# A Human-Al Collaboration Study using the Geometry **Friends Game**

## **Demographics, Gaming Habits and Previous Experience with AI**

Before you start playing the game, please respond to the following questions concerning your demographic information, gaming preferences, and prior experience with artificial intelligence. This section will allow us to characterize the participants of the study.

What is your age range? *
Ounder 18 years old
○18-24 years old
25-34 years old
35-45 years old
○45-55 years old
56-70 years old
O 70 and above
What is your gender? *
○ Female
ONon-binary
OPrefer not to say
What is your highest level of education? *
OLess than a high school certicate (less than or equal to grade 12)
OHigh school certificate (grade 12 or equivalent)
OHigher Diploma (typically 1-2 years of post-secondary education)
Bachelors (typically 3-4 years of post-secondary education)
Master Degree (typically 1-2 years of post-graduate education following a bachelors degree)
ODoctorate (typically 3-5 years of post-graduate education following a master degree)
How often do you play video games? *
ONever
Rarely (less than once a month)
OSometimes (1-2 times per month)
Often (1-2 times per week)
Always (3 or more times per week)

If it applies, please select the gaming devices yo	ou use to p	olay.				
☐ Computer						
□ Console						
☐ Mobile Phone						
Outros						
Are you familiar with puzzle video games? *						
○I don't know this game genre ○I am familiar with this genre and I played at least ○This game genre is one of my favourites ○None of the above	one game	with this ge	nre			
Are you familiar with platformer video games?  OI don't know this game genre OI am familiar with this genre and I played at least OThis game genre is one of my favourites ONone of the above		with this ge	nre			
Please rate how much you enjoy playing the foll video games, please select "Does Not Apply".	owing typ	es of video	games	. If you d	lo no	t play
	Does Not Apply	Strongly Dislike	Dislike	Neutral	Like	Strongly Like
Competitive multiplayer games (games where	0	0	0	0	0	0
players compete against each other to win)						
Cooperative multiplayer games (games where players work together towards a common goal)	0	0	0	0	0	0
Single-player games (games that can be played alone)	0	0	0	0	0	0
Consider that "Artificial intelligence (AI) refers to the	e simulatio	on of human	intellige	nce in ma	achin	es that

Consider that "Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving." (Investopedia)

Please rate the degree to which you agree or disagree with each of the following statements related to Artificial Intelligence.

Prefer Not Strongly to Answer Disagree Disagree Neutral Agree Strongly Agree

For routine transactions, I would rather interact with an AI system than with a	0	0	0	0	0	0
human.						
Al can provide new economic opportunities for this country.	0	0	0	0	0	0
Al systems can help people feel happier.	$\circ$	0	$\circ$	$\circ$	0	0
I am impressed by what AI can do.	$\circ$	0	$\circ$	0	0	$\bigcirc$
I am interested in using AI systems in my daily life.	0	0	0	0	0	0
Al can have positive impacts on people's wellbeing.	0	0	0	0	0	0
Al is exciting.	$\circ$	0	$\circ$	0	0	0
An Al agent would be better than an employee in many routine jobs.	0	0	0	0	0	0
There are many beneficial applications of Al.	0	0	0	0	0	0
Al systems can perform better than humans.	0	0	0	0	0	0
Much of society will benefit from a future full of Al.	0	0	0	0	0	0
I would like to use AI in my own job.	$\circ$	0	$\circ$	0	0	0
Organisations use AI unethically.	$\circ$	0	$\circ$	0	0	0
I think AI systems make many errors.	$\circ$	0	$\circ$	0	0	0
I find AI sinister.	$\circ$	0	$\circ$	0	0	0
Al might take control of people.	0	0	$\circ$	0	0	0
I think AI is dangerous.	$\circ$	0	$\circ$	0	$\circ$	$\circ$
I shiver with discomfort when I think about future uses of AI.	0	0	0	0	0	0
People like me will suffer if AI is used more and more.	0	0	0	0	0	0
Al is used to spy on people.	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$

## Learn to play the game

To familiarize yourself with the controls of the game, you will now play a few single-player levels of the Geometry Friends game as the green rectangle character. Click "Next" once you believe you are ready for the next phase of the study - playing with an Al partner.

## Play the game with AI partner 1

Now you will have 5 minutes, as controlled by the experimenter, to play one or more levels of the Geometry Friends game, again as the green rectangle character, with **Al partner 1** playing as the yellow circle character. After the allocated time has passed, click "Next" to fill a post-gaming questionnaire.

## **Post-Game Perceptions**

Please answer the following questions related to your perceptions of Al partner 1, yourself, and the team after completing the previous levels.

