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Artificial Intelligence and the Virtual Multi-Door ODR Platform for Small Value Cross-Border e-Commerce Disputes

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In recent times, the volume of cross-border e-commerce has witnessed an upward trend and has been accompanied by increased disputes, with cross-border e-commerce being characterized mainly by low value and large volume issues. For this reason, Online Dispute Resolution (ODR) was formed to carry out dispute resolutions in cross-border e-commerce. A virtual multi-door ODR platform for small value, cross-border disputes in e-commerce is then proposed in this paper. For a couple of decades, researchers have tried to employ Artificial Intelligence (AI) to Law. However, it turns out that they were faced with a couple of obstacles to integrate AI to Law since it is highly difficult to program AI to process the common sense of a human being. For example, AI cannot assimilate the affective side of a human being, and it is problematic to integrate a human being's common sense into the AI system. Considering this situation, this study puts forward an ODR model for cross-border e-commerce in the evolutionary perspective.

Key Words : Artificial Intelligence, ODR, Platform, Cross-Border, e-Commerce, Small Value Disputes

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Ⅰ. Introduction

The motivation of the creating global redress system for cross-border e-commerce disputes is originated from the sharp increase of the volume of e-commerce in 21st century. The advent of smart suggests that consumers switch themselves from passive consumers to the active prosumers. Smart consumers extend their consumptions to other countries by comparing domestic prices with prices abroad across the spectrum of commodities. The success of e-commerce depends on trustworthiness of e-commerce, and the trustworthiness of e-commerce relies on the soundness of Online Dispute Resolution(ODR) providers. The absence of an effective redress system is often heralded as one of the major obstacles to the growth of cross-border e-commerce.[1] Cross-border e-commerce entails disputes that are hard to be settled in offline court in two respects. First, most of disputes occur in the process of international transaction. Because of this, any country is not able to determine jurisdiction of disputes. Second, it is impractical for disputing parties to rely on offline dispute resolution, For example, suppose that a consumer bought a commodity from internet shopping mall abroad. After that, she finds out that the commodity she bought is far from her satisfaction. The price of the commodity is equivalent to USD 50. If she wants to negotiate seller on face to face basis, she has to travel to another country, The problem is that the price of air ticket is more expensive than the price of the commodity she bought. In this case, ODR is the suitable way to solve the disputes.

For a couple of decades, scholars tried to employ Artificial Intelligence(AI) to Law. However, it turns out that we are faced with a couple of obstacles to apply AI to Law, since it is very difficult to make AI to understand commonsense of human being. However, in the area of ADR, we do not need to rely on laws. Furthermore, in most of developing countries, law system does not work effectively to solve disputes. Most of village people utilizes traditional dispute resolution system, such as Buddhist or Islam monk in order to settle the disputes.[2] When village people experiences frustrations

1) Shackelford, Scott and Raymond, Anjanette, "Building the Virtual Courthouse: Ethical Considerations for Design, Implementation, and Regulation in the World of ODR", *Wisconsin Law Review*, 2014, p.622.

2) Chung, Yongkyun, "Dispute Resolution Culture and Institution of Laos in the Perspective of ADR Styles", *Dispute Resolution Studies Review*, Vol.16, No.3, 2018, p.94, Chung, Yongkyun, Combining

using ADR, they give up resolution or visit national court. In this connection, ODR is an effective candidate for small value cross-border e-commerce.

The main objective of this study is to design a class of virtual multi-door ODR for small value cross-border e-commerce disputes in the evolutionary perspective. Instead of providing a simplified version of ODR platform, this study proposes a couple of multi-door ODR platforms in which various menus of negotiation, mediation, and arbitration are provided to disputing parties, in a sequential basis.

Ⅱ. Literature Review

To date, literature on Online Dispute Resolution(ODR) has shown three fold streams. First stream of researches provides case studies in order to highlight the role of private company's success story such as e-Bay and Modria. Second stream has focused on building a global redress system for cross-border e-commerce disputes. Third stream has attempted to integrate the Artificial Intelligence(AI) into the ODR system.

