

Supplementary Materials

A. Details of the Basic Two-Stage Summarizer

A.1 Utterance Extractor Following Chen and Bansal (2018), we leverage a hierarchical neural model to learn the utterance representations and a selection network to extract utterances based on their representations. First, we use a Transformer encoder with multi-head attention (Vaswani et al. 2017) to compute m_i , the representation of each individual utterance in the dialogue. Formally, given the input embeddings of an utterance $u_i = [r_i, e_{i1}, \dots, e_{iN}]$ (r_i is the role embedding and e_{ij} is the word embedding), we concatenate another embedding e_i^{cls} as a special token [CLS] at the beginning of each u_i as in Devlin et al. (2019). Then, hidden states of tokens can be obtained by:

$$[m_i^{cls}, m_{i0}, \dots, m_{iN}] = \text{TFEnc}([e_i^{cls}, r_i, e_{i1}, \dots, e_{iN}]). \quad (1)$$

We use m_i^{cls} to represent each utterance, namely $m_i = m_i^{cls}$. To further incorporate global context of the dialogue and capture the long-range semantic dependency between utterances, we apply another Transformer encoder on the output hidden states as follows:

$$[h_1, h_2, \dots, h_M] = \text{TFEnc}([m_1, m_2, \dots, m_M]), \quad (2)$$

where M is the utterance number in a dialogue. After obtaining the utterance representation h_i , we add a Transformer decoder to train a *Pointer Network* (Vinyals et al. 2015) to recurrently extract utterances. The output state of decoder z_t at the t -th decoding step can be derived as:

$$z_t = \text{TFDec}([h_1, h_2, \dots, h_M]; q_t), \quad (3)$$

where q_t is the partial decoded sequence. At time step t , if the i_t -th utterance u_{i_t} is selected, h_{i_t} will be fed into the decoder as part of q_t at time $t + 1$. Then, we calculate the extraction probability by:

$$a_i^t = \begin{cases} V_p^\top \tanh(W_{p1}h_i + W_{p2}z_t) & \text{if } i_t \neq i_k \\ & \forall k < t \\ -\infty & \text{otherwise} \end{cases} \quad (4)$$

$$P(i_t|i_1, \dots, i_{t-1}) = \text{softmax}(a^t). \quad (5)$$

All the W 's and V 's are trainable parameters. Eq.4 avoids the extraction of duplicate utterances. Furthermore, following Chen and Bansal (2018), we add another set of trainable parameters h_{EOE} (EOE represents 'End-Of-Extraction') with the same dimension as the utterance representation. The pointer network treats h_{EOE} as one of the extraction candidates and results in a stop action in the extraction process. We also set another stop condition: if the total length of extracted utterances exceeds l_{max} ¹, the extraction will also be terminated. The extracted utterances will be fed into the abstractive refiner for further processing.

A.2 Abstractive Refiner The abstractive refiner is a basic sequence-to-sequence (Seq2seq) model implemented with the Transformer framework, which compresses and paraphrases extracted utterances to a concise summary. Here, we

¹Empirically, we set l_{max} to 512 because it is applicable to pre-trained LMs like BERT (Devlin et al. 2019).

concatenate all selected utterances in the order of appearance in the dialogue, and use a special token [SEP] to separate these utterances. The role embedding r_i is still added in front of every utterance to keep the role information. Then, the concatenated utterances as a sequence is input into the refiner to generate a concise summary in a Seq2seq manner.

A.3 Model Training Since the extractor performs a non-differentiable extraction, we employ the standard policy gradient approach to bridge back-propagation between the extractor and the refiner similar to Chen and Bansal (2018). In practise, before applying policy gradient training in an end-to-end fashion, we should first pre-train the extractor and refiner separately to tackle the cold start problem of RL. For the extractor pre-training, due to the lack of extraction (saliency) labels for each utterance, we use a simple similarity method to provide a 'proxy' target label for the extractor. Specifically, we use a greedy algorithm to select utterances whose combination maximizes the ROUGE score (Lin 2004) against the gold summary similar to Nallapati et al. (2017). Given the selected utterances as proxy training labels, the extractor is trained to minimize the cross-entropy loss. For the refiner pre-training, we directly pair decoder outputs with the gold summary to perform a usual sequence-to-sequence learning.

