A turn to language: How interactional sociolinguistics informs the redesign of prompt:response chatbot turns

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Abstract

This paper discusses how a microlevel linguistic analysis, using interactional sociolinguistics as an umbrella framework and drawing on analytical concepts from politeness theory and conversation analysis, can be used to advise chatbot designers on the interactional features contributing to problematic human user engagement as part of a consultancy project. Existing research using a microlevel linguistic analysis has analysed human user:bot interactions using natural language. This research has identified a central role for language which promotes sociability between the machine and users in the alignment of their goals and practices. However, there is no research currently which discusses how a microlevel linguistic analysis can help identify how the discursive construction of alignment and affiliation within prompt:response chatbots supports social presence and trust. This paper addresses this gap through an analysis of a database of prompt:response chatbot interactions which identified problematic sequences involving misalignment and disaffiliation, undermining human users' trust and sense of social presence within the interaction. It also reports on how the consultancy project suggested changes to the programming of the chatbot which have potential to lead to improved user engagement and satisfaction.

Keywords

chatbots; micro-analysis; trust; alignment; affiliation; social presence

Funding

This work was supported by an Innovation Voucher Grant provided by the University of Surrey [grant number RIS 924].

1. Introduction

Digital interactions within social or commercial contexts rely on the human user (hereon referred to as the 'user') being engaged and having a pleasant experience. This also applies for customers in conversation with chat-bots (hereon referred to as 'bots'). Natural language technology used in some bots provides an initial boost to 'connect' users to a conversation through the mimicking of human behaviour, where novelty and curiosity support engagement. An example would be XiaoIce, a chatbot designed to convey 'empathy' by using natural language to ask questions, offer greetings and engage the 'user' in social dialogue (Zhou, Gao, Li, & Shum, 2018). An alternative strategy of a prompt:response design provides a more constrained user experience, where users select from a range of options at each turn rather than engaging with the bot using natural language. We argue that given the constraints for user engagement, it is particularly critical to consider the 'human perspective' in order to optimise the bot's design.

This paper reports on a consultancy project in which two researchers, representing applied linguistics and social psychology, were tasked by a bot development company to review the prompt:response volleys of their commercial bot, designed to handle enquiries from customers wishing to make a complex product purchase on a website. In a typical prompt: response bot, the bot and the user communicate through pre-written question and answer volleys. The bot is programmed to use the input given by the user and ask relevant follow-up questions. The bot's communication method is solely text-based to guide the interaction to identify customer problems and needs. The bot works unsupervised and its role in customer support requires effective operation against multiple objectives including initial engagement, subject orientation, preference gathering, detailed product information and recommendations for purchase. However, feedback from users and observers during internal usability testing was that conversations sometimes seem ponderous, annoying, underwhelming or even simply boring. To illustrate how the chatbot operates in interaction with a user, the following screenshot shows an example of the chatbot develop company's bot after the intervention described in this paper (see Image 1).