1. Private Company and Online Dispute Resolution(ODR)

A bright future for online dispute resolution(ODR) has been drawn by many scholars since the late 1990s. Many commentators expected that it would be possible to place all of the relevant legal rules within a specific domain into a computer and have software resolve all possible cases. On the contrary to this optimistic expectation, however, after the early days of proliferation of ODR providers in 1990s, non-negligible portions of ODR providers disappear in the business world. For example, by 2004, roughly 30 out of 115 ODR providers were no longer operational.[3] Furthermore, the use of ODR has been largely disappointing save for a limited number of success stories.[4]

Arbitration with Mediation: Two Cultures of China and Malaysia, Journal of Arbitration Studies, Vol.26, No.3, 2016, p.158.

3) Probet, Marta, Casanovas, Pompeu, Lopez-Cobo, Jose Manuel, and Casellas, Nuria, "ODR, Ontologies, and Web 2.0", *Journal of Universal Computer Science*, Vol.17, No.4, 2011, p.619.

4) Cortes, Pablo and Lodder, R. Arno, "Consumer Dispute Resolution Goes Online: Reflections on the Evolution of European Law for Out of Court Redress", 2014, p.14.

(1) e-Bay

To date, e-Bay platform handles over 60 million e-commerce disputes annually. These disputes have an average value of USD 70-100 and each are processed through a Resolution Center that enables parties to resolve their problems amicably through direct communication. e-Bay's resolution center also offers information to facilitate identification of reliable sellers. It makes extensive use of a feedback system. The system allows participants to make informed choices about whom they will trade with based on reports of positive and negative experience.[5] One of the weakness of ODR is the lack of judicial enforcement mechanism. In case of e-Bay, enforcement problem is being solved by either a feedback mechanisms to tell the world of bad behavior reminiscent of the principles of polycentric governance or by a charge back facility that is completed through payment.[6]

(2) Modria

Modria holds a unique place in the growing ODR industry. The Modria platform adopts a sequential multi-tiered processes of dispute resolution: diagnosis, negotiation, mediation, and finally arbitration.[7] These four stages stand as a progression from a party controlled complaint process to a process both external to the parties and managed by a neutral decision maker. As one progresses through the system, the level of party control diminishes and the outcome gathers greater legal impact as the award becomes globally enforceable. An impartial third party mediator manages stages three within the intention of seeking to assist the parties in clarifying the issues and brainstorming options. The final stage in the process requires that the parties select an impartial third party arbitrator with the mandate of rendering a final and binding decision.[8]

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5) Del Duca, Louis, Rule, Colin, and Loebl, Zbynek, "Facilitating Expansion of Cross-Border E-Commerce: Developing a Global Online Dispute Resolution System (Lessons Derived from Existing ODR Systems: Work of the United Nations Commission on International Trade Law", *Penn State Journal of Law & International Affairs*, Vol.1, No.1, 2012, p.64.

6) Shackleford and Raymond(2014), p.624.

7) Cortes, Pablo, Online Dispute Resolution Services: A Selected Number of Case Studies, *Computer and Telecommunications Law Review*, Vol.20, Issue 6, 2014, p.175.

8) see http://www.modria.com/resolution-center. The connection between trust in the system and the willingness to sell and purchase items online is connected for both groups. For example, eBay

(3) SmartSettle

SmartSettle is an ODR system that assists parties in overcoming the challenges of conventional negotiation through a range of analytical tools. It is widely believed that disputants tend to falsely predict their successes in the stage of legal suit. Those false beliefs deteriorate the extent of disputes. For the correction of those situation, SmartSettle is designed to clarify interests, identifying trade offs, recognize party satisfaction, and generate optimal solutions. The aim of SmartSettle is to prepare parties for negotiation and support them during the negotiation process. Accordingly, the mechanism of SmartSettle is similar to early neutral evaluation(ENE) practiced in United States.

