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Exploring Factors Influencing AI Sentiment-Analysis Engine Robot Use - Surveying Students in Social Science College

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Abstract: To understand the factors influencing AI engine robot use, this study developed a conceptual model along the lines of previous research. The research model hypothesized that personal innovativeness in Information Technology (new software, new hardware, new AI engine, new chatbot, use new technology), perceived usefulness of Information Technology and perceived ease of use of Information Technology positively affect attitude toward AI engine robots, which in turn facilitates AI engine robot intention and AI engine robot use. By collecting data from 55 surveys from college Student's respondents who have employed AI engine robots, we applied statistics to test the relationships in the model. Our findings demonstrate a positive effect of personal innovativeness in Information Technology, perceived usefulness of Information Technology and perceived ease of use of Information Technology on attitude toward AI engine robots. In addition, attitude toward AI engine robots has a positive effect on AI engine robot intention and AI engine robot use. Students use the AI engine to score the natural language description of the copywriting. Future research in the field of natural language processing and natural language understanding, using several AI engines for mathematical operations and applications. Quantitative research on natural language processing and natural language understanding. Used to solve more complex NLP and NLU and sentiment analysis problems.

Keywords: NLP, NLU, Sentiment Analysis, AI Engine Robot, Information Technology

1. Introduction

The 21st century ushered in a new era of science and technology, with one of the hottest issues today being robots, especially service robots. The International Robot Association (IFR) provides a preliminary definition of the service robot: "a semi-autonomous or independent robot, it can complete the beneficial to human services." Over the past several years, the consumer electronics hardware war has evolved into integrated service innovation, making the hardware function no longer the most important element. On the contrary, "service" ability is the most important element for providing customer value [10].

Artificial Intelligence (AI) Robots Market (By Offering: Software, Hardware, Services; By Robot Type: Service Robots, Industrial Robots, Others; By Technology: Machine Learning, Computer Vision, Context Awareness, Natural Language Processing; By Deployment Mode: Cloud, On-premises; By Application) - Global Industry Analysis, Size, Share, Growth, Trends, Regional Outlook, and Forecast 2022-2030.

The global artificial intelligence (AI) robots market size was accounted at USD 9.2 billion in 2021 and is expected to be worth around USD 54.3 billion by 2030 with a registering growth at a CAGR of 21.81% during the forecast period 2022 to 2030.

AI robots will certainly be an increasingly important trend over the next few years [10].

Report Scope of the Artificial Intelligence (AI) Robots Market [5]. (Table 1).

Table 1. *Report Scope of the Artificial Intelligence (AI) Robots Market.*

Report Coverage	Details
Market Size in 2022	USD 11.21 Billion
Market Size by 2030	USD 54.3 Billion
Growth Rate from 2022 to 2030	CAGR of 21.81%
Base Year	2021
Forecast Period	2022 to 2030
Segments Covered	Offering, Robot Type, Technology, Deployment Mode, Application, Geography
Companies Mentioned	ABB, AIBrain, Inc., Alphabet, Argo AI, LLC, Blue Frog Robotics & Buddy - Emotional Robot, Brain Corporation, CloudMinds Technology Inc., DataRobot, Inc., Fanuc, Hanson Robotics Ltd., Harman International Industries, IBM Corporation, Intel Corporation, International Business Machines Corporation, Kawasaki, Microsoft Corporation, Mitsubishi, Neurala, Inc., NVIDIA Corporation, Omron, Promobot, SoftBank Corp., UB Tech Robotics, Inc., Veo Robotics, Inc., Vicarious, Xilinx, Yaskawa

Despite the growing popularity of the industry, to the author's best knowledge, scant studies have explored AI robot behavior. To understand AI robot behavior, this study proposes that AI robot perception is closely related to AI robot attitudes, in line with prior research [12]. According to Weeger and Gewald and Davis [16, 3], robot perception comprises personal innovativeness in IT, perceived usefulness of IT and perceived ease of use of IT are crucial factors, and these factors are supposed to influence attitude toward AI robots. The reasons why personal innovativeness in IT, perceived usefulness of IT and perceived ease of use of IT are as follows. First, technology acceptance factors have been included in many models on robot intention and have found to be important predictors [8]. Secondly, previous studies suggest that the TAM factors are influenced by personal innovativeness [9].

