Review Form2

BookName:	ScientificResearch,NewTechnologiesandApplications
ManuscriptNumber:	**Ms_BPR_2680**
Titleof theManuscript:	**TowardsExplainableAugmentedIntelligence(AI)forCrackCharacterization**
TypeoftheArticle	**Bookchapter**

PART1: Review Comments

CompulsoryREVISIONcomments	**Reviewer'scomment**	**Author's Feedback** *(Please correct the manuscript and highlight that partinthemanuscript.Itismandatorythatauthorsshould writehis/herfeedback here)*
Please write a few sentences regarding the importanceofthismanuscriptforthescientificcommunity.Whydoyou like (or dislike) this manuscript? A minimum of 3-4sentencesmayberequiredfor thispart.	The article focuses on developing an explainable AI for semi-automatic crack characterization in industrialcomponents using ultrasonic phased arrays for NDT&E.AutoNDE code includes signal-processing modulesbased on the Total Focusing Method, image-processing modules, and an explainable AI module in the form of adecision tree. Experimental set-up involves using RF data collected with a linear transducer array to probe steelblocks with surface-breaking notches and buried notches.AutoNDE's explainable AI module is a decision treethat characterizes defects, groups similar images, and generates reports based on crack parameters. AutoNDE wastrainedonsixteendatasetsandtestedondatasetscollectedbyAMECandCEA,withafocusonoptimizing parametersforaccurateanalysisandreportgeneration.	
Isthetitleofthearticlesuitable? (Ifnotpleasesuggestanalternativetitle)	"Development of an Explainable AI System for Ultrasonic Phased Array Inspection in Non-Destructive Testingand Evaluation(NDT&E) andAdvancementsinCrackCharacterization"	
Is the abstract of the article comprehensive? Do yousuggesttheaddition(ordeletion)ofsomepoints inthissection?Please writeyour suggestionshere.	Yes	
Aresubsectionsandstructureofthemanuscript appropriate?	Yes	
Please write a few sentences regarding the scientificcorrectnessofthismanuscript.Whydoyou thinkthatthis manuscript is scientifically robust and technicallysound? A minimum of 3-4 sentences may be requiredforthispart.	This manuscript is scientifically robust and technically sound for several reasons. First, it provides a clear andwell-documentedmethodologyfortacklingacentralchallengeinnon-destructivetestingandevaluation(NDT&E)—crackcharacterization—byusingultrasonicphasedarraysandexplainableAI.Theapproach,particularly the use of a modified total focusing method (TFM) combined with signal and image processing, istechnically rigorous and grounded in sound principles of physics and engineering. Additionally, the inclusion ofan explainable AI decision tree for interpreting inspection data, and the acknowledgment of both the strengths andlimitations of the AutoNDE system, further validates the scientific rigor of the research. The manuscript alsodiscussesindetailtheeffectsofsurfaceundulations,proposinganinnovativemethodfordealingwiththiscommonsourceoferror,whichaddsto itstechnicalsoundness.	
Arethereferencessufficientandrecent? Ifyouhavesuggestions of additional references, please mentiontheminthe reviewform. **-**	Yes	

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MinorREVISIONcomments **Isthelanguage/Englishqualityofthearticlesuitable forscholarlycommunications?**	Yes	
Optional/Generalcomments	The manuscript presents a solid and innovative approach, particularly in how it integrates explainable AI withultrasonic phased array data for crack characterization in NDT&E. The authors provide a thorough explanation oftheir methodology, including the signal-processing and image-processing modules, along with the decision tree-based AI. By addressing key challenges like surface undulations and optimizing hyperparameters, the studydemonstratesscientific rigor. However,someaspectscouldbenefitfromfurtherclarification.Forexample,themanualoptimizationofnumerous parameters could be expanded to discuss potential automation strategies in more depth. Additionally,while themanuscript acknowledges the limitations of training on a limited dataset, it could emphasize theneedformoreextensive testingondiversedatasetsto generalize theAI'sapplicabilitybetter. Overall, the manuscript is technically sound, but further validation through more datasets and deeper explorationofhyperparameterautomationwould enhance itsrobustness.	

PART 2:

	Reviewer's comment	**Author's comment***(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Are there ethical issues in this manuscript?	*(If yes, Kindly please write down the ethical issues here in details)*	

Reviewer Details:

Name:	**Paresh Mirgal**
Department, University & Country	**IMP PAN, Poland**