NAO Robot for Shopping Assistance

1st Yi Li
Deoartment of Engineering Mathematics
University of Bristol
we20618@bristol.ac.uk

2st Naresh Hemadri
Deoartment of Engineering Mathematics
University of Bristol
tw20675@bristol.ac.uk

3st Haoming Huang
Deoartment of Engineering Mathematics
University of Bristol
ck20744@bristol.ac.uk

4st Stefanos Lekanidis
Deoartment of Engineering Mathematics
University of Bristol
uv20529@bristol.ac.uk

5st Keshava Shankar Nagu Koduru
Deoartment of Engineering Mathematics
University of Bristol
uy20317@bristol.ac.uk

Abstract—**As the number of people infected with covid-19 in the UK gradually eases, public facilities are unblocked. To meet the demand for offline shopping and avoid the re-emergence of the recent crown outbreak, the shopping assistant design concept was born. The research is designed to determine if the question 'NAO robots can role-play as a sales assistant and provide better assistance in the supermarkets soon?'. Due to the current situation in the laboratory scenario, the NAO robot is placed on the table. There is only one product category in this user study to make it simple of milk and with some sub-categories. And the user study is carried into three major phases: introduction, shopping, and exit. There were 11 participants to perform this user study and wrote the questionnaire. The key questions from the questionnaire results will be presented in the form of histograms, and the data will be analysed to give the results of this experiment. Although the number of participants in this experiment was relatively small at 11, the vast majority of participants agreed with the design concept, suggesting that it is feasible to replace human sales with shopping assistance robots.**

Keywords—Robot, HRI, NLP, Shopping Assistance

I. INTRODUCTION (*HEADING 1*)

A. Background

In the last two years, the outbreak of COVID-19 in the UK increased the number of people infected with covid-19. All non-essential public facilities in the UK have been closed, and the number of people going out has decreased significantly. Over time, it has become clear through public social media that more and more people are becoming disenchanted with the isolation of their homes and online shopping. The gradual unblocking of public facilities and shopping centre sales has led to an explosion of shopping enthusiasm among the home-bound population. But the sudden mass movement of people in the UK could lead to a new epidemic outbreak.

B. Motivation

The shopping assistance robot is designed to meet the needs of people shopping offline while avoiding the re-increase in the number of people infected with covid-19 due to human contact. In other words,the motivation for the user study is the current COVID-19 to reduce human contact in supermarkets by NAO to roleplay in supermarkets as sales assistant.

C. Main questions

The user study is designed to test the hypothesis by testing the below main question: 'How well the NAO robot be able to provide a product suggestion based on the preferences of the user'

II. EASE OF USE

A. Selecting a Template (Heading 2)

First, confirm that you have the correct template for your paper size. This template has been tailored for output on the A4 paper size. If you are using US letter-sized paper, please close this file and download the Microsoft Word, Letter file.

B. Maintaining the Integrity of the Specifications

The template is used to format your paper and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin in this template measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations.

III. RELATED WORK

Global literature has lot of works that have been done for the application of social robots for consumer purposes in shopping assistance. Here few of the literatures are listed below that has few interesting correlations with our user study.

In this paper [1] the social robot Spoon was placed in a telephone and IT shop in the center of Paris. The main purpose of this work was to explore the interaction between the robot and the customer. The first use-case that was examined was: the robot is used to guide the customer to the product location based on user's preference. The second use-case tested was: to take pictures and messages from the customers as an alternative way for a guest book. The robot Spoon can detect the presence of a customer using its integrated visual sensors and it engages the interaction with the human. The interaction interface is multimodal, as the user can interact with by voice, by touch screen or by visually and evaluated with ethnographic interview to get feedback by recorded interviews which is valuable.

In this paper [2] a guide robot for a shopping mall was designed to interact as route guidance and provide shopping information. The robot was placed in the shopping mall for 25 days with the purpose to interact with approximately 100 groups of customers each day to build a rapport. The robot interacts with the natural language by making body gestures. For the user-centered evaluation, three different

questionnaires were given to the customers. There were three questionnaires in total: Questionnaire for the route guidance, for providing information and for the rapport building.

It provides results of the adequacy of route guidance, familiarization of the robot with user, and one fourth of the participants purchased products as recommended by robot which is quite low. Generally, the analysis results showed that participants accepted the robot with positive impressions and were influenced by the information provides by the robot.

