General

ID[1]				
Use case name	Robotic solution for replacing human labour in Hazardous condition			
Application domain	Security			
Deployment model	On-premise systems			
Status	PoC			
Scope[2]	Building an AI based robotics solution for replacing Human Labour in Hazardous condition			
Objective(s)	Building an AI based robotics solution for replacing Human Labour in Hazardous condition			
Narrative	Short description (not more than 150 words)	Building an AI based robotic solution enabled with computer vision and equipped with various sensors such as temperature, pressure, smoke detector etc which can effectively replace human labour in risky work environment.		
	Complete description	Human labour in Hazardous work environment causes many accidents and loss of life, recent example being NTPC incident that occurred in November 2017 in Unchahar power plant. Working under hazardous conditions also create other serious health related problems including cancer, Asthama etc An AI based robotic system in line with Industry 4.0 fusing technology based automation in manufacturing can replace human labour in hazardous condition and can work efficiently. This also has the potential to reduce incidents caused by human mistakes.		
Stakeholders[3]				
Stakeholders' assets, values[4]				
System's threats and vulnerabilities[5]				
Key performance indicators (KPIs)	ID	Name	Description	Reference to mentioned use case objectives
	1	Response Time	Response time required to react to work environment	Response time should be minimal (real time), so that the

				robotic system can intelligently react in changing work environment.
	2	Minimum Overshoot	The movement of robotic physical system beyond the intended position should be minimum, ideally zero.	This will enable the robotic system to work accurately in the work environment.
		Reliability	The robotic system should be extremely reliable to avoid any catastrophic failure in the industry. The system should continuously monitor the fitness of its software and hardware component and must have adequate redundancy. It should be able to generate alarm before failure.	Industrial grade robotic solution should be extremely reliable.

AI features	Task(s)	Automation
	Method(s)[6]	Artificial Intelligence, Machine Learning, Statistics, Anomaly Detection, Computer Vision
	Hardware[7]	Robotic Hands, Centralized monitoring and control,
	Topology[8]	
	Terms and concepts used[9]	Automation, Computer Vision, Reinforced Learning
Standardization opportunities/ requirements		
Challenges and issues	The problem is challenging because 1. **Solution should be customizable for different work environments**	
Societal concerns	Description	Addresses the issue of accidents in Hazardous work environment.
	SDGs[10]	Decent work and economic growth

Data (optional)

Data characteristics	
Description	
Source[11]	
Type[12]	
Volume (size)	
Velocity (e.g. real time)[13]	
Variety (multiple datasets)[14]	
Variability (rate of change)[15]	
Quality[16]	

Process scenario (optional)

Scenario conditions					
No.	Scenario name	Scenario description	Triggering event	Pre-condition[17]	Post-condition[18]

Training (optional)

Scenario name	Training				
Step No.	Event[19]	Name of process/Activity[20]	Primary actor	Description of process/activity	Requirement

Specification of training data[21]	

Evaluation (optional)

Scenario name	Evaluation				
Step No.	Event[22]	Name of process/Activity[23]	Primary actor	Description of process/activity	Requirement

Input of evaluation[24]	
Output of evaluation[25]	

Execution (optional)

Scenario name	Execution				
Step No.	Event[26]	Name of process/Activity[27]	Primary actor	Description of process/activity	Requirement

Input of Execution[28]	
Output of Execution[29]	

Retraining (optional)

Scenario name	Retraining				
Step No.	Event[30]	Name of process/Activity[31]	Primary actor	Description of process/activity	Requirement

Specification of retraining data[32]	

References

[1]J. Zhang, T. Gao, Z. G. Liu, Traffic Video Based Cross Road Violation Detection, In Proc, 2009, International Conference on Measuring Technology and Mechatronics Automation (ICMTMA), Vol.3, pages 645-648, April 2009.
[2] D. W. Lim, S. H. Choi, J. S. Jun, Automated detection of all kinds of violations at a street intersection using real time individual vehicle tracking, Image Analysis and Interpretation, 2002. Proceedings. 5th IEEE Southwest Symposium, pages 126-129, 2002.
[3] Y. Chen, C. Yang, Vehicle red-light violation detection base on region, Computer Science and Information Technology (ICCSIT), 2010 3rd IEEE International Conference, Vol. 9, pages 700-703, July 2010.
[4] P. KaewTraKulPong and R. Bowden, An improved adaptive background mixture model for real time tracking with shadow detection, In Proc. 2nd European Workshop on Advanced Video Based Surveillance Systems, AVBS01, Sept 2001.

Footnote

[1] Leave this cell blank.

[2] The scope defines the limits of the use case.

[3] Stakeholder involved in the scenario - examples are: type of organization; customers, 3rd parties; end users; humans; environment; negative stakeholders (attackers, criminals, etc).

[4] Assets and values that are valuable to the stakeholders and at the risk of being compromised by the AI system deployment – examples can include competitiveness; reputation or trust; fairness; safety; privacy; stability; etc.

[5] Threats and vulnerabilities can compromise the assets and values above. Examples are: different sources of bias; incorrect AI system use; new security threats; challenges to accountability; new privacy threats (hidden patterns).

[6] AI method(s)/framework(s) used.

[7] Hardware system used.

[8] Topology is the study of geometric forms differentiated by intersection and bifurcation. The term is used for the graphic aspects network architectures.

[9] Terms and concepts listed here can be used to extend the work of WG 1 (AWI 22989 and AWI 23053) as necessary.

[10] The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a collection of 17 global goals set by the United Nations General Assembly. SDGs are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.
See URL for more details: http://www.undp.org/content/undp/en/home/sustainable-development-goals.html

[11] Origin of data, which could be from instruments, IoT, web, surveys, commercial activity, or from simulations.

[12] Structured/unstructured Images, voices, text, gene sequences, and numerical. Composite: time-series, graph-structured

[13] The rate of flow at which the data is created, stored, analysed, or visualized.

[14] Data from a number of domains and a number of data types. The wider range of data formats, logical models, timescales, and semantics complicates the integration of the variety of data.

[15] Changes in data rate, format/structure, semantics, and/or quality.

[16] Completeness and accuracy of the data with respect to semantic content as well as syntactical of the data (such as presence of missing fields or incorrect values)

[17] Describe which condition(s) should have been met before this scenario happens.

[18] Describe which condition(s) should prevail after this scenario happens. The post-condition may also define "success" or "failure" conditions.

[19] The event that triggers the step. This might be completion of the previous event.

[20] Action verbs should be used when naming activity.

[21] Training data can be further specified.

[22] The event that triggers the step. This might be completion of the previous event.

[23] Action verbs should be used when naming activity.

[24] Specify input of evaluation.

[25] Specify output of evaluation.

[26] The event that triggers the step. This might be completion of the previous event.

[27] Action verbs should be used when naming activity.

[28] Specify input of evaluation.

[29] Specify output of evaluation.

[30] The event that triggers the step. This might be completion of the previous event.

[31] Action verbs should be used when naming activity.

[32] Retraining data can be further specified.