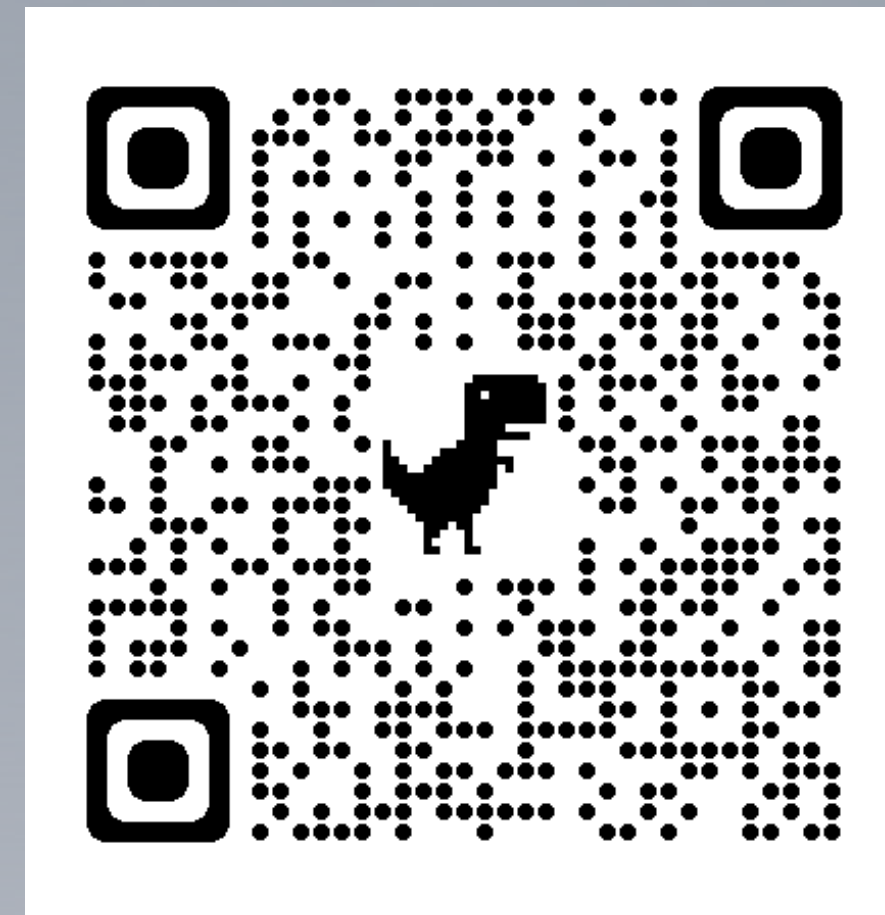


A SYSTEM FOR HUMAN-AI COLLABORATION FOR ONLINE CUSTOMER SUPPORT

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TASK

- Utilise AI for customer support
- Do not replace the human agent
- Find ways for human and AI agent to collaborate