In the paper [3] the NAO robot is used as a shopping assistant so that to study if the HRI influences the shopping behavior of the customers. The tasks of the robot are to communicate with the customers in different ways accordingly to the emotional state of the customers, and the second task is the robot to try to influence the customer decisions about their shopping, changing their emotional state. In this project, the HRI is based on the development of empathy and friendship. To understand the social interaction between the robot and the user as also to analyze the verbal and nonverbal communication, a cognitive and social task analysis was implemented.

The paper [4] has explained to provide recommendation using the Network robots in a real-world retail shop using two other scenarios to compare their recommendation with digital signage advertisements or without any ads. The experiment was also tested the other two conditions of finding shopping patterns and behaviors using RFID tags in product, using location history of products.

It is interesting that the time spent in the aisle with robot installed in the experiment in [4] is high compared to the other methods. However, the recommendations success rate was not high enough to validate recommendations has improved their sales of the product. It is same scenario of product suggestion, but the approach used in our user study was only using interaction with the robot.

TOOMAS the shopping guide developed by Metra Labs GmbH Ilmenau, Germany and tested in the home improvement store to find the location of the product and guide the person to the product has been discussed in the paper [5] which is a motivation to our study. They have a well-equipped sensors and SLAM algorithm to navigate in the shop floor using the product location which is added in background from the server. It was liked by the over more than 90% of the customers to use the robot again this trial run has more than 2000 participants on average for each category which holds the results with more value of information for implementation.

This paper [6] has explained the experimentation of getting the product list from the computer and then it uses the robot screen to display the shopping list when the QR code is scanned to authorize their shopping list, it also provides the offers nearby with the price for the related product and suggestions. It uses the mobile robot for interaction as a companion to do above mentioned roles. However, they have not displayed the robot setup in this experiment. The paper [6] has a similar clear view of how it was planned at first to implemented in this user study but due to the limitations of NAO robot and time it was slightly deviated.

IV. METHODS

A. Hypothesis

'Do the NAO robots can role-play as sales assistant and provide better assistance in the supermarkets in near future?'

The user study is designed to test the hypothesis by testing the below main question:

"How well the NAO robot be able to provide a product suggestion based on the preferences of the user"? The major focus on this user study was on the suggestion of the product considering cost, allergens, offer packs and saying the product location which makes it easy for the customer to find the product. The product suggestions are given based on the selected category of the product and user preferences.

The motivation for the user study is the current COVID-19 to reduce human contact in supermarkets by NAO to roleplay in supermarkets as sales assistant.

For papers with more than six authors: Add author names horizontally, moving to a third row if needed for more than 8 authors.

B. User Study Design

The user study must be tested in a supermarket scenario for ideal results. But due to the current situation it was tested in the laboratory scenario. The robot must be placed on higher platform as it is small compared to human size and cannot be placed in the shop floor. The setup in the laboratory is such that the NAO robot is placed on the table. The user comes near the robot and starts an interaction with the robot and enquires about the product. It provides the details of the product and helps the customer through its voice recognition capabilities and with a dialogue to interact with the customer. In this user study we just consider only one product category to make it simple of milk and with some sub-categories like skimmed, whole, UHT, almond and soymilk products with different brands, budget choices like offer packs. The user study has used basic decision tree-based algorithm to provide recommendations.

C. User Study Procedure

The user study is carried into three major phases like the introduction phase, Shopping phase and exit phase.

Introducing phase:

For this user study the person comes before the NAO robot and starts the interaction by saying a hi or a waving his hand to catch its attention. After that the NAO robot tracks the person, it greets the person by saying a hi and asking about the user's day. It starts in this manner to make the person comfortable to interact with the robot.

Shopping phase:

In this phase the robot asks the customer questions to narrow down to the product by selecting categories and sub-categories of the product. After choosing the product it asks question related to the product if they have some allergies to the product, for example if they choose the category of milk then it asks whether they lactose intolerant or not to narrow down the required product by avoiding the allergens. It was also designed to find the budget friendly product if they need a budget friendly product. After finding the product it provides the suggestion of the product and say its location like it is in

which aisle. After that it asks if they need a new product suggestion, if they finished shopping it ends with exit phase.

Exit phase:

It says a thank you note for shopping in the shop and ends the conversation.