2. Global Redress System for Cross-Border e-Commerce Disputes

The growth of e-commerce continues to accelerate around the world as more consumers gain confidence to transact business online and Internet access levels in both developed and underdeveloped countries began to converge.[9] The motivation of the establishment of global redress system for cross-border e-commerce disputes is the sharp increase of the volume of e-commerce in 21st century. At the same time, most of the value of disputes belongs to small value, for example USD 50. Accordingly, it is not rational to visit the national court for dispute resolution.[10] The absence of an effective redress system is often heralded as one of the major obstacles to growth of cross-border e-commerce.[11] In this connection, The United Nation and the European Union have recently recognized the need to promote the use of ODR methods to enhance options for redress cross-border trade particularly in digital market. There are two institutions to attempt to build the global ODR platform. First, United Nation Commission for International Trade Law(UNCITRAL) established a Working Group (WG III on ODR) with the aim of providing a legal framework on ODR to facilitate the

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Amazaon and PayPal alll have ODR system that are widely acknowledged as increasing overall trust of the online buying and selling and payment environment(Shackleford and Raymond, 2014, pp.626-627).

9) Shackleford and Raymond(2014), p.619.

10) Furthermore, she has to pay lawyer fee to initiate the litigation in national court.

11) Shackleford and Raymond(2014), p.622.

settlement of low value disputes between businesses and between consumers and traders. In parallel, the EU has also been keen to promote the use of ODR with the aim of stimulating growth in the internal market. By 2000, the E-commerce Directive had already required national laws to be compatible with the use of ODR technique s.[12] EU Regulation requires the creation of an ODR platform that will become a hub in the EU for all extra-judicial resolution of consumer complaints. The ODR platform will enable consumers to submit complaints in their own languages, while nationally approved ADR entities will be able to deliver their services through the Platform using an online case management tool.[13] On the other hand, UNCITRAL Working Group III (ODR) has developed a draft model set of procedural rules to deal with high volume low value cross-border disputes. The rules propose a tiered procedure that commences with negotiation, and escalates to the appointment of a neutral third party that acts as conciliator/facilitator when both parties so agree. Unresolved disputes will be adjudicated through binding arbitration.[14]

In recent times, a couple of researches including Duca, Rule and Loebl(2012), Cortes and Rosa(2013), and Raymond(2014), suggest a view of building global ODR system in order to handle cross-border e-commerce disputes. According to Del Duca, Rule and Loebl(2012), cross-border ODR system must provide minimum common ODR rules and standards for ODR providers and neutrals. Disputes arising in the online context can vary considerably and are often extremely difficult for courts to handle for a number of reasons including the high volume of claims, the contrast between the low value of the transaction and the high cost of litigation. the question of applicable law, and the difficulty of enforcement of foreign judgement.[15] As the transaction values in consumer purchases are relatively low, perspectives on consumer protection vary between countries, and because buyers are often unsophisticated about their rights as compared to vendors[16], it is quite difficult to design a system that fairly meets the needs of all the involved parties.[17]

12) Cortes and Lodder(2014), pp.16-17.
13) Cortes and Lodder(2014), pp.16-17.
14) Cortes, Pablo and De La Rosa Fernando, "Building a Global Redress System for Low Value Cross-Border Disputes", *International and Comparative Law Quarterly*, Vol.62, 2013. p.408.
15) Del Duca, Rule, Loebl(2012), p.62.
16) Raymond Anjanette, "Yeah But Did You See the Gorilla ? Creating and Protecting an Informed Consumer in Cross-border Online Dispute Resolution", *Harvard Negotiation Law Review*, 2014.