In this work, we utilize self-critical sequence training (SCST) (Rennie et al. 2017) as the policy gradient algorithm for reinforcement learning. At each time, we obtain two sequences of candidate utterances from the extractor. The first sequence \hat{y} is obtained by greedily selecting utterances that maximize the extractive probability distribution, and the other sequence y^s is produced by sampling from the distribution. The two groups of utterances are fed into the refiner separately to generate summaries and calculate ROUGE scores as our rewards, namely $R(y_s)$ and $R(\hat{y})$. The reinforcement loss \mathcal{L}_S is then calculated as:

$$\mathcal{L}_{ext} = -(R(y^s) - R(\hat{y}))\log p(y^s). \quad (6)$$

The extractor is optimized by updating parameters with gradient descent techniques on the above loss function. Meanwhile, for the abstractive refiner, we minimize maximum-likelihood loss at each decoding step to perform a standard seq2seq learning to generate summaries:

$$\mathcal{L}_{abs} = -\sum_i \log p(w_i). \quad (7)$$

The final loss function is composed of the above loss functions to jointly train the extractor and refiner of the two-stage dialogue summarizer:

$$\mathcal{L}_S = \mathcal{L}_{ext} + \mathcal{L}_{abs}. \quad (8)$$

B. Training Details

Since our model employs the Transformer encoder and decoder, it can be easily combined with pre-trained LMs. In this work, we use BERT (Devlin et al. 2019) as the word-level encoder² to facilitate the pre-training of extractor and refiner. To alleviate the mismatch between BERT

²For computation efficiency, we applied a BERT variant with fewer pre-trained parameters released at <https://github.com/ymcui/Chinese-BERT-wwm>.

and other randomly initialized parameters, we follow Liu and Lapata (2019) to apply Adam (Kingma and Ba 2015) ($\beta_1=0.9$, $\beta_2=0.999$) with learning rate $1e-3$ for BERT and $1e-2$ for other parameters. The extractor and refiner along with three topic models are pre-trained for 80,000 steps with 5,000 warm-up steps (No warm-up for parameters in topic models). After pre-training, we further fine-tune the whole model using policy gradient with learning rate $1e-5$ for 30,000 steps. For topic models, we perform word segmentation with the jieba toolkit³ for Chinese transcriptions, and word embeddings are pre-trained with Word2vec (Mikolov et al. 2013). Words with an occurrence frequency higher than 6,000 are regarded as stop words and are removed. For the two-stage model, we employ the same vocabulary and word embeddings as used in BERT. All experiments are conducted on a single Tesla V100-SXM2 16GB GPU with PyTorch⁴. Model checkpoints are evaluated on the development set every 2,000 steps. Checkpoints with top-3 performance on the development set are finally evaluated on the test set to report averaged results. All Transformer blocks have 3 layers, 8 heads, 768 hidden units, and the hidden size of all feed-forward layers is 2,048. The dimension of topic vectors and Word2vec embeddings is set to 100. The loss coefficient λ is $1e-3$. The effect of topic numbers K , K_s , K_o are discussed in the main part of the paper, and we report the main results with $K = 50$ and $K_s = K_o = 25$.

C. Generation Samples

Figure 1 and Figure 2 show examples of output summaries from different systems. The original texts are in Mandarin Chinese and we also translate them into English.