D. Dependent Measures

The questionnaire was prepared in a logical manner to test the above hypothesis. First need to understand the user's mindset with the shopping to interpret their preferences and the decisions taken by them further. Then verifying the robot performances and the user's satisfaction with the interaction and the product suggestion by the robot. The possible changes that are required to suit the application for the supermarket like how the appearance of robot impacts the results.

E. Participants

There were 11 participants who performed this user study. All participants were around the age group of 20-30. The user study was conducted without any gender restrictions. As gender distribution was not required for testing the hypothesis so it was not recorded during the user study. Most of them were familiar with robots but they don't have a mental model of the interaction for the user study scenario.

V. Results

This user study has answered few questions related to this topic and with the context of interaction of the NAO robot in a shopping experience like the performance of the robot how good it was for the interaction and with product recommendation. The satisfaction rating is done on a scale of 1-5. With 1 as "Not satisfied" and 5 as "Satisfied". If we consider 3 as the average scale of the rating. The results from the Fig.1 show that the robot's relevancy of suggestion of product was marked above average scale by around 8 out of 11 participants. It shows that around average of 72.8% of the participants like the product recommended and found the product to be relevant to their preferences.

6. Does the product recommended by the robot meet your expectation?
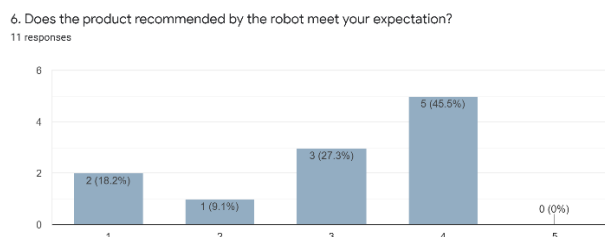11 responses

Fig.1 Statistical data for recommendation related question

From the below image of Fig.2 shows that 7 out of 11 participants liked the performance of the robot and given a rating above the average of 3 scale. It means around a average of 63.7% of the participants liked the robots performance.

7. How good was the interaction with the robot?
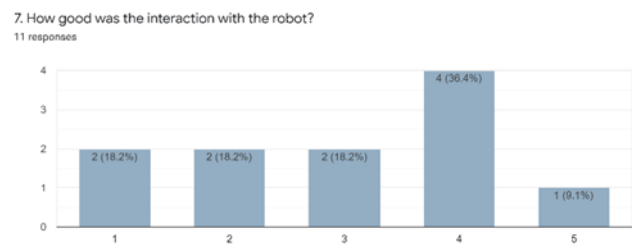11 responses

Fig.2 Statistical data of the performance of the NAO robot

The user study has also answered the main question of the hypothesis of how possible it is to use the NAO robot to be used as shopping assistance. From the Fig.3 it is clear that the 45.5% of them has a clear answer that the robot can be used for this application of shopping. As the 36.4% of participant has no opinion and uncertain about the possibilities of this application which has fifty-fifty possibility of falling on to both categories which may increase the positive responses.

10. Do you think the robots will be used as shopping assistant in the future?
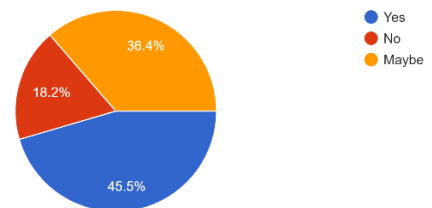11 responses

Fig.3 Pie chart for the robot in shopping assistance

However, most of the participants are in acceptance of our hypothesis to use of robots for shopping in the future.

VI. Discussion

The results of the fifth part of the questionnaire show that the design of the shopping assistance robot is highly feasible. Most participants well-received both the functionality and the performance of the shopping assistant robot. The vast majority of participants believe that replacing human salespeople with shopping assistants in the future is desirable.

The shopping assistance robot in this project has the same main function as most similar jobs. This function is to provide specific information on the product's location and the information requested by the customer. In the experiments of paper [3], the difference is that the robot was used as a shopping assistant to change the customer's emotional state by communicating with them in different ways. Our group did not consider friendship and emotion-based communication in this experiment. Instead, to provide advice on the customer's preferences. In other words, the main function of the shopping assistant bot in this experiment is to provide personalised product recommendations to different users. It is not the same as establishing emotional communication between the shopping assistant robot and the customer.

The limitations of this shopping assistance robot are also obvious:

- There were only 11 participants in the project, which resulted in a low level of external stability. It means

that the shopping assistance robot, although accepted by the majority of participants, may not meet the needs of other customers around the world.