Moreover, attitude towards a behavior refers to "the degree to which a person has favorable or unfavorable evaluation of the behavior of the question" [6]. Attitude can be viewed as the bridge between a person's background characteristics and the behavior that fulfills their needs [2]. A person's behavior is influenced by attitude [7]. Hence, this study thus expects to find an association between attitude toward AI robots and AI robot intention and AI robot use.

As the aim of this study is to explore factors influencing AI robot use, this study developed a conceptual model based on previous studies. This study proposes that personal innovativeness in IT, perceived usefulness of IT and perceived ease of use of IT positively affect attitude toward AI robots, which in turn facilitate AI robot intention and AI robot use. Two hypotheses are proposed and examined with data collected from college students who have experience use with AI engine robots in university. This study enriches the current literature in several ways. First of all, it views attitude toward AI robots as a latent mechanism that links AI robot perception (i.e. personal innovativeness in IT, perceived usefulness of IT, perceived ease of use of IT) and AI robot behavior (i.e. AI robot intention and AI robot use). This study has shown that AI robot perception is closely related to AI robot attitudes [12]. In addition, attitude is directly affected by users' belief about a system, such as perceived usefulness and ease of use [3]. Secondly, this study examines the proposed model based on empirical data of users in the university students context.

2. Literature Review and Hypotheses

Depending on the technology the market for artificial intelligence robots is segmented into computer vision, machine learning, context awareness, and Natural Language Processing (NLP). The segment of machine learning is anticipated to increase significantly in the Artificial Intelligence Robots market over the forecast period. A huge amount of information is nurtured into the ML procedures, confirming that Artificial intelligence technologies like robotic structures can execute exactly. Machine learning is the progression of training and Optimization methods to deliberate for the situation and accomplish specific responsibilities or actions.

AI robot perception and attitude toward AI robots

According to Weeger and Gewald and Davis [3], AI robot perceptions entail personal innovativeness in IT, perceived usefulness of IT and perceived ease of use of IT, and personal innovativeness in IT. Perceived usefulness of IT and perceived ease of use of IT is demonstrated to have a positive effect on attitude. Specifically, personal innovativeness in IT means that those who are innovative tend to be more risk-averse [1]. Moreover, based on the technology acceptance model (TAM) the main antecedents of the attitude to use a particular technology are perceived usefulness and perceived ease of use [4]. Perceived usefulness refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" [3]; while perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort". Thus, it is hypothesized that:

H1a. Personal innovativeness in IT is positively related to attitude toward AI engine robots.

H1b. Perceived usefulness of IT is positively related to attitude toward AI engine robots.

H1c. Perceived ease of use of IT is positively related to attitude toward AI engine robots.

Attitude toward AI robots and AI robot behavior

Owing to the increasing importance of robot understanding, robot behavior expertise is beneficial to application. This study explored robot behavior in terms of AI robot intention and AI robot use. robot intention is defined as the extent a person is willing to work with robots; whereas robot use is

defined as the situational use of robots [4].

Attitude serves as a strong influence on behavior, attitude research offers a potentially useful device for explaining and predicting person's behavior" [14]. Attitudes have been perceived as powerful determinants of behaviors and researchers consider that an individual having a positive attitude toward something is more likely to have some behavior toward the objective [15]. The present study proposes that when people have positive attitudes toward robots, it may generate positive AI robot behavior (i.e. AI robot intention and AI robot use). Thus, it is hypothesized that:

H2a. Attitude toward AI engine robots is positively related to AI engine robot intention.

H2b. Attitude toward AI engine robots is positively related to AI engine robot use.

3. Methodology

A self-administered survey was distributed among University Students to examine the factors influencing their AI engine robot for programming use.

