

Intelligent Agents International Acceptance

One of the most promising areas of health innovation is the application of Artificial Intelligence (AI), primarily in medical imaging. Diagnosis of breast cancer disease requires the combination of many types of data, including patient and family histories, and imaging results. Clinical Decision Support Systems (CDSSes) must be able to combine these data types into a seamless system. Intelligent agents, an approach that has been used chiefly in other domain applications, provides a structure that can combine, not only data types, but also a variety of reasoning methodologies in the same decision support system. Clinicians are included as an agent in the system and can interact directly with any of the components. However, intelligent agents are raising concerns about adoption, efficacy, and acceptance which we are trying to study through this international anonymous survey.

The purpose of this questionnaire is to understand how world-wide clinical professionals perceive and potentially use AI systems, such as intelligent agents, and learn about their expectations, experience, and also performance concerns. The study takes place within the scope of BreastScreening ([breastscreening.github.io](#)) and MIMBCD-UI ([mimbcd-ui.github.io](#)) research work by Francisco Calisto at both Institute for Systems and Robotics ([welcome.isr.tecnico.ulisboa.pt](#)) and Interactive Technologies Institute ([iti.larsys.pt](#)), under the scientific coordination of Prof. Jacinto Nascimento and Prof. Nuno Nunes. The study involves an international collaboration network of partner institutions: Instituto Superior Técnico, University of Adelaide and University of Queensland.

The study complies with the provisions of the General Data Protection Regulation [Regulation (EU) 2016/279 of the European Parliament and of the Council of 27 April 2016], and follows the recommendations of the Declaration of Helsinki for research. There are no risks and benefits associated with your participation. Your participation is completely voluntary; you can give up at any time and without having to provide any justification, just "leave" without completing the tasks. In this case, the data will not be recorded.

The study is anonymous, with no identifying data collected, and it is not possible to identify you by your answers. The data will only be accessible to authorized researchers and will only be used for scientific research purposes.

For any additional information, you can contact ISR-Lisboa and ITI / LARSyS, through the following email:

francisco.calisto@tecnico.ulisboa.pt

* Indicates required question

1. Informed Consent *

By accepting and continuing, you confirm that you have been duly informed about the study, that you understand the information that has been transmitted to you and that you agree to participate in it.

Check all that apply.

☐ Accept and continue

Demographics

Please provide some information about yourself which will help the research team characterize the sample.

2. What is your gender? *

Mark only one oval.

- ☐ Female
- ☐ Male
- ☐ Other (prefer to self describe differently)
- ☐ Prefer not to say

3. How old are you? *

Mark only one oval.

- ☐ 18-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50-59
- ☐ 60-69
- ☐ 70-79
- ☐ 80-89
- ☐ > 89
- ☐ Prefer not to say

4. What is your nationality? *

Mark only one oval.

- ☐ Portuguese
- ☐ United Kingdom
- ☐ German
- ☐ French
- ☐ Spanish
- ☐ Italian
- ☐ Other EU-Country
- ☐ Non-EU European
- ☐ USA / Canada
- ☐ South or Central America
- ☐ Africa
- ☐ Asian
- ☐ Middle East
- ☐ New Zealand / Australia

Medical Experience

Please provide some information about your clinical experience or any relation you have with the healthcare sector.

5. Education Level *

Check all that apply.

- ☐ Post-Bologna Degree (Bachelor)
- ☐ Pre-Bologna Degree (Bachelor)
- ☐ Bologna Master Degree (Master)
- ☐ Bologna Doctoral Degree (PhD)
- ☐ Specialist
- ☐ Prefer not to say
- ☐ Other: _____

6. Training *

Mark only one oval.

- ☐ Doctor
- ☐ Nurse
- ☐ Technician
- ☐ Prefer not to say
- ☐ Other: _____

7. Area of expertise: *

Check all that apply.

- ☐ Radiology
- ☐ Gynecologist
- ☐ Senology
- ☐ Oncology
- ☐ Surgical
- ☐ Intervention
- ☐ Mastology
- ☐ General Medicine
- ☐ Family Medicine
- ☐ Genetic Medicine
- ☐ Prefer not to say
- ☐ Other: _____

8. Work Sector *

Check all that apply.

- ☐ Public
- ☐ Private
- ☐ Social
- ☐ Clinic
- ☐ Prefer not to say
- ☐ Other: _____

9. Experience *

Mark only one oval.

- ☐ Intern - before the speciality exam
- ☐ Junior - after taking the exam, up to 5 years
- ☐ Middle -more than 5 years but less than 10 years
- ☐ Senior - more than 10 years
- ☐ Prefer not to say
- ☐ Other: _____

10. How often do you analyze a patient with medical imaging exams? *

Mark only one oval.

- ☐ Everyday
- ☐ 3/4 days per week
- ☐ 2/3 days per week
- ☐ Weekly
- ☐ Monthly
- ☐ Prefer not to say
- ☐ Other: _____

11. How long do you analyze medical imaging exams? *

Mark only one oval.

- ☐ 0-5 years
- ☐ 6-10 years
- ☐ 11-15 years
- ☐ 16-20 years
- ☐ +20 years

Experience with AI systems

Please provide some information about your experience with AI systems.

12. Your experience with AI systems? *

Mark only one oval.

- ☐ I have never heard about AI systems
- ☐ I know about it but never tried
- ☐ I've tried but don't use it regularly
- ☐ I use it regularly

13. Your experience with AI systems *

Mark only one oval per row.

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
I am concerned / worried about AI systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have changed my workflow because of AI systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am afraid with my career because of AI systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think AI systems will mostly help me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I could follow the AI recommendations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am aware of AI systems in my practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that AI systems will help us for a better patient diagnosis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I trust in AI systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

AI Systems

Please provide some information about your experience with AI systems.

14. Technology Use and Adoption *

Mark only one oval per row.

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
I find AI useful for medical imaging	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using AI helps me in my workflow	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using the AI saves me time and effort	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using an AI system will be easy for me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning how to use AI systems would be easy for me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My interaction with an AI system will be clear and understandable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People who influence my behavior think that I should use AI systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My healthcare institution is helpful in promoting AI systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My colleagues think that I should use AI systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have the resources necessary to use AI systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have the knowledge necessary to use AI systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can get help from others if I have difficulties using an AI system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would definitely use an AI system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think other health institutions should use AI systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Given the chance, I intend to use an AI system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would recommend AI systems to others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Attitude, Privacy and Trust *

Mark only one oval per row.

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Using an AI system is a good idea	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like the idea that using an AI system helps diagnosing patients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using highly accurate AI systems should be mandatory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would totally trust in an accurate AI system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would feel confident using an AI system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall, I find AI systems a solution to mitigate medical error	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using AI systems would lead me to a loss of privacy because patient's information would be disclosed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think using AI systems could not keep patient's sensitive information from exposure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The chances of using an AI system and losing control over patient's information privacy is high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe an AI system providers will keep patients' interests and privacy in mind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe AI system providers are trustworthy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe AI system providers will do everything to secure patient data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Conclusion

Thank you very much for your participation in this survey. Your participation is very important to help us understand the clinical perception of AI systems and understand how intelligent agents can help to support the healthcare workflow.

16. Please share any other ideas, opinions or concerns that you might have about AI systems and intelligent agents.

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