- Due to the limited number of participants and the lack of design time, the design of the shopping aid robot only provided an application for food and drink, and the shopping aid robot was not able to make effective suggestions for other products.

- NAO was chosen as a shopping assistant robot in a laboratory setting, so it is not a good choice for a real mall setting, probably because it is too short and not very cost-effective.

- The design of the shopping assistance robot only includes language processing and natural language generation, which suggests that the NAO robot does not have path planning capabilities in this experiment, which means that customers need to find the product through the map after learning its location, rather than being guided by the robot to the product.

VII. CONCLUSION

The study is designed to test the hypothesis by testing the below main questions:'How well the NAO robot be able to provide a product suggestion based on the preferences of the user'.

The major focus on this user study was on the suggestion of the product considering cost, allergens, offer packs and saying the product location which makes it easy for the customer to find the product.

The shopping assistance robot in this study considers the various aspects that people consider when shopping for products, such as health, financial status, age, etc. The shopping assistant bot takes this information into account to recommend relevant products to the user. This is something that has not been addressed in previous related work.

Shopping assistance robots are designed for shopping in malls shops, grocery shops, clothing shops, etc. The essence is to replace human sales with robots. Therefore, all service and marketing industries are potential users of shopping assist robots.

In future research, shopping assisted robots should be further investigated in the following four areas.

Firstly, shopping assist robots should incorporate path planning and slam algorithms to guide customers to the location of products.

Secondly, shopping assistance robots should add shopping suggestions for products other than food.

Third, the shopping assistant robot needs to be tested with more participants.

Fourthly, the researcher needs to optimise and weigh the user information currently considered by the shopping assistant robot as the experiment progresses.

REFERENCES

[1] Velkovska, J. (2019) When an emotional robot meets real customers Exploring HRI in a customer relationship setting. Gesellschaft für Informatik e.V. [online]. Available from: http://dl.gi.de/handle/20.500.12116/25260doi:10.18420/MUC2019-WS-646.

[2] [1] T. Kanda, M. Shiomi, Z. Miyashita, H. Ishiguro, and N. Hagita, "An affective guide robot in a shopping mall," in Proceedings of the 4th ACM/IEEE International Conference on Human-Robot Interaction, HRI'09, 2008, pp. 173–180.

[3] Bertacchini, F., Bilotta, E. and Pantano, P. (2017) Shopping with a robotic companion. Computers in Human Behavior [online]. 77 pp. 382–395. Available from: http://dx.doi.org/10.1016/j.chb.2017.02.064 doi:10.1016/j.chb.2017.02.064.

[4] Kamei, K., Shinozawa, K., Ikeda, T., Utsumi, A., Miyashita, T. and Hagita, N. (2010) Recommendation from robots in a real-world retail shop. In: International Conference on Multimodal Interfaces and the Workshop on Machine Learning for Multimodal Interaction on - ICMI-MLMI '10 [online]. 2010 (no place) ACM Press. Available from: http://dx.doi.org/10.1145/1891903.1891929doi:10.1145/1891903.1891929.

[5] Gross, H.-M., Boehme, H., Schroeter, Ch., Mueller, S., Koenig, A., Einhorn, E., Martin, Ch., Merten, M. and Bley, A. (2009) TOOMAS: Interactive Shopping Guide robots in everyday use - final implementation and experiences from long-term field trials. In: 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems [online]. October 2009 (no place) IEEE. Available from: http://dx.doi.org/10.1109/IROS.2009.5354497doi:10.1109/iros.2009.5354497.

[6] Garcia-Arroyo, M., Marin-Urias, L.F., Marin-Hernandez, A. and Hoyos-Rivera, G. de J. (2012) Design, integration, and test of a shopping assistance robot system. In: Proceedings of the seventh annual ACM/IEEE international conference on Human-Robot Interaction - HRI '12 [online]. 2012 (no place) ACM Press. Available from: http://dx.doi.org/10.1145/2157689.2157722doi:10.1145/2157689.2157722.

NAO-for shopping Assistance-HRI user study

This is a user study done to check how well a NAO robot can helpful for your shopping by providing suggestions about a product from your choice. The basic demographics details will be used for a user study other personal information choices will be discarded safely after the user study is completed.

This a quick survey for the NAO robot user study to collect results after the interaction with the robot.

* Required

Skip to question 1Skip to question 1

Personal information

These details will be protected till the user study is done after that it will be properly destroyed.