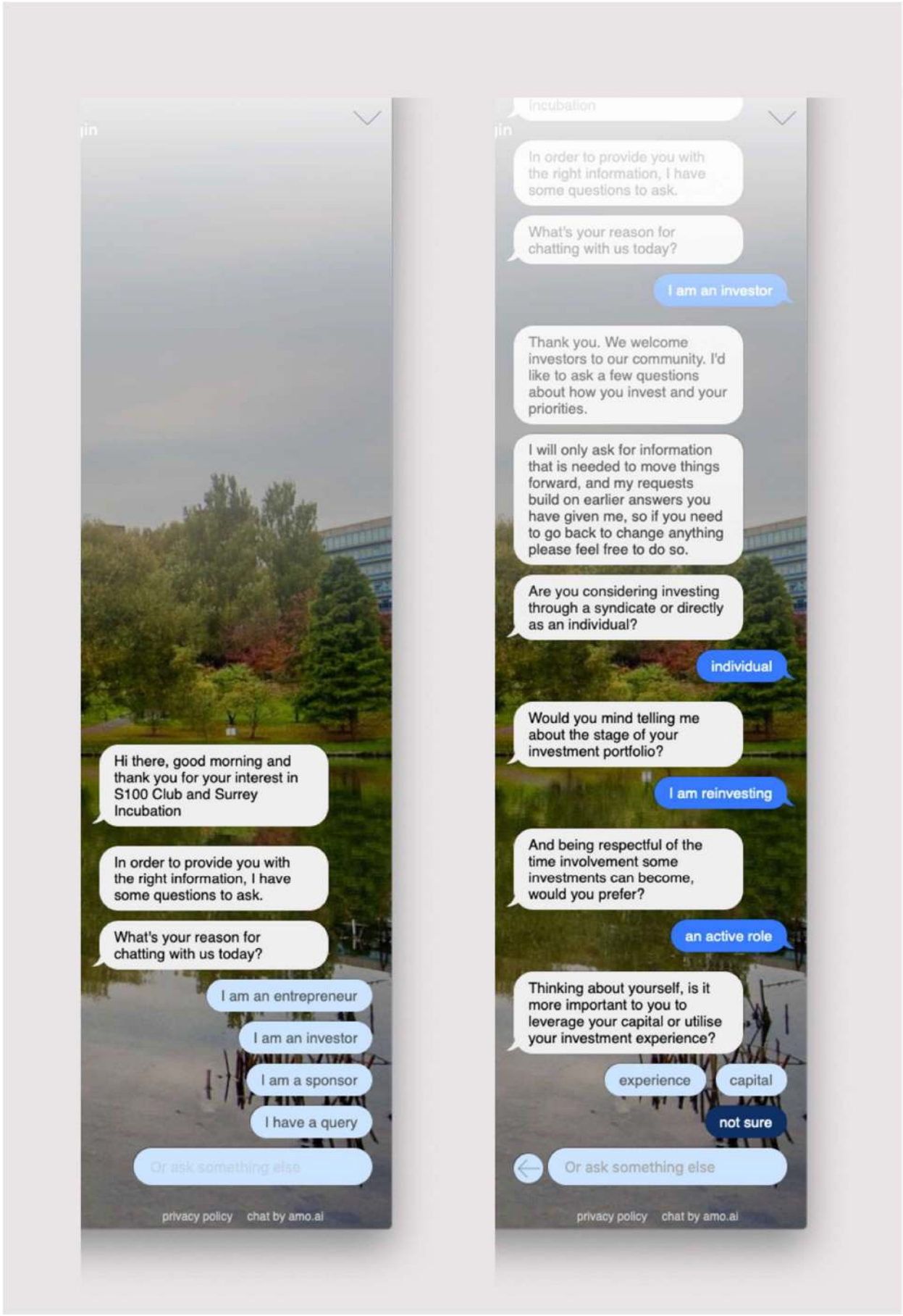

Image 1: Chatbot interaction (image © Account Management Online Limited)

Since words are a key mechanism, the researchers approached this project with a language-led perspective, believing that improving the programming of the bot's language use could increase positive user engagement and enjoyment. This paper shows how interactional sociolinguistics, with analytical tools derived from conversation analysis, and face and politeness theory, was used to make suggestions for changes to the bot design. This work was conducted using designer authored algorithmic databases of prompt:response volleys provided by the chatbot design company as well as a number of conversations between the researchers and the bot. This is a novel area of research, given that prompt:response bot interactions have so far only been subjected to subjectivist and interpretative research.

2. Theoretical perspectives

2.1 Social presence, trust and alignment

Previous research has established that the constructs of social presence, trust and alignment are associated with higher levels of user engagement (Li and Mao, 2015). This section starts by discussing these core concepts, followed by a discussion of the research methodologies which have previously been used to understand user:bot interaction. We then discuss how a language-led approach can inform research on user:bot interaction. More specifically, we outline a microlevel linguistic approach that draws on analytical tools and concepts from interactional sociolinguistics and pragmatics.

Social presence is the degree to which users perceive each other as being present within an online interface or "how feelings of human contact can be created without actual human contact" (Schurink, 2019, p. 9). Key variables for user:bot interaction which support social presence have been identified as sociability, warmth, personal connection and sensitivity (Schuetzler et al., 2018). Higher levels of social presence have been attributed to reducing user's feelings of helplessness, particularly when task-complexity is high and leading to higher levels of user satisfaction (Schurink, 2019). Bot design has focused on user experiences which are 'personalised' and likely to lead to 'hedonic' rather than solely 'utilitarian' user experience, where hedonic experience may be associated with more pleasurable user engagement and evaluations of bots as more credible (Li and Mao, 2015). User perceptions of trust in and alignment

with the bot are two key conditions for the establishment of social presence (Clark et al., 2019; Folstad et al., 2018).

Trust is defined as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another" (Rousseau et al., 1998, p. 395) and is believed to be borne out of trustor's perceptions of expertise, benevolence and integrity of the trustee. Traditionally, research into bot user's experiences has shown that bot 'expertise' for accurately interpreting user's goals, matched with its answer eloquence and its anthropomorphic characteristics, as well as user experiences of low risk interactions are key features which support user's trust in the bot (Nordheim, 2018).

Alignment is understood in user:bot interaction as a condition in which bots are programmed to support higher levels of congruence between users' expectations and the bot's responses to these expectations (Branigan et al., 2010; Li and Mao, 2015). Research suggests users perceive bots as social actors, and are, therefore, likely to identify cues representative of personality, ethnicity and gendered characteristics based on bot conversational styles, and whether these support more or less congruency (Mou et al., 2019).

Alignment and affiliation are often used as synonyms in microlevel analyses. However, alignment has tended to focus on features of interaction which demonstrate actions where two parties 'align' their actions. An example would be of an interaction involving storytelling, in which both parties mutually recognise each other's rights to 'access the floor'. This can be contrasted with misalignment, demonstrated when, for example, one party undermines the other's right to give their account (Lindström and Sorjonen, 2012). In a service provider context, the importance of alignment was identified as essential for effectively managing the coordination of help seeking in telephone calls to an emergency centre (Raymond and Zimmerman, 2016). For example, alignment was achieved when the presenting issue was readily codeable (e.g. an established event, such as a burglary) leading to the help provider giving a service announcement (e.g. we'll send a police officer). Misalignment occurred when the presenting issues was more circumspect, as it required a further narrative on the part of the help seeker, and the call completion was less likely to have been resolved (Raymond and Zimmerman, 2016).

In contrast, Strivers (2008) proposed that the term affiliation should be reserved for responses which endorse and support the other speaker's perspective by, for example, demonstrating affect and 'social solidarity'. Question and answer sequences which demonstrate a 'shared orientation' to a task such as 'getting information on record' have been shown to be important for establishing affiliation (Steensig and Larsen, 2008). Epistemic access is also important in displaying affiliation and demonstrated when there is congruence between both speakers' actions in recognising each other's claims to knowledge. Disaffiliation occurs when a claim to knowledge is challenged or contested, and is likely to lead to re-evaluation, such as downgrades by one party (Heritage, 2013).