3. Artificial Intelligence and ODR

Contrary to previous approaches in Online Dispute Resolution, a couple of scholars emphasize the role of technology in ODR framework. They argue that the design of ODR system entails the consideration of what Ethan Katsh and Janet Rifkin call "The fourth party", the technological elements involved.[18] In the early stages of ODR, email and video conference are frequently cited tools in order to utilize ODR. Now it is quite different from the past. In former times, ODR is just same story in cyber space without changing the characteristics of the traditional ADR such as negotiation, conciliation, mediation, or arbitration. As the importance of technology gets higher, the integration of AI into Online Dispute Resolution becomes a distinctively autonomous field among ADR paradigm.[19]

(1) Decision Support System(DSS)

At the elementary level of the integration of artificial intelligence to law, human neutrals is designed to be assisted by artificial intelligence in order to narrow down the gap between the formidable size of data and the bounded rationality of human brai n.[20] Decision Support System(DSS) has abilities to analyze relevant facts input by the parties as well as information such as norms or past known cases in order to make simple legal decisions. Considering the complexities of the legal domain, legal decision support system can be quite useful if one considers the huge amount of information that parties and neutrals must analyze in order to take decisions.[21] In summary, DSS is presumed to play the role of assistant to the lawyer, prosecutor, or judge, but AI assistants do not offer their views on the legal issue at hand.

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17) Rule, Colin, Rogers, Vikki, and Del Duca, Louis, "Designing a Global Consumer Online Dispute Resolution(ODR) System for Cross-Border Small Value-High Volume Claims: OAS Developments", *Uniform Commercial Code Law Journal*, Vol.42, No.3, 2010, p.224.

18) Kaufmann-Kohler, Gabrielle and Schultz, Thomas, *Online Dispute Resolution: Challenges for Contemporary Justice*, Kluwer Law International, 2004. Carneiro, Davide, Novais, Paulo, Andrade, Francisco, Zeleznikow, John and Neves, Jose, "Online Dispute Resolution: An Artificial Intelligence Perspective", 2014, p.3.

19) Katsh, Ethan and Rifkin, Janet, *Online Dispute Resolution: Resolving Conflicts in Cyberspace*, Jossey-Bass, 2001. Carneiro et al(2014), p.4.

20) Refer to Herbert Simon, Novel Prize winner and a founder of AI.

21) Carneiro et al(2014), p.7.

(2) Expert System

According to Susskind(1987), Expert System can be defined as computer program that have been constructed in such a way that they are capable of functioning at the level of human experts in given fields. Expert System is also defined as intelligent computer programs that use knowledge and inference procedures to solve problems that are difficult enough to require significant human expertise for their solution. In legal domain, as times go by, court decisions have been accumulated, and legal practitioners are faced with a formidable information, it is impractical to digest whole bunch of information in a certain legal suit. In that situation, legal expert system allows the assignment of weight to factual data on a case and compare a given case to the case stored in a the knowledge base.[22] In summary, Expert System is presumed to play the role of advisor to the lawyer, prosecutor, or judge, but human beings make decision making, even though Expert System offers an effective advice to human being.

<Table 1> Patterns of Artificial Intelligence to Law

Technology	Major Features
Decision Support System (DSS)	Compile and provide useful information to human being.
Expert System	Model human knowledge and inference mechanism Automation of simple task by applying an inference engine to knowledge
Case Based Reasoning (CBR)	Reasoning processes similar to the legal ones Contextualized retrieval of information e-Mediation
Legal Ontologies	Representation of legal knowledge For the communication with machine, it is needed to represent the knowledge to be understandable to AI Pattern extraction

Source: Carneiro et al(2014), p.14.

(3) Case-Based Reasoning(CBR)

The key assumption of case-based reasoning(CBR) is that if a new problem is similar to an old one, it will have a similar outcome. Generally, the CBR process is organized

22) Carneiro et al(2014), p.8.

in four sequential phases: retrieve, reuse, revise, and retain. In the first phase, the problem is analyzed and the cases that are relevant are retrieved from the knowledge base of memory. In the reuse phase, the solution from the previous case is mapped to the targeted problem. In the third phase, the solution is tested or simulated in an attempt to determine the result of its application. In the last phase, the solution adopted may be stored in the case memory. CBR is regarded to be useful in common law framework, since the law is interpreted and applied by judges.[23] In addition, CBR has the potential to be useful to solve cross-border e-commerce disputes, since cross-border disputes cannot be solved based on pre-determined rules of a particular country. In this cross-border setting, case-based approach is superior to rule-based approach. Furthermore, settlement entails persuasion, and calm down of emotion irrespective of rules of a particular jurisdiction in the setting of ADR.