1. Participant id: *

   _____

2. Age: *

   _____

Skip to question 3

Survey questions

There are ten questions that are important to understand the user study and robots performance. It might take just 3 mins to complete the survey.

3.   1. How often do you go to a supermarket? *

Mark only one oval.

⬭ Once in a month

⬭ Once in a week

⬭ Twice a week

⬭ More than 3 times a week

⬭ Daily

4.   2. Do you plan what to get before going to the supermarket? *

Mark only one oval.

⬭ yes

⬭ No

⬭ Maybe

5.   3. Do you like to have a shopping assistant to choose a product or to know the allergens present in the product? *

Mark only one oval.

	1	2	3	4	5	
Not required assistance	⬭	⬭	⬭	⬭	⬭	Like an assistance

6. **4. Do you like the assistant to be a robot or a human? ***

Mark only one oval.

◯ Robot

◯ Human

◯ No preferences

◯ I like to shop without assistance

7. **5. Do you like to know the offers when shopping or a cheapest product in a category? ***

Mark only one oval.

◯ Yes

◯ No

◯ Maybe

8. **6. Does the product recommended by the robot meet your expectation? ***

Mark only one oval.

	1	2	3	4	5	
Not satisfied	◯	◯	◯	◯	◯	Satisfied

9. **7. How good was the interaction with the robot? ***

Mark only one oval.

	1	2	3	4	5	
Not satisfied	◯	◯	◯	◯	◯	Satisfied

10.　8. Do you think the robot needs more questions to understand the user's preferences? (Is the number of question appropriate?) *

Mark only one oval.

	1	2	3	4	5	
Appropriate enough	⬭	⬭	⬭	⬭	⬭	Requires more questions

11.　9. Do you think the image (appearance and performance) of the robot will affect your desire to shop with it? *

Mark only one oval.

	1	2	3	4	5	
Not important	⬭	⬭	⬭	⬭	⬭	Great Influence

12.　10. Do you think the robots will be used as shopping assistant in the future? *

Mark only one oval.

⬭ Yes

⬭ No

⬭ Maybe

13.　If you have any suggestions to improve the user study or the application and your personal feedback please feel free to comment them below:

_____

_____

_____

_____

_____

Study Title: *NAO robot-Shopping Assistance*

PLEASE READ THIS SHEET IN ITS ENTIRETY

You are invited to take part in research taking place at the University of the West of England, Bristol. It is carried out as assignment for module UFMFHP-15-M Human-Robot Interaction. Before you decide whether to take part, it is important for you to understand why the study is being done and what it will involve. Please read the following information carefully and if you have any queries or would like more information please contact Haoming Huang, Keshava Shankar Nagu Koduru, Naresh Hemadri, Stefanos Lekanidis, Yi Li, , Faculty of Environment and Technology, Bristol Robotics Laboratory, University of the West of England, Bristol, haoming2.huang@live.uwe.ac.uk, keshava2.koduru@live.uwe.ac.uk, Naresh2.Hemadri@live.uwe.ac.uk, stefanos2.lekanidis@live.uwe.ac.uk, Yi3.Li@live.uwe.ac.uk.

Who is organising the research?
The project is led by Haoming Huang, Keshava Shankar Nagu Koduru, Naresh Hemadri, Stefanos Lekanidis, Yi Li, University of the West of England. Manuel Giuliani is the supervisor for this research. Please find their details at the end of this document.

What is the aim of the research?
The overall aim of the research is "Does assistance of the robot for product finding in a supermarket improves the shopping experience of the customer or not? "

The purpose of this study is to help the people in the supermarket. Not every salesman knows the allergen ingredients in a product, and it is time consuming to find a product in a big supermarket. During the pandemic, the queue is very big standing outside the supermarkets for a long time as the number of people in the shop is reduced. This experiment may provide an insight whether the usage of the robot is beneficial or not to find a product and the shopping time could be reduced or not for the customers. Even the salesman in the shop is changing it is even difficult for the salesman to remember all the products location and ingredients.

Why have I been invited to take part?
We are recruiting participants who are already working at the University of the West of England and are aware of the current risk and safety procedures due to COVID-19 restrictions.

Do I have to take part?
You do not have to take part in this research. It is up to you to decide whether you want to be involved. If you do decide to take part, you will be given a copy of this information sheet to keep and will be asked to sign a consent form. If you do decide to take part, you are free to stop and withdraw from the study at any time without giving a reason.