In order to understand the features of user:bot interaction which support social presence, trust and alignment and affiliation, a range of research methodologies have been deployed in previous research. For example, there is a tradition involving positivistic methodologies, such as experimentation involving the manipulation and measurement of user:bot interactional variables. An example is the system design of XiaoIce, a social bot, which involved the use of a set of heuristics which were developed through user engagement. This process led to the bot designers identifying associations between different discussion topics and users' cognitive and affective/emotional responses to them (Zhou, Gao, Li, & Shum, 2018). These associations were used to support bot content creation and subsequent user engagement, measured by the number of conversation turns per session (CPS), where a greater number was believed indicative of higher levels of trust and empathetic user:bot interaction (Zhou et al., 2018). Also in this tradition, an experimental study exploring customer satisfaction and emotional connection in commercial bot interactions, found that bots which used so-called extrovert linguistics – e.g. other-focused talk, informal talk, few hedges and conversation initiation, were associated with higher levels of customer satisfaction and emotional connection (De Lannoy, 2017). In another experimental study, a virtual real estate agent was used to test associations between users' reported satisfaction and enjoyment of interaction with the virtual agent and its ability to accurately recall user information. In the condition where the virtual agent incorrectly remembered user information, users reported significant frustration (Richards and Bransky, 2014).

Other studies on social presence, trust and alignment in user:bot interactions have used interpretive methodologies involving either interviews (Følstad et al., 2018) or questionnaires (Nordheim, 2018) to explore users' perceptions of their experience in engaging with bots. However, these methodologies make ontological assumptions about the 'nature' of user:bot interactions which support social presence, trust and alignment in that they presuppose that interactional features can be measured as either a set of discrete variables for relatively fixed and pre-determined behaviour (positivistic) and that the subtleties of interaction are recognisable to users (subjective and interpretative). In doing so, they miss opportunities to understand key features of human interaction, as they unfold, turn-by-turn.

We thus argue that a microlevel linguistic analysis of interaction is necessary to understand how social presence, trust and alignment are constructed through language in a solely text-based environment in which no other modes (e.g. gesture, expression, tone of voice) are available. Microlevel linguistic analysis to identify features of talk-in-interaction which are associated with alignment/misalignment and affiliation/disaffiliation has an established tradition in telephone and online contexts (e.g. Gehle et al., 2014; Markman, K., 2009; Pappas and Seale, 2009; Raymond and Zimmerman, 2016; Rintel et al., 2001; Sahin et al., 2017; Stommel and te Molder, 2015; Süssenbach et al., 2012). However, as yet there is, to our knowledge, no research in this area for prompt:response bots.

2.2 Microlevel linguistic analysis of interaction: concepts and existing research

A range of concepts derived from conversation analysis (CA), such as adjacency pair and repair, as well as from face and politeness theory, have previously been used for the microanalysis of interactions to account for the possible cues that may lead to misalignment and disaffiliation in user:bot interactions and thereby undermine the user's sense of social presence and trust with the bot.

Conversation analysis is normally focused on investigating natural language and is concerned with how speakers orientate and achieve action in the interaction through the orderliness and sequential organisation of talk. Research in CA has shown that talk is often organised in two part exchanges, called 'adjacency pairs', in which the second pair part (SPP) is functionally dependent on the first pair part (FPP). A second important concept is that of 'repair', relating to speakers' practices to address interactional

trouble in speaking, hearing and understanding (Hutchby and Woofit, 1998). Liebscher and Dailey O'Cain (2003) describe repair as a 'Role-Defining Mechanism', with access to repair defining speakers' roles and epistemic stances. In human:bot interaction, individuals' degree of repair initiation and intersubjective effort has been linked to the bot's anthropomorphic features (Corti and Gillespie, 2016).

The term 'face' is often attributed to Goffman (1967), who defines it an image of self which is co-constructed through interaction with others. Brown and Levinson (1987) extended Goffman's face concept to describe 'positive face' as individuals want for connection, for feeling wanted and needed, and 'negative face' as individuals want not to be imposed on, to keep their distance from others. They further argue that specific speech acts threaten face – for instance, a request threatens the addressee's negative face as it imposes on them to complete the required action – and that politeness strategies can mitigate the face threat.

Microlevel language-focused analyses of the interaction between humans via the instrumentality of machines are not new (see Paulus et al., 2016 for a summary of CA-based studies). For example, Garcia and Jacobs (1999) and Schönfeldt and Golato (2003) investigated online chat, with a focus on turn-taking and repair respectively. Stommel et al. (2017) focused on the role of hyperlinks as turns in service-focused chats, Gibson (2009) discussed the sequential organisation of turns in an asynchronous discussion group and Farina (2018) described the structure and organisation of comment threads on facebook. Other studies are comparative, e.g. Meredith and Stokoe's (2014) comparison of facebook chat with spoken interaction which foregrounds 'repair'.

While all these studies deal with instances in which two or more individuals use natural language (speaking and writing) with one another, others investigated human interactions with bots and robots. Süssenbach et al. (2012) used CA to reveal how competence is constructed in human interactions with a robot acting as a fitness instructor and Gehle et al. (2014) investigated repair in interactions between museums visitors and guide robots. Sahin et al. (2017) applied CA to interactions between a chatbot mimicking a real person as the recipient of spam phone calls. Li et al. (2019), using CA to investigate sources of communication breakdown between users and a banking chatbot, showed that these

breakdowns occurred when the bot was misunderstood, or when it failed to recognise the user's intended meaning.