References

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³<https://github.com/fxsjy/jieba>

⁴<https://pytorch.org>

<p>A: 这里是xxx客服，请问有可以帮您的</p> <p>C: 我想问一下，就是那个呃，就是咱们店铺后台有那种，就是新人专享活动是，然后就是那个1元的那个的话是怎么取消呢</p> <p>A: 嗯您，想把这个取消掉，对吗</p> <p>A: 嗯，这样，您是想把自己账号下这个，取消呢，还是说先帮您店铺的这个取消呢</p> <p>C: 什么意思</p> <p>A: 就是您现在，是什么情况呢</p> <p>C: 呃，是这样的，我这边儿就是呃，这边有个客户，他因为他那个新专享吗，就是那个是1元的价格特别低，他是想把那个活动取消</p> <p>A: 这个他是开店铺的，对吗，然后他那个是活动产品，是1元钱的，然后先把这个产品下架一下</p> <p>C: 不、是产品是1元钱的，它那个什么新人分享，然后那个价格就特别低</p> <p>C: 然后怎么把那个活动对把那个活动取消，不是说下架商品</p> <p>A: 就把他排在里面了，对吗</p> <p>A: 嗯，这样您把他那个账号说一下，我看一下可以吗</p> <p>C: 行行</p> <p>C: 我说手机号，你能搜吗</p> <p>A: 可以的</p> <p>C: 嗯，xxx</p> <p>A: 嗯，我这边有查到5个账号，请问他是哪一个</p> <p>C: xxx</p> <p>A: xxx有限公司吗</p> <p>A: 好，我看一下</p> <p>A: 嗯，您久等了，请问一下他那边之前有报名过什么活动吗</p> <p>C: 什么什么叫其他的活动，他现在就这一个，就是想把这个什么新人分享的这个活动，然后给取消了</p> <p>A: 就他有没有去报名过天天特卖，这些活动呢</p> <p>C: 没有他这个店铺开通不到3个月内，好多活动都参加不了的</p> <p>A: 嗯，我这边看了一下，他这个账号，现在是属于关闭状态的</p> <p>C: 你看的他那个店铺id是什么是xxx，对</p> <p>A: 对是xxx有限公司</p> <p>C: 对他的店铺怎么可能会是关闭的状态呢</p> <p>A: 能看到是账号，是关闭状态的</p> <p>C: 账号是关闭状态，这是什么意思</p> <p>A: 你我先看一下</p> <p>A: 建议您确认，他那个账号登录名称，就叫xxx有限公司，对</p> <p>C: 你是说id是吗</p> <p>C: id是xxx</p> <p>A: id是xxx，对吗</p> <p>C: 对</p> <p>A: 这样，因为它公司下面有很多个账号，所以说我的话，我这边货点了，这个款，我跟呃这个是没有问题的</p> <p>C: 就是这个6月份，刚开通的这个是</p> <p>A: 嗯，对他是6月22号注册的</p> <p>A: 我看一下，让他一元分享对</p> <p>C: 对对对，就是那个东西怎么弄，怎么取消</p> <p>A: 您先知道他是当时是怎么去报名的，这个活动吗</p> <p>C: 我不太清楚</p> <p>A: 不清楚对吗，我看一下</p> <p>A: 电话，我这边需要看一下，他这个报名活动到底是属于哪个类型的，可以如果只是这一单三項的话不确定它的是哪种类型的活动的话，所以说我这边也不知道这个具体情况，跟他往下，怎么操作的</p> <p>C: 就是免就是那个具体的，怎么去取消不清楚是</p> <p>A: 请问您需要跟他核实一下，他到底是当时是在通过哪个方式去进行的参加这个活动的相应的，看一下</p> <p>C: 我没现在，你能帮我看他那个报的那个活动的名字是什么吗</p> <p>A: 结果是查看不了的，只有他登陆后台，才能看到</p> <p>C: 那你刚才不是说了个什么，1元分享</p> <p>A: 就之前，我这边是这样，您说的那边去查询的</p> <p>C: 呃，能查到是吗</p> <p>A: 嗯，今天的话，我这边只能看到他有这个信息，但是具体它到底什么情况，我这边看不了的</p> <p>C: 那你妈看到底是个什么信息呢</p> <p>A: 就只是他这个活动产品，还是有些一元的产品，其他就没有了</p> <p>C: 有很多的产品是1元的，对吗</p> <p>C: 他这个1元的话，你在那儿看的话，是人人都能买吗</p> <p>A: 嗯，这个的话，我这边是看不了的</p> <p>C: 行好，谢谢，我待会儿拜拜</p> <p>C: 没了</p>	<p>A: This is XXX customer service. How can I help you?</p> <p>C: I'd like to ask, er, how to cancel the 1 yuan activity, you know, that activity exclusive for new users in the backstage of our shop?</p> <p>A: Well, you want to cancel it, right?</p> <p>A: OK, so you want to cancel the activity under your account, or that under your shop first?</p> <p>C: What do you mean?</p> <p>A: I mean what exactly do you need?</p> <p>C: Er, well, I have a client, he wants to cancel the 1 yuan activity exclusive for new users because the price is too low.</p> <p>A: So your client owns a shop, right? And he wants to delist the 1 yuan product under this activity.</p> <p>C: No, the price of the product is 1 yuan, it's that activity if sharing the product with new users, the price will be very low.</p> <p>C: And I want to know how to cancel that activity, not to delist some products.</p> <p>A: He's in this activity, right?</p> <p>A: Well, got it, could you tell me his account?</p> <p>C: Sure.</p> <p>C: Can you search his account with the cell phone number?</p> <p>A: No problem.</p> <p>C: OK, XXX.</p> <p>A: Well, I have got five accounts here. Which one is his?</p> <p>C: xxx.</p> <p>A: xxx company?</p> <p>A: OK, let me have a look.</p> <p>A: Well, sorry for keeping you waiting, may I ask if he signed up for any other activities before?</p> <p>C: What do you mean by other activities? This is the only activity he is participating in; he just wants to cancel this activity for new user sharing.</p> <p>A: I mean has he ever signed up for Tian Tian Te Mai or other similar activities?</p> <p>C: I don't think so, his shop has been opened for less than three months, which is not allowed to participate in many activities.</p> <p>A: OK, I have checked, his account is closed right now.