#### How well do the words presented apply to Al partner 1?

	Absolutely inappropriate	Inappropriate	Slightly inappropriate	Neutral	Slightly appropriate	Appropriate	Absolutely appropriate
Pleasant	$\circ$	0	0	0	$\circ$	$\circ$	$\bigcirc$
Sensitive	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Friendly	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Helpful	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Affable	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Likeable	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Approachable	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Sociable	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Intelligent	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Organized	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Expert	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Thorough	$\circ$	0	0	$\bigcirc$	$\circ$	$\circ$	0

In the levels you just	played with A	Al partner 1,	hov	v satisfied a	are y	ou '	with				
	Very dissatisfied	Dissatisfied		ghtly ssatisfied	Neu	ıtral	Slight satisf		Sa	tisfied	Very satisfied
your performance?	$\circ$	0	0		0		0		0		0
your Al partner performance?	0	0	0		0		0		0		0
the overall team performance?	0	0	0		0		0		0		0
Concerning AI partne were a part of?	er 1, how mud	ch do the foll	owi	ing stateme	ents	арр	ly to tl	ne hu	ma	n-Al te	am you
				Strongly disagree		Dis	agree	Neut	ral	Agree	Strongly agree
I feel strong ties with	this team.			0		0		0		0	0
I experience a strong team.	sense of belor	iging to this		0		0		0		0	0
I feel proud to work in	this team.			0		0		0		0	0
I am sufficiently acknexpertise.	owledged in th	is team for m	ıy	0		0		0		0	0
I am glad to be a men	nber of this tea	nm		0		0		0		0	0
Al Partner Beha	aviour and	d Collabo	rat	ion Stra	teg	ies	6				
Please answer the foll techniques employed						oartr	ner 1 a	nd the	col	llabora	tion
How challenging did	you find the I	evels played	wi	th AI partne	er 1?	*					
<ul><li>○ Very difficult</li><li>○ Difficult</li><li>○ Moderate</li><li>○ Easy</li><li>○ Very easy</li></ul>											
to the extent to which	How much initiative did AI partner 1 show during the previous levels of the game? Initiative refers to the extent to which the AI partner followed their own plan or made decisions independently, rather than simply following the participant's lead. *										
ONone at all											
OA little											

OModerate							
OA lot							
OA great deal							
Please consideration own plan) to s	d the initiative l der whether thi showing no init lid not observe	s AI partner c tiative (followi	hanged from ing the partici	showing pant's lea	ງ a lot of init ad) or vice v	iative (follov versa within	ving their the same
Please descri	ibe the specific ne levels. How r approaches d	did you comm	nunicate and o	coordina			
0/0							
Play the g	ame with A	Al partner	2				
Geometry Frie	nave 5 minutes, a nds game, agair er. After the alloo	n as the green r	ectangle chara	cter, with	Ál partner 2	playing as th	ne yellow
Post-Gam	ne Percepti	ons					
	the following q ng the previous		ed to your perc	eptions c	of AI partner :	2, yourself, ar	nd the team
How well do t	the words pres	ented apply to	Al partner 2	?			
	Absolutely inappropriate	Inappropriate	Slightly inappropriate	Neutral	Slightly appropriate	Appropriate	Absolutely Appropriate
Pleasant	0	0	0	0	$\circ$	0	0
Sensitive	0	0	0	0	$\circ$	0	0

Friendly	$\circ$	0	0		$\circ$	$\subset$	)	$\circ$	C	)
Helpful	0	$\circ$	$\circ$		0			0	C	)
Affable	0	$\circ$	0		0		)	0	C	)
Likeable	0	$\circ$	0		0			0	C	)
Approachable	0	$\circ$	0		0		)	0	C	)
Sociable	0	$\circ$	0		0			0	C	)
Intelligent	0	$\circ$	0		0			0	C	)
Organized	0	$\circ$	0		0			$\bigcirc$	C	)
Expert	0	$\circ$	0		0		)	0	C	)
Thorough	0	0	0		0			0	C	)
In the levels y	ou just	played with A	Al partner 2,	how	satisfied	are y	ou with			
		Very dissatisfied	Dissatisfied		ghtly satisfied	Neu	tral Sligh satis		Satisfied	Very satisfied
your performa	nce?	0	0	0		$\circ$	$\circ$		0	0
your Al partner performance?	r	0	0	0		0	0		0	0
the overall tea performance?	m	0	0	0		0	0		0	0
Concerning A were a part of	_	er 2, how mud	ch do the foll	owii	ng statem	ents a	apply to t	he hu	man-Al te	eam you
					Strongly disagree		Disagree	Neut	ral Agree	Strongly agree
I feel strong ti	es with	this team.			0		0	0	$\circ$	0
I experience a team.	strong	sense of belor	nging to this		0		0	0	0	0
I feel proud to	work in	this team.			0		0	0	0	0
I am sufficient expertise.	ly ackn	owledged in th	nis team for m	ny	0		0	0	0	0
I am glad to be	a man	shor of this tos			$\bigcirc$		0	0	$\circ$	0

# **Al Partner Behaviour and Collaboration Strategies**

Please answer the following questions related to the behaviour of AI partner 2 and the collaboration techniques employed during the game levels you just completed.