Theories of politeness and face have also been recognised as an important tool for analysing interactions mediated through technology (Morand and Ocker, 2002; Locher, 2010). Darics (2010), for example, conducted a micro-analysis of politeness strategies in instant messaging interactions in a professional setting. She found that participants adapted strategies from spoken interactions for the virtual (written) discourse to conduct relational work and establish a community of practice. Using these insights, she argued that an interactional perspective would allow for a fuller understanding of how language functions in a merely text-based environment. As far as bots and embodied conversational agents are concerned, we are however only aware of two studies which apply politeness theory. One of these (De Jong et al., 2008) described a model for adapting the politeness strategies used by a virtual museum guide to match the politeness level of its human communicators. The other one (Wallis and Norling, 2005), argued that a bot's ability to negotiate social relationships, and thus align with human expectations and behaviours, is much more important to users than its knowledge of the world: "The thing humans do however is to negotiate their failure. […] These negotiations can be seen as taking the form of a dialogue game, and the problem with conversational agents is that they, often, simply do not play the game" (p. 34).

2.3 Interactional sociolinguistics – an analytical umbrella framework

As stated earlier, there is evidence from research that users perceive bots as social actors (Mou et al., 2019), and there is a developing evidence-base derived from the application of CA to user:machine interactions which involve natural language (see 2.2). However, this study focuses on user:bot interactions which do not involve natural language. It is for this reason that interactional sociolinguistics (IS) represents the most appropriate umbrella framework for our analysis.

Interactional sociolinguistics is concerned with the use of language in its social context. In contrast to other microanalytical perspectives on talk-in-action such as CA, interactional sociolinguistics interprets what is happening in a sequence of talk rather than uncovering and predicting patterns. Its power is, according to Bailey (2008), in "account[ing] for how different dimensions of communicative behaviour are

related, e.g. prosody and words, and to explain the achievement, or lack of achievement, of intersubjective understanding in particular instances of interaction" (p.2317).

One of the core concepts of interactional sociolinguistics is the 'contextualisation cue', a verbal or nonverbal feature "by which speakers signal and listeners interpret what the activity is, how the semantic content is to be understood and how each sentence relates to what precedes or follows" (Gumperz, 1982, p. 31). Contextualisation cues signal communicative intent and determine what communicative intent is received and perceived. Applying this concept to digital discourse, Darics (2013) showed, using instant messaging (IM) interactions from a virtual workplace, how letter repetition signals affect, excitement and emotional involvement, creates intimacy and collegiality, and signposts the nature of the power relationship between participants.

To uncover the cues which signal communicative intent, interactional sociolinguistics liberally draws on other analytical traditions and frameworks, prompting Bailey (2008, p. 2317) to talk about its 'eclectic toolbox' (Bailey, 2008, p. 2317). For example, Stubbe (2010) positioned her study of miscommunication within the overall framework of interactional sociolinguistics but draws on CA's repair concepts to conduct the analysis. In another example deploying face and politeness theory, Jagodziński and Archer (2018) investigated call centre practices contribute to customer experience. They show that forced adherence to quality guidelines and regulation through scripts prevents linguistic co-construction and co-creation of the customer experience, with agents orienting primarily to transactional (task-oriented) rather than relationally (face-oriented) oriented elements of exchanges. They thus argued that "this commodification of language […] runs contrary to pragmatic accounts of meaning, which emphasize its co-construction 'in the moment' […] (and) the understanding, within the marketing literature, that customer experience is a co-creation between the representative of the company and the client" (p. 183).

Prompt:response bot interactions bear similarity to these scripted call-centre interaction as they do not allow co-construction and 'in the moment' construction and negotiation of meaning and relationships. Moreover, they are characterised by an extreme case of 'context collapse' (Androutsopoulos, 2014) as the potential audience is very diverse and has unpredictable characteristics, making it more difficult to tailor content and forms of talk (Frobenius, 2014) or, in other words, to 'align' with the user. As the bot

makes requests for information as well as requests to purchase a product, the choice of language for prompts and response needs to allow for maximum possible alignment with user expectations and enhance trust and social presence within the interaction.

2.4 Aims and objectives for the study

Interactional sociolinguistics, with its interpretative stance centred around the notion of 'cues' – represented here by the scripted prompts and responses of the bot – and its broad analytical toolbox make it an ideal umbrella framework to support this consultancy project. Specifically, this study explores, using algorithmic databases of prompts and responses as well as researcher generated interactions with a packing adviser bot and a software qualification bot, how the bot design was leading to bot:user interaction which did not support user:bot alignment and affiliation, thereby undermining user trust and social presence within the interaction. The microlevel linguistic analysis focuses on question design and the design of response options available.

3. Method

3.1 Design

A case study method was adopted to explore alternative methodological approaches for analysing user:bot interaction which did not involve natural language. As argued by Yin (2017), a case study method can address explanatory, rather than just descriptive or exploratory research questions because it enables in-depth analysis of relevant case examples in their real-world context. While a case study is not generalisable to wider populations, it does have the power to be generalisable to 'theoretical propositions' in the wider research literature (Yin, 2017) and is useful in identifying specific interactional features (Chatwin, 2014). This case study design aimed to identify examples of where the bot interactional design supported or undermined interaction involving trust, alignment and social presence which are associated with human engagement and satisfaction with bot interactions.