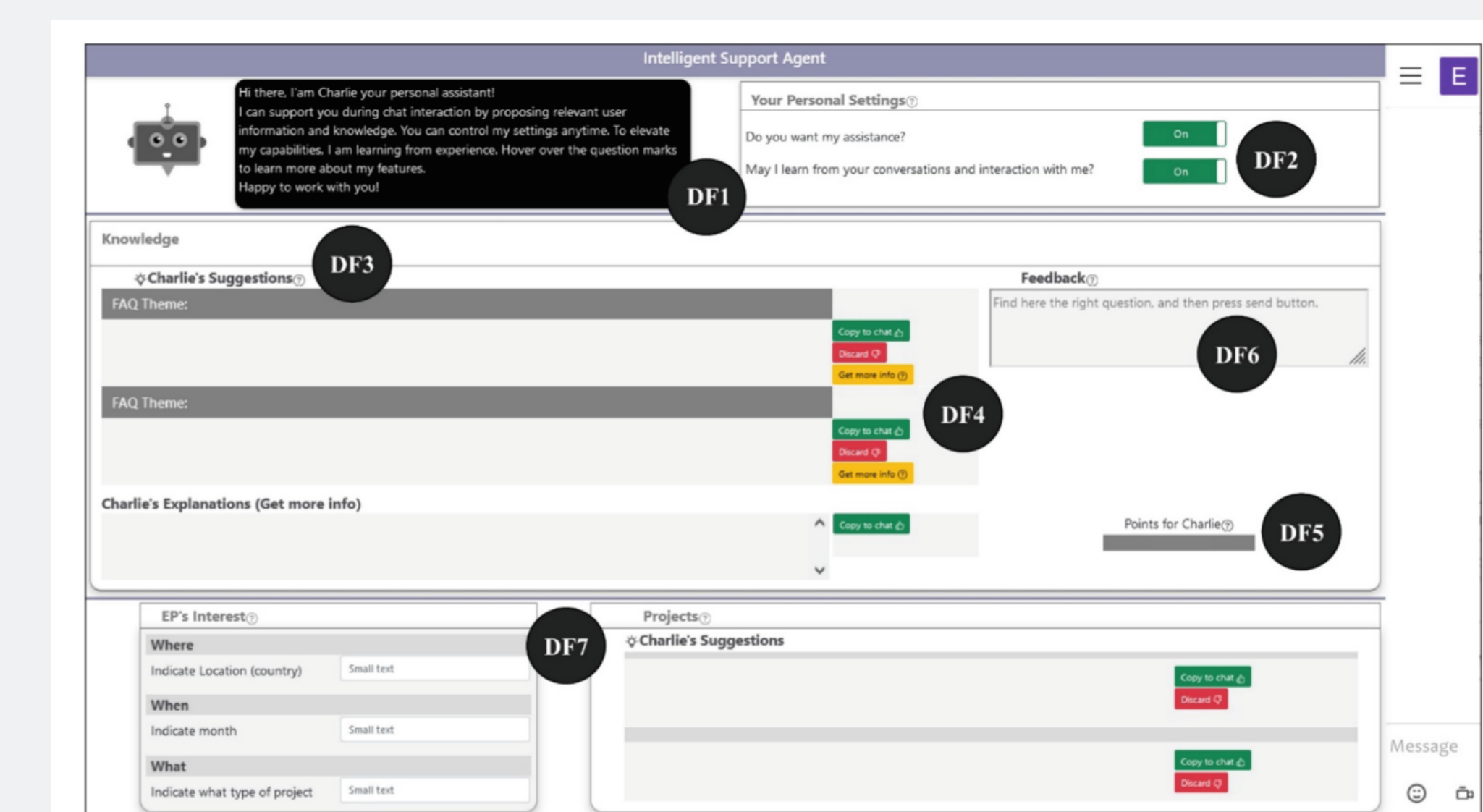
BACKGROUND

- Students seeking internships
- Agents handling queries
- Conversations in German

CONTRIBUTIONS

- An UI for the interaction
- A dataset to enable ML based learning
- Training of the AI based agent
- A novel use-case of collaboration