What will happen to me if I take part and what do I have to do?
You will first be asked to sign a consent form, read a privacy notice, and provide some basic demographic information. You will then

They will be asked to make a role play interaction with the robot as a shopping assistant and where the robot will help them to find the products and then get suggestions on a product if required.

They will be asked to fill a questionnaire to get feedback and the experiment gets completed.

The study will take approximately *15* minutes.

Data will be gathered using the following methods:

Questionnaires

They will be asked to fill a questionnaire form after completing the role-play task. This will be used to evaluate the experience of the robot interaction.

Written Feedback/Comments

How satisfied are you with the robots' feedback and products recommended by the robot from 1 to10?

Task Performance

- Relevancy of the robot recommendation.
- Time taken to do the shopping.

What are the possible risks of taking part?

There are no risks involved with this experiment.

In addition to the normal risk assessments, care has been taken to ensure the experiment is COVID-19 safe. You and the experimenter will be required to wear a mask and sanitise hands before the study, and safe distancing will be observed. All participants will be drawn from staff and students already complying with UWE Covid-19 safety rules. The robot and any other surfaces touched by the participants will be sanitised after each use.

What will happen to your information?

All the information we receive from you will be treated in the strictest confidence.

All the information that you give will be kept confidential and anonymised. You will be assigned a participant ID that you can use to request the removal of your data from the study up to 7 days after completion of the experiment. After this point, the anonymised data will be analysed, and we will ensure that there is no possibility of identification or re-identification from this point.

Hard copy material (the consent form) will be kept in a locked and secure setting to which only the researchers will have access in accordance with the University's and the Data Protection Act 2018 and General Data Protection Regulation (GDPR) requirements.

Where will the results of the research study be published?

The results of this usability study will be reported in the coursework report for UWE module UFMFHP-15-M Human-Robot Interaction.

Who has ethically approved this research?

The project has been reviewed and approved by University of the West of England University Research Ethics Committee. Any comments, questions, or complaints about the ethical conduct of this study can be addressed to the Research Ethics Committee at the University of the West of England at: Researchethics@uwe.ac.uk

What if something goes wrong?

If you have any questions about the ethical conduct of this research, have any complaints or concerns, or are uncertain about any aspect of your participation please contact the project supervisors or the University's research ethics committee.

Project Supervisor:
Professor Manuel Giuliani manuel.giuliani@brl.ac.uk

What if I have more questions or do not understand something?

If you would like any further information about the research, please contact in the first instance:

Haoming Huang, Keshava Shankar Nagu Koduru, Naresh Hemadri, Stefanos Lekanidis, Yi Li, - haoming2.huang@live.uwe.ac.uk, keshava2.koduru@live.uwe.ac.uk, Naresh2.Hemadri@live.uwe.ac.uk, stefanos2.lekanidis@live.uwe.ac.uk, Yi3.Li@live.uwe.ac.uk.

Thank you for agreeing to take part in this study.

You will be given a copy of this Participant Information Sheet and your signed Consent Form to keep.

Faculty of Environment & Technology
Faculty Research Ethics Committee (FREC)

Ethical Review Checklist for Undergraduate and Postgraduate Modules

Staff and PG research students must not use this form, but should instead, if appropriate, submit a full application for ethical approval to the Faculty Research Ethics Committee (FREC).

Please provide project details and complete the checklist below.

Project Details:

Module name	HUMAN ROBOT INTERACTION
Module code	UFMFHP-15-M
Module leader	Manuel Giuliani
Project Supervisor	Joe Daly, Manuel Giuliani
Proposed project title	NAO robot-Shopping Assistance

Applicant Details:

Name of Student	Haoming Huang, Keshava Shankar Nagu Koduru, Naresh Hemadri, Stefanos Lekanidis, Yi Li.
Student Number	20053967, 20053970, 20052633, 20052656, 20053963.
Student's email address	haoming2.huang@live.uwe.ac.uk, keshava2.koduru@live.uwe.ac.uk, Naresh2.Hemadri@live.uwe.ac.uk, stefanos2.lekanidis@live.uwe.ac.uk, Yi3.Li@live.uwe.ac.uk.