3.2 Data harvesting & procedure

The data used for the analysis was harvested from two sources:

1) The bot development company provided the researchers with descriptions of the 'volleys' – sets of user input and bot output algorithms – used for a packaging adviser bot and a software qualification bot. This allowed researchers an overview of the interactions which the bot development company bot would be able to generate. The software included 580 templated prompt:response conversation elements that can dynamically generate the conversation.
2) The researchers as well as the bot development company directors used the packaging bot to generate conversations as if they were customers attempting to solve a packaging problem. Whilst researcher involvement in the generation of the data may appear to be a limiting factor, the fact that the bot development company technology tested here did not deploy natural language meant that researchers and directors were working from the same conversational constraints which a customer would encounter.

This study does not rely on usability trials which would provide an indication as to when and why users perceive of instances of language as problematic. Consequently, in selecting examples, the researchers had to rely on their own 'curious noticing' of examples which might result in an uncomfortable imposition on the user, impacting trust, alignment and social presence. Researchers thus acted as representatives of possible bot users, using a theory-led approach to decide which linguistic cues which might be problematic and to arrive at conclusions about their affordances. Meredith (2017) links affordances to user perception, describing them as "not […] static features of technology, but are features that can be seen by users as having a number of potential actions associated with them. Therefore, an affordance exists once a user has perceived it and perceived the potential actions associated with it" (p. 43).

Examples, representing a range of conversation openings, closings and interactional sequences (e.g. requests for information, purchasing requests, greeting and closing phases, rejection) which are believed to be representative of real-world user:bot engagement, were selected through an iterative process. First, researchers took notes on instances of conversation which, through their knowledge of relevant theoretical frameworks in social psychology and applied linguistics if the bot and the user had had the

opportunity to discursively negotiate meaning and content, might have stood out as 'negatively marked' (Locher, 2006) for misalignment and disaffiliation. In the second stage, a shared data session resulted in large amounts of overlap of data selected as valid for our study.

3.3 Analysis

The two researchers analysed the data independently. After the initial identification of sequences which involved user:bot sequences of misalignment and disaffiliation, and believed to undermine user trust and social presence, each of the researchers analysed the sequences independently. In a second stage, the researchers held a joint data session to compare their analyses, discuss analytic assumptions and confirm distinctive interactional patterns within the data.

For the analysis, we used adjacency pairs as the primary unit of analysis. Each adjacency pair included question phrases and multipart response options. We looked at instances of alignment/misalignment and affiliation/disaffiliation using several analytic concepts. Firstly, we used politeness theory (Brown and Levinson, 1987) with its notions of negative and positive face and looked for linguistic indicators of positive politeness (e.g. features which foster a sense of inclusion) and negative politeness (features which limit the imposition on the interlocutor). Secondly, we investigated how turn allocation and turn content, including opportunities for 'repair' to address problems in the interaction (Hutchby and Woofit, 1998), constructed the user's alignment and affiliation with the bot. Thirdly, we considered how the bot design constructed epistemic stance in the interaction (Heritage, 2013), and in particular the user's ability to 'be heard' as knowledgeable about their needs and requirements, also important for alignment and affiliation. Finally, we contemplated how the interactional features we identified may support or undermine social presence (Schuetzler et al., 2018) in the interaction.

A third stage of the process involved the researchers presenting their analysis to the bot development company directors for further critical review and discussion. In a final stage, the bot development company directors then created a new set of conversational volleys applying the analyses stages 1-3. A new set of volleys was created for an investment hub bot, a furniture bot, a recruitment bot and a health and safety software bot. Due to space constraints, and as this paper aims to show how micro-analysis can

be applied to prompt:response bots, we are only able to display one example from the investment hub bot to showcase some of the changes made as a result of the recommendations.

3.4 Ethical considerations and data protection

As no personal or demographic data was collected, and no primary data collected from participants, the study did not involve formal ethical procedures. All the data for this study was harvested from a collection of bot volleys or simulated bot interactions facilitated by the directors and researchers. The collaborative academic/commercial study was funded by an Innovation Voucher grant provided by the University of Surrey.

4. Analysis

4.1 Misalignment

In this analysis, misalignment concerns the bot's design whereby it fails to align with users' expectations in terms of the question design and/or response options available and thus potentially undermines trust, engagement and credibility (Li and Mao, 2015). The focus of this analysis is on bot displays of incompetence (4.1.1); bot epistemic stance (4.1.2); bot's use of directive rather than partnership building language (4.1.3); and bot design demoting user engagement (4.1.4).

4.1.1 Bot displays of incompetence

Bot competence and expertise are known to be important issues within user:bot interaction (Nordheim, 2018). However, the design of the prompt:response bot in this study displayed its incompetence for appropriately aligning next sequence based on prior task completion. In example (1) the bot asks a series of questions to elicit information from the user (l. 1, 3, 5), and closes the sequence with an offer of 'further help' (l. 8).

Example (1)

1 bot: So, who does the packaging?

[dedicated team | machinery | just me | anybody]*

2 user: dedicated team

3 bot: Where do you store packaging materials?

[warehouse | storeroom | cupboard | anywhere]*

4 user: warehouse

5 bot: And finally, do you have to palletise shipments?

[frequently | occasionally | never]*

6 user: occasionally

7 bot: That's given me a great introduction to your business.