</p> <p>C: The shop ID you checked is xxx, right?</p> <p>A: Yes, xxx company.</p> <p>C: How could his shop be closed?</p> <p>A: I can see his account is closed.</p> <p>C: What does it mean that the account is closed?</p> <p>A: Let me check.</p> <p>A: It's better to confirm again, his login name is XXX company, right?</p> <p>C: You mean ID, right?</p> <p>C: ID is xxx.</p> <p>A: ID is xxx, right?</p> <p>C: Yes.</p> <p>A: Well, there are several accounts under the company, so I checked another account. This one should be it.</p> <p>C: Yes, that's it, the one just opened in June.</p> <p>A: Well, yes, he registered on 22 June.</p> <p>A: Let me have a look. He has participated in the 1 yuan activity for new user sharing, right?</p> <p>C: Yes, right. I'd like to know how to cancel it.</p> <p>A: Do you know how he signed up for this activity in the first place?</p> <p>C: I don't know.</p> <p>A: So you have no idea, right? Let me have a look.</p> <p>A: Phone number, I need to check what kind of activity he signed up for. If it is just for the 3 items in this order, and you don't know what kind of activity it is, I am not sure about the specific situation, and how he operated it, either.</p> <p>C: You mean you don't know the specific situation and how to cancel it, right?</p> <p>A: Could you please check with him, how he participated in this activity?</p> <p>C: I can't check with him right now. Can you tell me the name of the activity he signed up for?</p> <p>A: I can't see the name, only he can see it when logging in the backstage.</p> <p>C: Didn't you mention the 1 yuan sharing activity?</p> <p>A: I was checking according to what you told me.</p> <p>C: Er, you can find the information about it, right?</p> <p>A: Well, today I can only see he has participated in the activity. As for the specific situation, I cannot see it.</p> <p>C: So what information can you see?</p> <p>A: Just that product participating in the activity, and some 1 yuan products, nothing else.</p> <p>C: The price of many products is 1 yuan, right?</p> <p>C: Can you check If those 1 yuan products are available for everyone?</p> <p>A: Well, I can't see that here.</p> <p>C: All right, thank you. I'll call back later. Bye.</p> <p>C: That's all.</p>
<p>GOLD: 客户来电表示要退出新人分享活动，但客户不确定具体是什么活动，引导客户先去后台核实。</p> <p>PGNet: 您可以点此进入我的后台页面，取消自动续费，之后申请退款后若卖家一直未处理，系统将会自动退款哦。</p> <p>BERT+TRF: 深圳市场活动客户咨询如何取消？已按方告知。</p> <p>HiBERT: 客户来电咨询活动价格不对，告知客户活动不认可，客户要求取消，完结。</p> <p>FastRL: 客户来电咨询自己的产品是否可以取消，告知客户可以，客户认可。</p> <p>TDS+SATM: 客户来电咨询新人专享商品分享的活动是否可以取消，告知客户需要核实，客户认可。</p>	<p>GOLD: The customer called to withdraw from the new user sharing activity, but the customer was not sure what the activity was, so the customer was guided to log in backstage to confirm first.</p> <p>PGNet: You can click here to enter the backstage page to cancel the automatic renewal. If the seller does not process the refund after your application, the system will refund automatically.</p> <p>BERT+TRF: The customer inquired how to cancel the marketing activities in Shenzhen? We have told the customer according to the method.</p> <p>HiBERT: The customer called to inquire about the wrong price of the activity, and the customer was told that the price was not approved for the activity. Then the customer requested to cancel. Case closed.</p> <p>FastRL: The customer called to inquire whether the products can be canceled, and the customer was told the products can be canceled. The customer accepted the answer.</p> <p>TDS+SATM: The customer called to inquire whether the activity exclusive for new user sharing could be canceled, and the customer was told to further confirm. The customer accepted the answer.</p>