(4) Legal Ontologies

For the communication between human being and Artificial Intelligence(AI), the representation of a case is needed for AI in order to understand a particular issue. For example, the aviation mechanism of bird is different from that of aircraft. Both bird and aircraft perform aviation, but mechanisms of aviation are different among bird and aircraft. In computer science, ontologies are enablers of Semantic Web that describes a group of methods and technologies that allow machines to understand the meaning of information on the Web. The ontologies allow machines to read, interpret, and understand information in its own right.[24]

Ⅲ. Model Specification

1. General Description

For the purpose of designing ODR system for cross-border e-commerce disputes, this study adopts evolutionary approach that flows from a simple framework of ODR model to a more sophisticated ODR model. A class of cross-border ODR models in this study

23) Carneiro et al(2014), p.11.
24) Carneiro et al(2014), p.13.

is a kind of multi-door courthouse in virtual space. In 1975, Frank Sander proposes the model of multi-door courthouse at Pound Conference. According to Chung(2018), a couple of countries implement the multi-door courthouse including Latin American countries, Australia and United States. Unlike Frank Sander's multi-door courthouse model, we design the multi-door ODR platform in a sequential process for dispute resolution. In Frank Sander's multi-door courthouse model, disputants are free to choose one of doors provided by a multi-door courthouse. We adopt multi-tiered hierarchical structure where at first stage, disputants enter the negotiation stage. If disputants failed to get a consensus without the help of third party. Then, disputants proceed to second stage of conciliation or mediation. If they failed to arrive at the settlement, Then disputants proceed to arbitration.

2. Benchmark model of ODR Platform

A benchmark model in this study takes the feature of multi-door ODR platform with the sequential structure. A couple of scholars suggest a sequential multi-door courthouse model, building ODR platform. Lodder an Zeleznikow(2005) proposes a sequential type model. In their model, first, negotiation support tool provides feedback on the likely outcomes of the disputes, if the negotiation were to fail, ie, the best alternative to a negotiated agreement(BATNA). Second, their model attempts to resolve any existing conflicts using dialogue techniques. Third, for those issues not resolved in step two, the tool should employ compensation/trade-off strategies in order to facilitate resolution of the dispute. Finally, if the result from step three is not acceptable to parties concerned, the tool allows the parties to return to step two and repeat the process recursively until new agreement is obtained. Another sequential ODR model is suggested by Rules, Rogers, Del Duca(2010) where disputants proceed to the initiation and negotiation phase, and proceed to online arbitration phase, if they fail to get settlement in the first phase. We adopt the sequential ODR model as the benchmark model of ODR platform. The benchmark model consists of three layers: the initiation/negotiation phase, online arbitration phase, and award phase. The characteristics of benchmark model is the extent of automation. For example, this benchmark model allows the first stage as the automation process, in other words, no

human intervention. On the other hand, arbitrator who make a final decision on dispute is human being in the benchmark model.

(1) The Initiation/Negotiation Phase (No human)
(2) Online Arbitration Phase (Human arbitrator)
(3) Award (Human arbitrator)

(1) The Initiation/Negotiation Phase

The initiation/negotiation stage is managed entirely by software without requiring the involvement of a human case manager. To begin the process, the buyer visits a particular web site out of approved national ODR providers and completes the online initiation form available there. Once the form is electronically submitted, the vendor is notified and is given seven days to respond. If the vender does not respond within seven days, the case automatically moves to the online arbitration phase.[25)]

(2) Online Arbitration Phase

Once the case is escalated to the arbitration phase, a human arbitrator will be selected by the ODR provider from it's approved panel of neutrals. Following Rules, et al (2010), online arbitrator in our benchmark model, will determine whether the dispute would benefit from a facilitated settlement. If so, the arbitrator may communicate with the buyer and vendor to attempt to reach an agreement. If the parties reach an agreement, the arbitrator can render an award on that basis. In that sense, benchmark model assigns the role of persuading disputants to the online arbitrator in order to induce settlement. This type of arbitrator looks to be "oriental type" arbitrator found in Japan, Laos PDR, and South Korea. In case of Japan, arbitration law emphasizes the role of arbitrator that continually encouraging disputants to make settlement in the arbitral proceedings.[26)] The law of Lao PDR also definitively argues that judges are required to elicit an agreement during the law suit.[27)]

25) Rules, Rogers, and Del Duca(2010), p.237.
26) Tashiro, Kenji, "Conciliation or Mediation during the Arbitration Process: A Japanese View", *Journal of International Arbitration*, Vol.12, 1995, pp.119-133.