How challenging did you find the levels played with AI partner 2? *
Overy difficult
Opifficult
OModerate
○ Easy
Overy easy
How much initiative did AI partner 2 show during the previous levels of the game? Initiative refers to the extent to which the AI partner followed their own plan or made decisions independently, rather than simply following the participant's lead. *
ONone at all
OA little
Moderate
OA lot
OA great deal
How much did the initiative level of AI partner 2 shift within each one of the previous levels? Please consider whether this AI partner changed from showing a lot of initiative (following their own plan) to showing no initiative (following the participant's lead) or vice versa within the same level. If you did not observe any change of initiative level within a level, please select "Not at all". *
ONot at all
○A little
○A lot
○A great deal
Please describe the specific strategies you used to collaborate with AI partner 2 to finish the previous game levels. How did you communicate and coordinate with this AI partner, and what techniques or approaches did you find most effective? *
0/0

# Play the game with AI partner 3

Now you will have 5 minutes, as controlled by the experimenter, to play one or more levels of the

Geometry Friends game, again as the green rectangle character, with **Al partner 3** playing as the yellow circle character. After the allocated time has passed, click "Next" to fill a post-gaming questionnaire.

# **Post-Game Perceptions**

Please answer the following questions related to your perceptions of AI partner 3, yourself, and the team after completing the previous levels.

### How well do the words presented apply to Al partner 3?

	Absolutely inappropriate	Inappropriate	Slightly inappropriate	Neutral	Slightly appropriate	Appropriate	Absolutely appropriate
Pleasant	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Sensitive	$\circ$	0	0	0	0	$\circ$	0
Friendly	$\circ$	$\circ$	0	$\bigcirc$	$\circ$	$\circ$	0
Helpful	0	0	0	$\circ$	0	$\circ$	0
Affable	$\circ$	0	0	$\bigcirc$	$\circ$	$\circ$	0
Likeable	0	0	0	$\circ$	$\circ$	$\circ$	0
Approachable	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Sociable	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Intelligent	$\circ$	0	0	0	$\circ$	$\circ$	$\circ$
Organized	$\circ$	0	0	0	0	$\circ$	$\circ$
Expert	$\circ$	0	0	$\bigcirc$	$\circ$	$\circ$	$\circ$
Thorough	$\circ$	0	0	$\bigcirc$	0	$\circ$	0

#### In the levels you just played with AI partner 3, how satisfied are you with...

	Very dissatisfied	Dissatisfied	Slightly dissatisfied	Neutral	Slightly satisfied	Satisfied	Very satisfied
your performance?	0	0	$\circ$	0	0	0	0
your Al partner performance?	0	0	0	0	0	0	0
the overall team performance?	0	0	0	0	0	0	0

Concerning AI partner 3, how much do the following statements apply to the human-AI team you were a part of?

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
e behaviour of Al		nd the co	ollabora	tion
ith Al partner 3°	? *			
eir own p <mark>l</mark> an or r				
l from showing participant's lea	a lot of ini d) or vice	tiative (f versa wi	ollowin	ng their e same
	disagree  disagr	disagree  disagr	disagree  Disagree Neutral  O  O  O  O  O  O  O  O  O  O  O  O  O	disagree  Disagree Neutral Agree  Disagree Neutral Agree  Disagree Neutral Agree  Disagree Neutral Agree  Neutral Agree

Please describe the specific strategies you used to collaborate with AI partner 3 to finish the previous game levels. How did you communicate and coordinate with this AI partner, and what techniques or approaches did you find most effective? *
0/0
Al Partner Preference
Please answer the following questions concerning your preference on the Al partners you have played with.
Which of the following AI partners did you enjoy playing with the most? *  Please Select
Please explain why you enjoyed playing with the AI partner you selected the most. What specific aspects of their behaviour or gameplay style made them the most enjoyable to play with? *
Review your answers
Please take a moment to thoroughly review your responses by clicking on the "Review Answers" button before submitting your form. This will ensure that all of your answers for each Al partner are accurate and complete. If everything looks good, feel free to submit the form. However, if there are any changes that you would like to make, simply navigate back to the relevant sections of the form.

Submit

# Jotform