Figure 1: Dialogue example from the test set showing the output summaries of different models.

<p>A: 这里是xxx热线，很高兴为您服务，请问有什么可以帮到您</p> <p>C: 嗯，我投诉下你们xxx的客服</p> <p>A: 嗯，好好的您等一下，您这边，这个来电手机号是您这个下单账号的是吗</p> <p>C: 呃，不是下单账号</p> <p>A: 是xxx吗</p> <p>C: 呃，不对我下单之后好像是</p> <p>C: 好像就是这个好像就是</p> <p>A: 好的小二，好的小二，这边有查询到</p> <p>C: 你你你你你你你看是不是今天下单呢</p> <p>A: 嗯，好的，好的。小二这边有查询到订单就是您这边今天下单的一笔商品是吗</p> <p>C: 呃对</p> <p>A: 好的，好的是这样的先生，您这边的话就是啥看到您这边订单的话，是在xxx门店购买的是吗</p> <p>C: 嗯，对一个小时到的那，个都不行</p> <p>A: 嗯，好的是这样的，因为小二这边的话是xxx的一个客服热线的，就是您这边的一个xxx的话，是会有一个专门的客服热线，给您服务的您这边方便联系一下吗</p> <p>C: 就是他们的客服不行</p> <p>C: 知道，我，我们有山竹一盒里面6个有三个是坏的</p> <p>C: 有3个、是坏的呢，我们我们没找到他们的客服电话吗，是，他们那边也没写电话，我们就申请退款，他打电话过来，说，嗯，不行，只能送5元钱券</p> <p>A: 嗯，好的那</p> <p>C: 你说我不要了，很快5元钱券有啥用，你有几个坏的理赔偿家，几个对不对，说他说那样我们要回收商品呢，那您和商品我都扔垃圾桶了，我在掏给你，对不对那个我我都拍了照片了照片我都有呢，现在我看还在垃圾筒里边，你让他们过来拿好</p> <p>A: 嗯，好的是这样的，因为您这边的话就是说呢xxx的一个，这个处理流程的话，小二这边可能是无法监管到的，就是还是建议您联系一下这个xxx的一个客服电话，小二这边给您报一下，您看可以吗</p> <p>C: 呃没有打他们那不一样</p> <p>A: 嗯，您那您那您那边的，您说</p> <p>C: 他们，他们意思</p> <p>C: 他们的意思是坏的要拿回去，我就拿回去好，现在我看还在垃圾桶里，没有扔掉，我得过来派人过来拿，对不对他们又没反应，我打过他们电话了，他们没有回复</p> <p>A: 嗯那您</p> <p>C: 说，刚才的客服不在没回复，没回复，你说这怎么处理</p> <p>A: 嗯，那您那边的那个电话的话，呃，您这边方便说一下嘛，看是不是这边的一个xxx客服电话，您看可以吗</p> <p>C: 电话，您在另一个手机上面，刚刚好</p> <p>C: 他只能送5元钱卷，我要了卷，有啥用，你们现推广到处都是选，把我要了就要有啥用，是</p> <p>C: 那就</p> <p>C: 这个xxx</p> <p>A: 嗯，好的是这样的呃呢先生，您这边的一个xxx客服电话的话，是xxx的，这边的话可能是一个总部客服电话，建议您再联系一下，您看可以吗</p> <p>C: 不他刚才打过了，他是xxx</p> <p>A: 嗯，就是这边的一个xxx客服电话的话，您方便记一下吗，小二这边给您报一下</p> <p>C: 嗯，客服他刚才说就打他那个电话就行了，但打到了电话，有没反应</p> <p>A: 嗯，那您那边的那个电话的话，可能是您这边现在下单的这个门店来，就是说建议您还是联系一下这个小二，这里的一个xxx客服电话，您这边记一下xxx</p> <p>C: 你说呢</p> <p>C: xxx吗</p> <p>A: 嗯，对是这样的，xxx</p> <p>C: 我不是021，我这是苏州</p> <p>A: 嗯，好的，我想知道就是您这边可能这个xxx的一个客服的一个总部，在这边的就说您这边记一下就好了</p> <p>C: 021是</p> <p>A: 就对xxx</p> <p>C: 你你</p> <p>A: xxx</p> <p>C: 你，这不是上海电话吗，是</p> <p>A: xxx</p> <p>C: 嗯，记下了，现在有人接吗</p> <p>A: 嗯，这边的话，现在给您是有人给您服务的，那还有什么其他可以帮到您的吗</p> <p>C: 别的没了，我就打这电话吧</p>	<p>A: This is XXX hotline. Glad to serve you. What can I do for you?</p> <p>C: Well, I'd like to complain about the customer service of XXX</p> <p>A: OK. Just a moment. Is this calling number the one from the account where you place the order?</p> <p>C: Uh, this is not the order placing number.</p> <p>A: Is it XXX?</p> <p>C: Uh, it seems to be this one after I placed the order.</p> <p>C: Sounds like it. It shall be this one.</p> <p>A: OK, OK. I have found it here.</p> <p>C: Please check if the order is placed today.</p> <p>A: OK. I have found it. Is this order for the goods that you purchased today?