(3) Award

Once all the relevant information is collected, the arbitrator will make his or her decision based on the documents submitted without a hearing. These deliberations will be completed within 20 days of the arbitrator's appointment. The award will be final and binding.[28)]

3. Expert System augmented Med-Arb Model

The second model shows two characteristics. First, the second model is a med-arb augmented model in which med-arb process is included in the second process. In some of cultures such as China and Malaysia, one of Islamic countries, neutrals in conflict resolution play the dual role of arbitrator as well as mediator.[29)] In the claim, where value is less than USD 100, disputants are expected to have flexible attitudes toward the demarcation between mediator and arbitrator. Disputants are presumed to ask a speedy resolution, instead of full recovery of damages. For speedy resolution, disputants allow mediator to change hats and play the role of arbitrator.[30)]

(1) The Initiation/Negotiation Phase (No human)
(2) Online Med-Arb Phase (Human neutral assisted with Expert System)
(3) Award

Second, med-arb neutral is designed to be supported by Expert System for a speedy resolution. Legal expert system generally allows the assignment of weights for factual data on a case and to compare a given case stored in the knowledge base. Expert system is designed in order to help med-arb neutrals to deal more rapidly with the

27) Chung, Yongkyun, "Dispute Resolution Culture and Institution of Laos in the Perspective of ADR Styles", *Dispute Resolution Studies Review*, Vol.16, No.3, 2018, p.94.
28) Rules, Rogers, Del Duca(2010), p.237.
29) Chung, Yongkyun, "Combining Arbitration with Mediation: Two Cultures of China and Malaysia", Journal of Arbitration Studies, Vol.26, No.3, 2016, p.158.
30) In case of huge amount of money at stake, disputants are keen to divide the role of arbitrator and mediator.

case. providing the guidance. If mediation is successful, both parties make an agreement without proceeding to arbitration. If mediation is not successful, disputants start arbitration stage and arbitrator renders an award. Since ex-post arbitrator(former mediator) already knew the detailed information of both sides, he or she can render an arbitral award in a short time. Furthermore, since disputants already knew that if they fail, ex-post situation after mediation stage will not be controlled, they have an incentive to converge to speedy settlement, although they do not arrive at the resolution of disputes in the long run.[31)]

4. AI-mediator augmented Model (cognitive function)

(1) Model Specification

The third model is the AI-mediator augmented model where the number of total processes increases from three phases in a former model to four phases, adding the e-Mediation phase as a second process. In this model. two processes become automated. and remaining stages are not automated. In other words, human arbitrators intervene, evaluate, determine, and render award, since human beings, in general, seems to be not ready to accept the final decision made by artificial intelligence(AI), as yet. In this stage, the electronic mediator or software mediator has been equipped with cognitive function only. In other words, electronic mediator only suggests possible scenarios to disputants. However, electronic mediator does not take into consideration of disputants' emotions. The electronic mediator does not interface with disputants emotionally or affectively.

(1) The Initiation/Negotiation Phase (No human)
(2) e-Mediation Phase (AI equipped with cognitive function)
(3) e-Arbitration Phase (Human arbitrator)
(4) Award

31) Druckman Daniel, "Settlement and Resolutions; Consequences of Negotiation Processes in the Laboratory and in the Field", *International Negotiation*, Vol.7, 2002, pp.313-338.