8 Let me help you further

*Suggestion prompts (options) for response

This is clearly an inappropriate response as the bot cannot offer *further* (l. 8) help where no *initial* help has been offered. The positioning of this statement leads to misalignment between the user's anticipation of the helping sequence, which we might expect would involve the bot either summarising user information given and/or signifying next transactional steps appropriately. The sequence also constitutes a possible threat to face as the promise of help, which appeals to positive face and thus the need for connection, is being broken.

4.1.2 Bot epistemic stance

When a bot makes marketing statements these have been recognised as undermining user trust in user:bot interactions (Nordheim, 2018). In example (2), the bot's design integrates a marketing statement which position it as the 'expert' with the knowledge and skills needed to provide help to the user. However, it does not ask for, nor take account of the user's perspective or knowledge of their own needs.

Example (2)

1 bot: I'm Packaging Live Expert, software trained by real experts

2 Packaging AI, to provide expertise 24/7 anytime you need help in

3 finding the right solution

4 bot: You're on the Packaging AI home page - can I help with?

[packing advice | pick a specific product | warehousing solutions | other]*

5 user: other

6 bot: OK, what would you like to know more about for example

7 product bulk prices?

[my order | product | company | account | else]*

8 user: my order

*Suggestion prompts

Example (2) shows that the bot is programmed to take a K+ epistemic stance (Heritage, 2013) which is evident through the way turns are allocated: the bot starts with a lengthy introduction (l. 1-3), which is immediately followed by another turn which elicits an answer from the user (l. 4). The users thus automatically has the SPP allocated to them, and retains this position in the next adjacency pair, too (l. 6-8). The questions 'Can I help with' (l. 4) and 'what do you want to know about for example product bulk prices? ' (l. 6-7) further positions the user to take a K- stance as the bot's K+ position has pre-empted the user's specific requirements and the user has no scope to elaborate on their own situation, including any displays of knowledge or expertise about their specific requirements. This misalignment is likely to undermine user engagement, as users' claims to knowledge regarding their requirements are being constrained in the very sequences designed to elicit these.

4.1.3 Bot's use of directive rather than partnership building language

The analysis identified the use of question and answer sequences which involved directive rather than partnership building language. This was evident through a prompt-response pair which required closed-ended questions to facilitate a limited range of responses, as shown in example (3) representing the opening sequence for a new user inquiry:

Example (3)

1 bot: You're on the Packaging AI home page – can I help with?

[pick a specific product | packing advice | warehousing solutions |other]*

*Suggestion prompts

As can be seen from the bot's question turn (l. 1), the question is not constructed as an interrogative, which may be heard by the user as an even more 'directive' style of language and, therefore, stronger 'male' voice. While this may appeal to an audience with a preference for this style of language, it may serve to alienate users more likely to align with language which supports partnership building. Furthermore, a more directive style is also more likely to threaten the user's negative face, i.e. their need for retaining freedom of action (Brown and Levinson, 1987).

4.1.4 Bot design demoting user engagement

The analysis identified some prompt:response designs likely to inhibit user engagement. For example, in the following question-response sequence – example (4) – the user had only one turn where very little information about their requirements was elicited:

Example (4)

1 bot: Which of the following products might be of interest...?

[boxes | protection | bags | decoration | palletising | stretch film |

strapping tape | labelling | more...]*

2 *user: boxes*

3 *bot: Standard boxes are our lowest cost option. Clever boxes offer*

4 *special benefits such as super strength, including for export, crash*

5 *lock for reduced packaging time, adjustable sizes or telescopic*

6 *construction for variable volumes for a snug fit.*

7 *bot: Postal box products are designed to withstand public transit*

8 *adding to protection of the item. Are you looking for?*

[standard | clever | postal | other]*

9 *user: standard*

10 *bot: These seal top and bottom with tape.*

11 *bot: Do you need a size to palletise in complete layers*

*Suggestion prompts

The adjacency pair structure used here again positions the bot as the dominant partner in the interaction. The bot initiates all first pair parts in this sequence, with the visitor providing (very brief) second pair parts when prompted. After the user's first reply (l. 2), the bot's second question prompt 'Are you looking for?' (l. 8) is preceded by a lengthy pre-sequence (l. 3-8) in which the specific properties of various packaging solutions are explained. Epistemically, this positions the bot as the partner with the superior knowledge. The user is not given any opportunity for 'repair', i.e. to ask questions, to ask the bot to back-track a step etc. This is exacerbated by the fact that the bot uses some 'split turns' with the options divided into two turns and no opportunity for the user to re-engage (e.g. l. 3-6, 7-8). In addition, the closed question format of 'Are you looking for?' (l. 8) further closes the user's interactional space and denies them the opportunity to 'opt out' of an answer, and the lack of an 'other' option subsequently denies the opportunity for repair, e.g. by asking for clarification.

4.2 Disaffiliation

In this analysis, disaffiliation concerns the bot's design whereby it fails to endorse or support the user's perspective by demonstrating affect or 'social solidarity' (Stivers, 2008), a concept also captured by the concepts of 'positive face' encapsulating human need for connection, and 'negative face' describing human need not to be imposed on (Brown & Levinson, 1987). The focus of this analysis is on bot design leading to threats to user 'face' (4.2.1); bot design leading to rudeness (4.2.2); and bot design reducing opportunities for sociability (4.2.3).

4.2.1 Bot design leading to threats to user 'face'

The user:bot interactional characteristics in example (5) demonstrate contraventions in interaction based on 'face'. Admission of incompetence by the bot equates to a threat to the user's positive face – a human need for connection and approval – as the suggestion that more training is required (l. 1) implies that the user's query is too complex to answer and is thus not worthy of an answer.