3.1. Sample

This study used a questionnaire survey method to collect data. The sample was drawn from respondents who have experience cognition with AI engine robots in university students. Variables in the questionnaire comprise background information, personal innovativeness in IT, perceived usefulness of AI robots, perceived ease of use of AI robots, attitude toward AI robots, AI robot intention and AI robot use. In addition, Questionnaire in class, 55 questionnaires to selected respondents, of the 43 returned questionnaires, representing a response rate of 78.18%.

In terms of gender identity, there were 87% female respondents and 13% male respondents. In terms of age, the largest groups ranged from 18-25 years old (86%) and 26-30 years old (14%). And in terms of education, Respondents were university students.

3.2. Measures

All the items were derived from previous studies and this study used a six-point Likert-type scale to measure the variables. We also provided internal consistency reliability as follows:

*Personal innovativeness in I*T. To measure this variable, we selected the four items with the highest factor loadings in the original scale developed by Agarwal and Prasad [1]. One sample item is: "Among my peers, I am usually the first to try out new information technologies".

Perceived usefulness of IT. This variable was measured by a five-item scale. This study used the three items with the highest factor loadings from the original scale developed by Davis [3]. One sample item is: "If I used robot for work, I would find it easy to get these devices to do what I want them to do".

Perceived ease of use of IT. Perceived ease of use of IT was measured using a scale that comprised six items with the highest factor loadings in the original scale developed from previous studies [4]. One sample item is: "If I used robot for financial advice, it would enable me to accomplish tasks more quickly.".

Attitude toward AI robots. Attitude refers to a person's overall evaluation of AI robot as a tool, which can be positive / favorable or negative / unfavorable. The items used to measure the attitude toward robots were modified from the scale developed by Taylor and Todd [13]. One sample item is: "Using the robot is a wise idea" [11].

AI robot intention. To measure this variable, this study selected the three items with the highest factor loadings in the original scale developed by Brown and Venkatesh. One sample item is: "I intend to use the robot service".

AI robot use. AI robot use was measured using a scale that comprised three items with the highest factor loadings in the original scale developed from previous studies [4]. One sample item is: "I quietly rely on robots."

4. Results

4.1. The Statistics

Table 2. *The Statistics.*

Variables	Mean	SD	Var
Personal innovativeness inIT	3.98	0.025	0.0006
Perceived usefulness of IT	3.68	0.098	0.0097
Perceived ease of use of IT	4.10	0.012	0.0001
Attitude toward AI robots	3.74	0.152	0.0233
AI robot intention	3.92	0.127	0.0162
AI robot use (UX)	3.65	0.104	0.0109

Note: N=43

In terms of Hypothesis 1, as seen in Table 2, the coefficient for personal innovativeness in IT (mean=3.98), perceived usefulness of IT (mean=3.68) and perceived ease of use of IT (mean=4.10) were significant, just as we expected. The links to attitude toward AI engine robots from personal innovativeness in IT (H1a), perceived usefulness of IT (H1b), and perceived ease of use of IT (H1c) are completely supported.

As to hypothesis 2, analytical results demonstrate that attitude toward AI engine robots had a positive effect on AI engine robot intention (mean=3.92) and AI engine robot use (mean=3.65). The above findings demonstrated that hypothesis 2 was fully supported.

Six variables, the mean is above 3.65, Indicates that the hypothesis is supported. The standard deviation is very small. Indicates high data concentration, and the data dispersion is low.

4.2. Reliability Analysis

The most commonly used value for reliability analysis is Cronbach's α. Cronbach's α can also be called a measure of internal consistency. For exploratory purposes, 0.6 is considered acceptable, and for verification purposes, 0.7 is considered

acceptable. Acceptable, above 0.8 is considered better.

Table 3. *Research Facet Cronbach's α.*

Research Facet	Cronbach's α
Perceived usefulness of IT	.937
Perceived ease of use of IT	.880
Personal innovativeness in IT	.914
Attitude toward AI engine robots	.869
AI engine robot intention	.932
AI engine robot use	.888

From the item analysis results, it can be seen that each facet has good reliability, the internal consistency (Cronbach's α) of the three items in the perceived usefulness facet is 0.937 greater than 0.9, and the internal consistency of the three items in the perceived usability facet (Cronbach's α) is 0.880 greater than 0.8, the internal consistency (Cronbach's α) of the three items in the product innovation dimension is 0.914 greater than 0.9, the internal consistency (Cronbach's α) of the three items in the use attitude dimension is 0.869 greater than 0.8, the use The internal consistency (Cronbach's α) of the 3 items in the will facet is 0.932 greater than 0.9, and the internal consistency (Cronbach's α) of the 3 items in the user experience facet is 0.888 greater than 0.8.