</p> <p>C: Uh, Right.</p> <p>A: All right, Sir. From what I see here, this order was purchased in XXX store, was it?</p> <p>C: Yes, the stuff sent one hour ago was not OK at all.</p> <p>A: OK. This is the customer service hotline for XXX. For the XXX that you complained, there will be a special customer service hotline to serve you. Is it convenient for you to contact that one?</p> <p>C: But their customer service is not OK.</p> <p>C: I know. 3 out of the 6 mangosteens in one box have gone bad.</p> <p>C: 3 out of 6 went bad. We didn't even find their customer service number. They didn't leave any phone number. So, we requested for a refund. He called and said, "No, you can't refund. I can only offer you a 5-yuan coupon."</p> <p>A: Well, OK.</p> <p>C: I don't want it, what's the use of a 5-yuan coupon? They have a few complaints, not just me. He said I need to return the goods. But I have thrown them into the dustbin. Was he asking me to get them out? I already took photos. I see the fruit is still in the dustbin. You can ask them to come and pick up.</p> <p>A: Well, I see. But since this is the complaint of XXX, for the processing procedure, I may not be able to supervise. So, I still suggest you to contact the customer service number of XXX, I can tell you the number. Is that ok for you?</p> <p>C: Well, I did call them.</p> <p>A: Well, you...</p> <p>C: But their meaning...</p> <p>C: Their meaning is that they need to get back the bad ones. They can get them, they're still in the dustbin now and not thrown away. But they need to send someone to pick them up, right? They didn't respond. I called them, but there's no reply.</p> <p>A: well, you...</p> <p>C: They told me that the one called me was not there. There's no reply yet. How can I deal with it?</p> <p>A: OK, could you please tell me the number you called? I will check if it is the customer service number of XXX? Is that OK?</p> <p>C: The number is on the other phone.</p> <p>C: He can only give me a 5-yuan coupon. What is the use of the coupon? It's everywhere. What's the use?</p> <p>C: Uh...</p> <p>C: This one, XXX...</p> <p>A: Well, Sir, the customer service number of XXX you have is the number of XXX. I've got a customer service number of the headquarters, I suggest you to contact again. Is that OK?</p> <p>C: No, I just did. It is XXX.</p> <p>A: Well, can you write down the customer service number of XXX? I'll tell you now.