Example (5)

1 bot: I'm afraid I need a bit more training to guide you to an optimum

2 solution. I'll brief a colleague and get back to you at your convenience.

A further example of directive language which has the potential to not only undermine some users' disaffiliation with the bot, but also consequently instil an unfavourable impression of it, concerns the use of feedback where the user's needs are not well matched to the service being provided in examples (6) – (8):

Example (6)

1 bot: Oh dear, I don't think you're ready. Build your visitors and then

2 let's talk.

Example (7)

1 bot: I'm really sorry, but really you won't benefit from our software

2 until you get more views

Example (8)

1 bot: I'm sorry, but I think you should focus on traffic

In these three cases, the bot wraps up the information gathering phase of the interaction with an assessment of the suitability of the user's needs to the software. All these examples are potentially face-threatening due to the words chosen. The bot's pre-programmed linguistic choices are framed around its own requirements ('You won't benefit from our software', 'I don't think you're ready'). Consequently, they constitute a threat to positive face as they do not display approval of the user's perspectives and needs. This is then followed up by demands for what the user needs to do to meet these requirements, which threaten negative face as they are direct and blunt and include only very few devices which might be able to mitigate face threat (Brown & Levinson, 1987).

The consequence of this exchange is likely to lead to disaffiliation between the bot and the user and a threat to user's self-esteem. In addition, users here are positioned to carry the risk for their goals to succeed. This is exacerbated by the fact that the user is not given an opportunity to 'repair' by asking the bot a question about how to fulfil the requirements.

4.2.2 Bot design leading to rudeness

Another example of directive language, which is likely to lead to disaffiliation, concerns directives designed to moderate the user's pace of engagement when response times are slower, showcased in examples (9) – (11):

Example (9)

1 bot: OK let's get on with it

Example (10)

1 bot: Come on, haven't got all day ☺

Example (11)

1 bot: Let's step up the pace a bit

The directive language used in these examples constitutes a potential threat to users' negative face. The directives impose on the user to provide an answer, and to do so quickly. They are also delivered bald-on-record in the form of imperatives, without any mitigating devices such as hedges or reasons (Brown and Levinson, 1987). Hence, users' freedom of action is severely limited and their needs are being ignored as the programmed language choices do not demonstrate solidarity.

4.2.3 Bot design reducing opportunities for sociability

Reduced opportunities for fostering sociability with the user are also evident in other sequences. In the following example (12), no sensitivity towards the user's perspective is present while the bot elicits relevant information, despite the topic under consideration involving risks to the user:

Example (12)

1 bot: Do any of the following keep you awake at night?

[cost | damage | security | regulation]*

2 user: security

3 bot: So security, in particular?

[theft | fraud | confidentiality | everything]*

4 user: fraud

5 bot: In terms of cost, does this specifically include?

[price per unit | pack size | machine price | time to wrap |

storage cost | compliance | most of these]*

6 user: most of these

7 bot: And looking at regulation...

[customs | restrictions | environment | multiple]*

8 user: customs

*Suggestion prompts

This interaction starts with a bot query about user concerns. However, threat to negative face is likely here as the formulation 'keep you awake at night' (l. 1) imposes a state of affairs that may not apply. There is also an issue of alignment between the first pair part – a yes / no question (l. 1) – and the second pair part, chosen from of options (l. 2). This adjacency pair is followed by three more in which information is elicited from the user through questions. The first two of these (l. 3, l. 5) are heavily truncated questions in that they don't include a question pronoun such as 'what', and don't refer in person to the user by using 'you'. The third one (l. 7) is not posed in question format at all. For these reasons, these questions do little to support a personal connection with the user and sensitivity to their needs. In addition, the question format is also representative of an ethnocentric position. Research in English as a lingua franca suggests that, when English language use orients to linguistically diverse audiences including non-native speakers of English, it is characterised by increased levels of explicitness to convey meaning clearly (Björkman, 2013; Mauranen, 2012). The question format in example (12) may not sufficiently signpost the intended meaning of the bot's prompts. For example, 'keep you awake at night' (l. 1) is an idiomatic expression which may not be familiar to users of English who speak English as a second or foreign language. 'And looking at regulation' (l. 7) may not be decodable as a question at all. Thus, the bot's prompts undermine rather than promote the principle of explicitness.

A further example of how the question-answer responses misses opportunities for developing social presence concerns a lack of attentiveness to personal relevance for the user. In example (13), an assumption is made about the user's inquiry:

Example (13)

1 bot: The most common packaging questions I get are about

2 single parcels shipping by land in UK, with normal protection

3 bot: Is that you?

[YES, that's me | overseas | retail or store | bulk or multiple

| extra protection]*

4 user: overseas

*Suggestion prompts

In an adjacency pair, the second pair part is functionally dependent on the first i.e. a question elicits an answer. Whilst, in this example, we do find a question – answer sequence in which the bot asks for information from the user (l. 1-2, l. 3), the bot then imposes an answer on the user ('single parcels shipping by land in UK', l. 2) and then merely asks for confirmation ('is that you?', l. 3)? Not only does this constitute a potential threat to negative face as the user's freedom of action is restricted. In addition, it subsequently leads to misalignment of the first pair part (ending in 'Is that you?') with the second pair part ('overseas', l. 4), which the user was able to pick from the prompts. Of the prompts available, only 'Yes that's me' would have constituted a functionally well-aligned SPP. And the perspective of clarity, 'Is that you?' may not necessarily be easily decodable by less proficient speakers of English who need longer to parse and decode written text, given the indirectness of the question and the lack of fit to the prompts provided.