4.3. Confirmatory Factor Analysis

"Confirmatory Factor Analysis" (Confirmatory Factor Analysis, CFA) is a part of SEM analysis. Hair, Anderson, Tatham and Black (1998) [17] proposed the following criteria.

1) The factor loading is greater than 0.5.
2) Composition reliability greater than 0.6.
3) The average variance extracted is greater than 0.5.

In this study, CFA analysis was performed on the facets. The factor loadings of all facets were between 0.688-0.989; the composition reliability (CR) was between 0.868-0.940; the average variation extraction (AVE) was between 0.687-0.841 between.

Table 4. *Analysis of measurement mode results.*

Construct	Item Reliability			Composite Reliability	Convergence Validity
	p-Value	STD.	SMC	CR	AVE
Perceived usefulness of Information Technology		0.946	0.895	0.940	0.841
	0.000	0.989	0.978		
	0.000	0.806	0.650		
Perceived ease of use of Information Technology		0.831	0.691	0.895	0.740
	0.000	0.896	0.803		
	0.000	0.853	0.728		
Personal innovativeness in Information Technology		0.849	0.721	0.910	0.773
	0.000	0.946	0.895		
	0.000	0.838	0.702		
Attitude toward AI engine robots		0.764	0.584	0.868	0.687
	0.000	0.881	0.776		
	0.000	0.837	0.701		
		0.858	0.736	0.929	0.814
AI engine robot intention	0.000	0.904	0.817		
	0.000	0.942	0.887		
AI engine robot use		0.962	0.925	0.900	0.753
	0.000	0.928	0.861		
	0.000	0.688	0.473		

4.4. Discriminant Validity

In this study, the rigorous AVE method was used to examine the discriminant validity. suggested that the root mean square of AVE of each facet should be greater than the correlation coefficient of each pair of variables, which shows that there is discriminant validity between facets.

Table 5. *Facet correlation table.*

Construct	(Pearson product correlation coefficients)					
	1	2	3	4	5	6
1. Perceived usefulness of IT	0.917					
2. Perceived ease of use of IT	0.621	0.860				
3. Personal innovativeness in IT	0.702	0.724	0.879			
4. Attitude toward AI engine robots	0.685	0.998	0.794	0.829		
5. AI engine robot intention	0.806	0.772	0.888	0.933	0.902	
6. AI engine robot use	0.769	0.854	0.550	0.897	0.742	0.868

5. Discussion and Conclusions

Although AI robots are commonly seen as a new trend in modern times, to the authors' knowledge, few studies have explored factors influencing AI robot use. To fill the gap, this study was designed to empirically explore factors that may affect AI robot use. Data was collected from University

students who had AI engine robot experience. Overall, the findings fully supported the hypotheses. This study observed that personal innovativeness in IT, perceived usefulness of IT and perceived ease use of IT positively affected attitude toward AI robots. Moreover, this study demonstrated that attitude toward AI robots exerts a positive effect on AI robot intention and AI robot use. Hence, when firms aim to promote a person's AI robot use, they should focus on how to enhance person's attitude toward AI robots.

There are also some achievements of college students applying AI engine robot. Students use the AI engine to score the natural language description of the copywriting and related works.

Despite the limitation of the causal relationships among the chosen constructs, this study has made an important contribution by developing a model of the positive effect of personal innovativeness in IT, perceived usefulness of IT and perceived ease of use of IT on attitude toward AI engine robots. In addition, attitude toward AI engine robots has a positive effect on AI engine robot intention and AI engine robot use. Only the relationships among constructs need to be further investigated to either corroborate or compromise our findings.

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