</p> <p>C: OK. The customer service told me I can call that number, but when I called, there's no response.</p> <p>A: Well. The phone number you said may be from the store where you placed the order. I suggest you to contact this customer service number. This is the customer service number of XXX. Please write it down, XXX.</p> <p>C: OK, please.</p> <p>C: Is it XXX?</p> <p>A: Yes, that's right, XXX.</p> <p>C: I'm not 021. This is in Suzhou.</p> <p>A: Well, this is the customer service number of the headquarters. You can write it down.</p> <p>C: 021 is ...</p> <p>A: XXX...</p> <p>C: You...</p> <p>A: xxx</p> <p>C: You... Isn't this the number of Shanghai?</p> <p>A: xxx</p> <p>C: Yes, I got it. Will there be anyone answering my call now?</p> <p>A: Yes, there will be someone to serve you now. Is there anything else I can do for you?</p> <p>C: Nothing else, I'll call this number.</p>
<p>GOLD: 用户来电表示山竹坏了几个，核实是xxx订单，建议联系xxx客服，认可。</p> <p>PGNet: 客户来电表示在xxx门店购买的商品有三个是坏的，客户要求退款，小二告知客户会处理流程，客户</p> <p>BERT+TRF: 客户进线表示自己购买的商品收到之后发现商品破损了，客户要求门店回电处理，小二告知客户可以申请退款，如果有问题可以直接联系我们处理。</p> <p>HiBERT: 客户进线表示之前客服答应补偿的优惠券没有收到，小二核实到是门店漏检了，客户不认可，要求门店回电处理</p> <p>FastRL: 客户进线表示自己的xxx的商品，自己在门店购买商品。</p> <p>TDS+SATM: 客进线咨询xxx订单，商品损坏要求退款，已告知客建议客联系xxx，客知悉。</p>	<p>GOLD: The user called and mentioned that several mangosteens went bad. It was verified that the order is XXX. I suggested to contact the customer service of XXX. The user agreed.</p> <p>PGNet: The customer called and mentioned that three of the goods purchased in XXX store went bad and the customer requested for refund and the customer was told the procedure.</p> <p>BERT+TRF: The customer called and mentioned that the goods he bought were damaged after receiving them. The customer requested the store to call him back to get it dealt with. The customer was told that he can apply for a refund. If there's any problem, he can contact us directly.</p> <p>HiBERT: The customer called and mentioned that the coupon promised by the customer service was not received. It was confirmed that the store had forgot to inspect. The customer did not accept this and required the store to call back.</p> <p>FastRL: The customer called and mentioned that the goods XXX was purchased in the store by himself.</p> <p>TDS+SATM: The customer consulted order XXX. The goods were damaged and he asked for a refund. The customer has been advised to contact XXX. The customer agreed.</p>

Figure 2: Dialogue example from the test set showing the output summaries of different models.