5. Discussion

5.1 From analysis to action

Existing research has not accounted for how prompt:response turns involving misalignment and disaffiliation position the user negatively in human:bot interaction when no natural language is available. Using a case study approach to analyse a 'library' of bot volleys and a small dataset of researcher and company generated conversations, this paper has demonstrated that a microlevel linguistic analysis provides an alternative approach for understanding user:bot prompt:repsonse interactions. In particular,

589 the integration of different theoretical perspectives, which drew on a range of analytic concepts,
590 supported a pragmatic approach for recognising user:bot misalignment and disaffiliation which was of
591 practical use to the bot designers. The approach allowed identification of problematic sequences which
592 feature threats to user positive and negative face, ineffective management of epistemic stance and
593 respect of user's knowledge, including self-knowledge, and user loss of control through sequences which
594 lead to user inability to repair where their needs or requirements are unmet. This analysis identified these
595 problematic sequences as restricting the development of social presence, alignment and trust which may
596 potentially lead to user dissatisfaction with the bot.
597 The bot development company were able to use the analysis to reprogram the bot to attend to the
598 problematic interactional sequences. They made changes to different bots that service visitors in the fields
599 of packaging, investment, recruitment, health and safety and software, in particular focussing on:
600 • avoiding any admittance of the bot's limited competence and removing misleading promises
601 • setting expectations upfront by using a clear "call to action" prior to engagement, with marketing
602 language removed
603 • taking account of the user's perspective by giving the user the ability to make statements or ask
604 something else in addition to pre-existing prompt options
605 • use of less directive and more partnership-building language, including the use of 'you' and
606 'your'
607 • improved rejection handling, adding an option to re-engage or seek direct contact
608 • removing domain specific language (or technical jargon) in order reduce the epistemic gradient
609 between the bot and the user
610 • rewording the question format to prevent assumptions being made about user needs
611 • improving the opportunity for user repair with a more prominent and functional undo button
612 The following illustrative example (14) showcases a sequence which leads to rejection of an entrepreneur
613 from the investment hub. It shows changes to expectations management (l. 2-4), partnership-building
614 language with use of 'you' and 'your' (e.g. l. 3, l. 9) and improved rejection handling (l. 8-17).

Example (14)

1 user: I am an entrepreneur

2 bot: We work with businesses at all stages of development. So I

3 can understand you and your opportunity better I have up to eight

4 questions.

5 bot: I hope that's OK. To start with, what best describes your

6 venture at this point

[working on a great idea | startup company | early stage

with customers | established mature business / or ask something

else]*

7 user: working on a great idea

8 bot: Based on the information you have given me, I feel that

9 there is not a good match between your objectives and those we

10 can meet.

11 […]

11 bot: Our network favours technology companies – others rarely

14 proceed to investment. This is not a value judgment on your

15 business

16 bot: May I wish you and your business every success and good

17 luck in the future

[no problem | I understand | or ask something else] *

*Suggestion prompts

5.2 Consultancy and the rigor-relevance gap

This paper is based on a volley library and researcher/bot designer generated interaction rather than naturally occurring user:bot interaction to identify the social activities and action being accomplished through interaction (Mondada, 2012). It is also reliant, as described above, on researcher-selected

examples. Thus, it may not be unfeasible to argue that this project suffers from what has been called 'rigor-relevance gap' (Kieser and Leiner, 2012), the gap between academic rigor and relevance to professionals and their work.

However, we believe, that the dataset and approach used were sufficient to explore the application of an established methodological approach to a novel context despite these limitations. In this collaborative project, academic researchers from the fields of social psychology and applied linguistics did not just 'present' their findings, but collaboratively reflected on them and discussed them with the engineering practitioners from the chatbot development company. This approach supports Kieser and Leiner's (2012) argument that "actionable knowledge can be produced independently from rigorous research" (p. 22) and is an example of what Gibbons (2000) calls 'Mode 2 Knowledge Production', which he describes as transdisciplinary, a preference for flatter hierarchies, socially accountable and reflexive (p. 159-160).

In addition, this paper is not arguing for the development of a theoretical approach in developing a 'universal' conceptual framework of specific interactional patterns in prompt:response bot designs. Rather, it is arguing for the development of a language-led approach to identify problematic bot sequences so that they may be reprogrammed to enhance users' experience of social presence, alignment and trust. In the future, the validity of this analysis can be further strengthened through analytic generalisations for patterns in other similar interactions. This requires the identification of recognisable linguistic patterns within turn construction units across a large corpus of data.

6. Conclusion

In conclusion, this paper reports on the application of a language-led approach for understanding user:bot, and by extension human-machine interaction in a consultancy context, to understand how social presence, alignment and trust are supported or inhibited. Specifically, it applied concepts from conversation analysis and pragmatics, such as politeness theory, in a micro-level linguistic analysis of user:bot interactions, which is an alternative approach to existing methods which tend to be either interview- or experiment-based. Additionally, the paper argues for inter-disciplinary teamworking to

identify problematic sequences and discusses how they can be modified to generate improved bot interactional capacity.

The reconfigured set of volleys for an investment hub bot has only recently been deployed by the chatbot development company, so that the impact of the bot on generating leads and engaging users is not yet known. Future research, involving usability trials, intends to assess the efficacy of the analysis of the current study for identifying misalignment and disaffiliation believed to undermine users' sense of social presence and trust when interacting with bots.

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