during the project

- Definition of edge test cases from real traffic data and syntetic data based on expert knowledge.
- Evaluating different approaches to identify relevant scenarios on rural roads.
- Accelerated AI development and training making use of the dynamic scenario database.
- Generation of automatic test scenarios using AI.
- Generation of edge test cases using AI.

References
Previous research project

Project acronym / starting date	Main objectives	Main activities	Role in the project
1. 5G-MOBIX -5G for cooperative &connected automated Mobility on X-border corridors	5G-MOBIX develops and tests automated vehicle functionalities using 5G core technological innovations along multiple cross-border corridors and urban trial sites, under conditions of vehicular traffic, network coverage, service demand, as well as considering the inherently distinct legal, business and social local aspects.		Our role in this project is to involve in x-border trials between Greece & Turkey by implementing cloud-based path planning application for the autonomy of the platooning trucks at the customs.
ADACORSA - Airborne Data Collection on Resilient System Architectures	This project aims to realize the smart construction sites and forest lands for safer and self-operating environments with the support of emerging drone technologies.		Our role in this project is (i) smart construction operations of a truck and excavator within a construction site with the occupancy grip provided by the information from sensors on the drones, (ii) construction site aerial survey with LIDAR and camera and mapping, (iii) hover flight with tethered drone for environment surveillance and map updates.

Related Publications:

[1] Ozturk, S. (2017), Investigation of Software Product Quality of Robot Development Software Infrastructures, 19th Automatic Control National Meeting, 21-23 September, İstanbul

[2] Odabasi, M., Gul, E. (2022) The Effect of Environmental Metrics on Software Fault Prediction, International Journal of Software Engineering and Knowledge Engineering Vol. 32