(2) Design of Electronic Mediator

In this section, we briefly summarize the e-mediation framework which has been discussed among scholars in recent times. We provide the contents of Fersini, et al (2014)'s smart online dispute resolution. According to Fersini et al(2014), e-mediation system, first, must guarantee the awareness motivation: providing information about the party legal position. It could help to improve the awareness about their own liability and to figure out their chances in court proceedings.[32] Second, for a successful e-mediation, flexibility motivation is to be satisfied, since the main requirement of e-mediation is to improve the flexibility of the parties involved in a conflict. Third, e-mediation model adopts case-based approach, since cross-border e-commerce disputes usually have no definite jurisdiction, In this case, precedent rule is meaningful.[33] In this sense, legal retrieval is needed to match disputant's case with court decision.[34]

1) Indexing

Indexing is aimed at storing the court decisions in a suitable data base. The main functionality of this module is to organize court decisions into a highly cross-reference lookup.[35]

2) Core Mining

Core Mining is composed of three functionalities. First, Document Representation creates a vector space model for court decisions. Second, Dimensionality Reduction is to reduce the number of features using Principle Component Analysis.[36] Third, Classification trains a model based on court decisions. It enables the retrieval of the relevant court decision to a given disputant's description. The main objective of

32) Therefore, e-Mediation system should provide a retrieval functionality in order to narrow down the gap between the layman case description and the court decision, Fersini, E., Messina, E., Manenti, L., Bagnara, G., El Jelali, S, and Arosio, G.,"eMeidation: Towards Smart Online Dispute Resolution", *Proceedings of the 6th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management*, 2014.

33) Carneiro, Davide, Novais, Paulo, Andrade, Francisco, Zeleznikow, John and Neves, Jose, "The Legal Precedent in Online Dispute Resolution", 2009.

34) El Jelali S., Fersini, Elisabetta, and Messina, Enza, "Legal Retrieval as Support to eMediation: Matching Disputant's Case and Court Decisions", *Artificial Intelligence and Law*, Vol.23, No.1, 2015.

35) El Jelali et al(2015), p.6.

36) Without this module, too much features emerges.

Classification module is to train a model with good generalization abilities to associate a legal field to the informal text provided by a disputant.[37]

3) Query Processing

Query Processing extracts the relevant terms from the disputant case description in order to effectively match the court decision.

5. AI-mediator augmented Model (cognitive+affective function)

The final model is the AI-mediator augmented model equipped with affective function as well as cognitive function. The difference of the fourth model from the third model is that AI mediator in the fourth model handles disputes with affective function combined with cognitive function. The common element through benchmark model to the final model in this study is that third and fourth processes are designed to render a finally binding award by human arbitrator, since computers are unable to interpret norms and their framework and accordingly they will not be sufficient to make judicial systems. Moreover, law is not straight forward and ambiguous.[38]

(1) The Initiation/Negotiation Phase (No human)
(2) e-Mediation Phase (AI equipped with cognitive and affective function)
(3) e-Arbitration Phase (Human arbitrator)
(4) Award

To be equipped with affective function, it is necessary to design the system where human being and AI communicate on the base of affective interaction. To date, AI equipped with affective function is only partially feasible. In recent times, Rana, El Kaliouby established a startup named Affectiva where their mission is to develop the AI system to cognize and understand human being.[39] Using face-recognition software, AI can recognize the emotional state of human being.

37) El Jelali et al(2015), p.9.
38) Carneiro(2014), p.16.
39) Martin Ford, *Architects of Intelligence*, Packt Publishing Company, 2018.

Ⅳ. Discussion

1. Affective Side of Disputes

The integration of AI to ADR seems to be a difficult job in a couple of viewpoints. First, AI does not understand the human's emotion and feeling and cannot be in sympathy with human being. Because of this, AI system can handle only the half of disputes, in other words, only in terms of rational basis such as pecuniary aspects. On the other hand, human beings usually have a conflict with other persons, since they are suffered from emotional aspects. In this connection, disputing parties do not want to settle disputes, although the rational part of disputes are already settled.