	CHECKLIST QUESTIONS	Yes/No	Explanation
1.	Does the proposed project involve **human tissue, human participants, animals, environmental damage, or the NHS.**	Yes	It requires humans to interact and role play.
2.	Will participants be clearly asked to give consent to take part in the research and informed about how data collected in the research will be used?	YES	They will be informed about the questionnaire data that is collected and a user consent form to fill.
3.	If they choose, can a participant withdraw at any time (prior to a point of "no return" in the use of their data)? Are they told this?	YES	Yeah, if they feel uncomfortable then they can withdraw without giving a reason.

	CHECKLIST QUESTIONS	Yes/No	Explanation
4.	Are measures in place to provide confidentiality for participants and ensure secure management and disposal of data collected from them?	YES	Yeah, the statistical data will be taken used anonymously and any further information taken will be discarded
5.	Does the study involve people who are particularly vulnerable or unable to give informed consent (e.g., children or people with learning difficulties)?	NO	
6.	Could your research cause stress, physical or psychological harm to humans or animals, or environmental damage?	NO	
7.	Could any aspects of the research lead to unethical behaviour by participants or researchers (e.g., invasion of privacy, deceit, coercion, fraud, abuse)?	NO	
8.	Does the research involve the NHS or collection or storage of human tissue (includes anything containing human cells, such as saliva and urine)?	NO	

Your explanations should indicate briefly for Qs 2-4 how these requirements will be met, and for Qs 5-8 what the pertinent concerns are.

- **Minimal Risk:** If **Q 1 is answered 'No'**, then no ethics approval is needed.

- **Low Risk:** If **Qs 2-4 are answered 'Yes'** and **Qs 5-8 are answered 'No'**, then no approval is needed from the *Faculty Research Ethics Committee* (FREC). However, your supervisor must approve (a) your information and consent forms (Qs 2 & 3) and (b) your measures for participant confidentiality and secure data management (Q4).

- **High Risk:** If **any of Qs 5-8 are answered 'Yes'**, then you must submit an application for full ethics approval *before* the project can start. This can take up to 6 weeks. Consult your supervisor about how to apply for full ethics approval.

Risk Assessment: Separate guidance on risk assessment can be found on UWE's Health and Safety forms webpage at https://go.uwe.ac.uk/RiskAssessment. If needed, you must complete a Risk Assessment form. This must also be attached to your application for full ethics approval if your project is **High Risk**.

Your supervisor must check your responses above <u>before</u> you submit this form.
Submit this completed form via the *Assignments* area in Blackboard (or elsewhere if so directed by the module leader or your supervisor).
After you have uploaded this form, your supervisor will confirm it has been correctly completed by "marking" it as *Passed*/100% via the *My Grades* link on the Blackboard.

Further research ethics guidance is available at http://www1.uwe.ac.uk/research/researchethics

CONSENT FORM

Study Title: *NAO robot-Shopping Assistance*

This consent form will have been given to you with the Participant Information Sheet. Please ensure that you have read and understood the information contained in the Participant Information Sheet and asked any questions before you sign this form. If you have any questions please contact a member of the research team, whose details are set out on the Participant Information Sheet.

If you are happy to take part in this study please sign and date the form. You will be given a copy to keep for your records.

Please read the statements below and sign below to give consent:

I have read and understood the information sheet
I have been given the opportunity to ask questions and have had my questions answered to my satisfaction.
I am aware of the risks and benefits of taking part in the study
I am aware that data collected will be anonymised, kept in accordance with General Data Protection Regulation (GDPR), and will be viewed and analysed by the research team as part of their studies.
I am aware that I have the right to withdraw consent and discontinue participation without penalty before or during the study.
I am aware that I have the right to withdraw my data from the experiment up to 7 days after the completion of the experiment, using the participant ID that the researcher will provide.
I have freely volunteered and am willing to participate in this study.
I am willing to have my questionnaire responses collected.

Name (Printed)……………………………………………………………………….

Signature……………………………………………………. Date…………………….

PRIVACY NOTICE
Study Title: *NAO robot-Shopping Assistance*

I.   PURPOSE OF THE PRIVACY NOTICE

This privacy notice explains how the University of the West of England, Bristol (UWE) collects, manages and uses your personal data before, during and after you participate in this focus group. 'Personal data' means any information relating to an identified or identifiable natural person (the data subject). An 'identifiable natural person' is one who can be identified, directly or indirectly, including by reference to an identifier such as a name, an identification number, location data, an online identifier, or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.

This privacy notice adheres to the General Data Protection Regulation (GDPR) principle of transparency. This means it gives information about:

- How and why your data will be used for the research;
- What your rights are under GDPR; and
- How to contact UWE Bristol and the project lead in relation to questions, concerns or exercising your rights regarding the use of your personal data.

This Privacy Notice should be read in conjunction with the Participant Information Sheet and Consent Form provided to you before you agree to take part in the research.

II. WHY ARE WE PROCESSING YOUR PERSONAL DATA?

UWE Bristol undertakes research under its public function to provide research for the benefit of society. As a data controller we are committed to protecting the privacy and security of your personal data in accordance with the (EU) 2016/679 the General Data Protection Regulation (GDPR), the Data Protection Act 2018 (or any successor legislation) and any other legislation directly relating to privacy laws that apply (together "the Data Protection Legislation"). General information on Data Protection law is available from the Information Commissioner's Office (https://ico.org.uk/).

III. HOW DO WE USE YOUR PERSONAL DATA?

We use your personal data for research with appropriate safeguards in place on the lawful bases of fulfilling tasks in the public interest, and for archiving purposes in the public interest, for scientific or historical research purposes.

We will always tell you about the information we wish to collect from you and how we will use it.

We will not use your personal data for automated decision making about you or for profiling purposes.

Our research is governed by robust policies and procedures and, where human participants are involved, is subject to ethical approval from either UWE Bristol's Faculty or University Research

Ethics Committees. This research has been approved by UWE Bristol's Ethics Committee. The research team adhere to the **Ethical guidelines of the British Educational Research Association (and/or the principles of the Declaration of Helsinki, 2013) and the principles of the General Data Protection Regulation (GDPR).**

For more information about UWE Bristol's research ethics approval process please see our Research Ethics webpages at:
www1.uwe.ac.uk/research/researchethics

IV. WHAT DATA DO WE COLLECT?

The data we collect will vary from project to project. Researchers will only collect data that is essential for their project. The specific categories of personal data processed are described in the Participant Information Sheet provided to you with this Privacy Notice.

V. WHO DO WE SHARE YOUR DATA WITH?

We will only share your personal data in accordance with the attached Participant Information Sheet and your Consent.

VI. HOW DO WE KEEP YOUR DATA SECURE?

We take a robust approach to protecting your information with secure electronic and physical storage areas for research data with controlled access. If you are participating in a particularly sensitive project UWE Bristol puts into place additional layers of security. UWE Bristol has Cyber Essentials information security certification.

Alongside these technical measures there are comprehensive and effective policies and processes in place to ensure that users and administrators of information are aware of their obligations and responsibilities for the data they have access to. By default, people are only granted access to the information they require to perform their duties. Mandatory data protection and information security training is provided to staff and expert advice available if needed.

VII.

VIII. HOW LONG DO WE KEEP YOUR DATA FOR?

Your personal data will only be retained for as long as is necessary to fulfil the cited purpose of the research. The length of time we keep your personal data will depend on several factors including the significance of the data, funder requirements, and the nature of the study. Specific details are provided in the attached Participant Information Sheet. Anonymised data that falls outside the scope of data protection legislation as it contains no identifying or identifiable information may be stored in UWE Bristol's research data archive or another carefully selected appropriate data archive.

IX. YOUR RIGHTS AND HOW TO EXERCISE THEM:

Under the Data Protection legislation, you have the following **qualified** rights:

    (1)   The right to access your personal data held by or on behalf of the University;

    (2)   The right to rectification if the information is inaccurate or incomplete;

    (3)   The right to restrict processing and/or erasure of your personal data;

    (4)   The right to data portability;

    (5)   The right to object to processing;

(6)   The right to object to automated decision making and profiling;

(7)   The right to complain to the Information Commissioner's Office (ICO).

Please note, however, that some of these rights do not apply when the data is being used for research purposes if appropriate safeguards have been put in place.

We will always respond to concerns or queries you may have. If you wish to exercise your rights or have any other general data protection queries, please contact UWE Bristol's Data Protection Officer (dataprotection@uwe.ac.uk).

If you have any complaints or queries relating to the research in which you are taking part please contact either the research project lead, whose details are in the attached Participant Information Sheet, UWE Bristol's Research Ethics Committees (research.ethics@uwe.ac.uk) or UWE Bristol's research governance manager (Ros.Rouse@uwe.ac.uk)

v.1: This Privacy Notice was issued in April 2019 and will be subject to regular review/update.