According to Chung(2009), the affective trust is stronger than the cognitive trust in e-commerce. In purchasing a commodity in online shopping mall, the affective trust provides stronger impact to the intent of purchasing of consumers than does cognitive trust. Based on these findings, the main impetus of purchasing in online shopping mall is the affective aspect of human decision making. Focusing on the cognitive side of disputes neglecting the affective side of disputes, might produce misleading results, which is far from resolution of disputes. Accordingly, AI dispute resolution system is to be designed to take into consideration of affective side of disputes. However, the current state of artificial intelligence does not reflect the affective side of disputes.

2. Commonsense and Understanding

Usually disputes are composed of detailed facts. Pending problem is that AI does not understand commonsense shared by human beings. The simplest commonsense has proved intractable to formalization, although it looks to be very simple in the perspective of human being. AI at this juncture, does not understand the commonsense of human society.[40] According to neuroscience, human beings accept so many informations out of their environments. Human beings' environments are so complicated that it is hard to upload those formidable informations to AI system.

40) Franklin James, "How Much of Commonsense and Legal Reasoning is Formalizable? A Review of Conceptual Obstacles", *Law, Probability, and Risk*, Vol.11, 2012. p.226.

Originally, the AI project was premised on imitating one thing, human understanding by blind manipulation of uninterpreted symbols according to rules.[41] After 50 years of experience, it is time to face the possibility that understanding is essentially quite unlike rule-following.[42]

3. Symbol Ground Problem

It is hard for AI system to solve the so called symbol ground problem. In order to cognize an object, AI has to know the content of a particular concept, since then, AI proceeds to enter the naming procedure. Without the content, AI does not recognize a particular object. In case of the meaning of words, we cannot just define words by other words, for the same reason that we cannot learn the meaning of Chinese words using only a Chinese-Chinese dictionary.[43] Our use of the word 'cat' has to attach to be learned from our experiences of cats. To date, deep learning makes it possible to solve the symbol ground problem at the elementary level such as the recognition of a simple object of a cat. In a real world, so many objects are needed to be cognized in order to figure out a legal case.

4. Security Problem

One of the serious weakness of ODR system is the security problem, since ODR system stores the private information of disputants to Knowledge Base. The data base are exposed to risks that hackers will intrude and copy the contents of the details of disputants. It is necessary for ODR system to protect the security problem. Furthermore, the multi-door ODR platform in this study presumes the existence of med-arb neutral. In case of med-arb in China, neutral performs dual function of neutral as mediator and arbitrator in a proceeding of ADR. This condition also criticized by Western commentators, since it violates the neutrality condition of ADR process.

41) Franklin(2011), p.240.
42) Franklin(2011), p.241.
43) Franklin(2011), p.233.

Ⅴ. Conclusion

In this study we attempt to design a class of multi-door ODR models consisting of four kinds of ODR platform models in order to handle disputes out of cross-border e-commerce. Some of them incorporate Artificial Intelligence(AI) into the ADR system in order to speed up the settlement of cross-border low value e-commerce disputes. In addition, we also discuss various limitations in integrating AI to ODR such as affective side of disputes, symbol ground problem, commonsense and understanding and security problem. For a couple of decades, scholars have attempted to employ Artificial Intelligence to Law. However, it turns out that we are faced with a couple of obstacles to apply AI to Law, since it is very difficult to make AI to understand commonsense of human being. However, relative to AI to Law, AI to ADR might lessen the burden of integrating AI to Law. Because, ADR does not rely on law, heavily. For example, mediation has a diverse kinds of variants.[44] A core element of mediation is the amicable settlement, irrespective of law in many countries from ancient times to modern world. Furthermore, as smart consumers extend their boundaries of consumptions to other countries by comparing domestic prices with prices abroad of the same commodity, e-commerce disputes are also accelerated, as volume of the transaction increases in cross-border e-commerce. To date, many commentators suggest that ODR systems such as SquareTrade in e-Bay and Modria show a remarkable success story in handling the disputes in cross-border e-commerce. Nevertheless, it is necessary to construct to establish a multi-door ODR platform in order to upgrade the quality of ODR services through enhancing the ability of ODR framework using Artificial Intelligence.

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