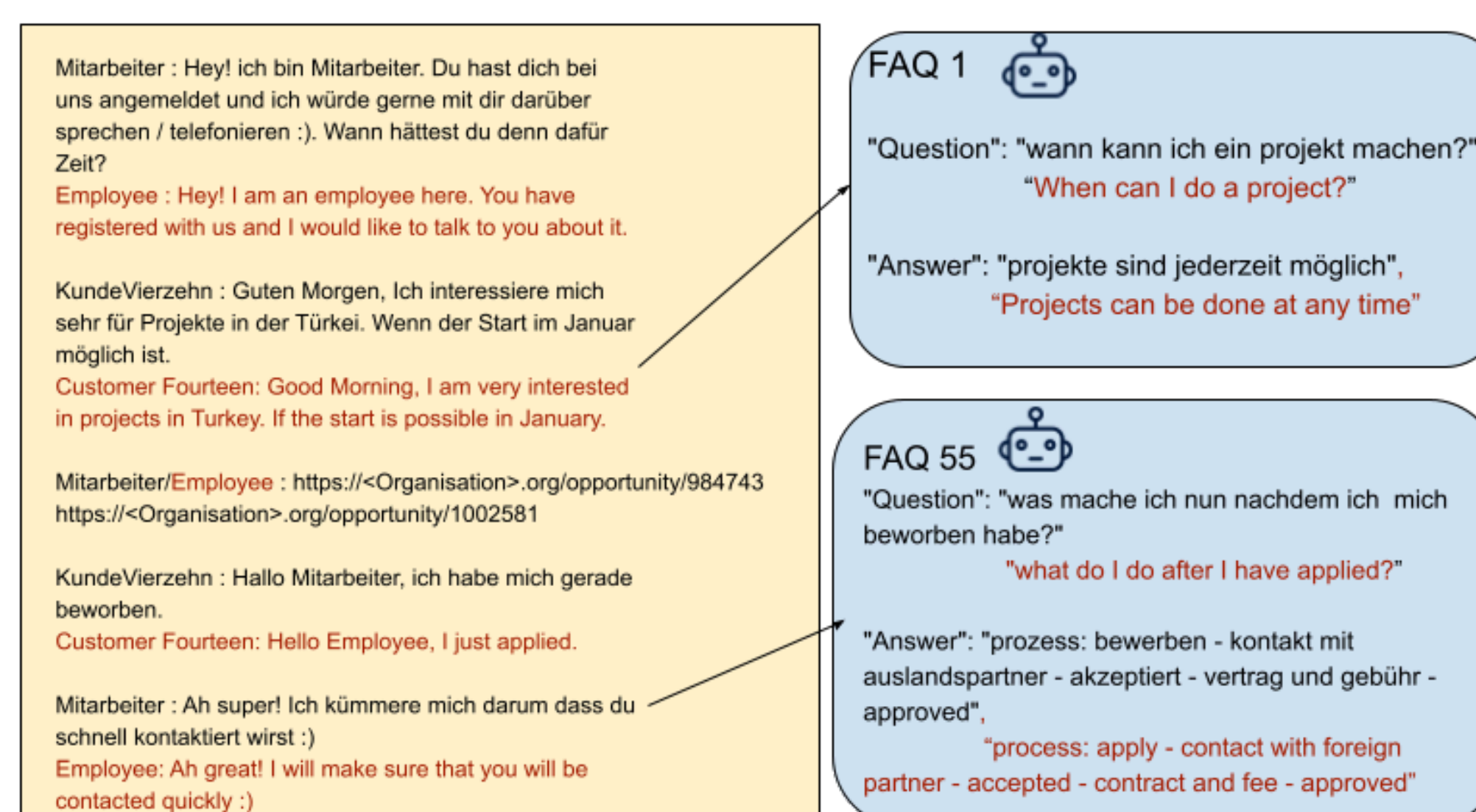
UI



- Human agent interacts with customer.
- AI suggests answers to human agent

DATASET

- 26 human-human conversations in German
- Length ranges from 22 to 607 utterances
- Annotated with FAQ database



Mitarbeiter: Hey! Ich bin Mitarbeiter. Du hast dich bei uns angemeldet und ich würde gerne mit dir darüber sprechen / telefonieren. Wann hättest du denn dafür Zeit?
Employee: Hey! I am an employee here. You have registered with us and I would like to talk to you about it.

KundeVierzehn: Guten Morgen, ich interessiere mich sehr für Projekte in der Türkei. Wenn der Start im Januar möglich ist.
Customer Fourteen: Good Morning, I am very interested in projects in Turkey. If the start is possible in January.

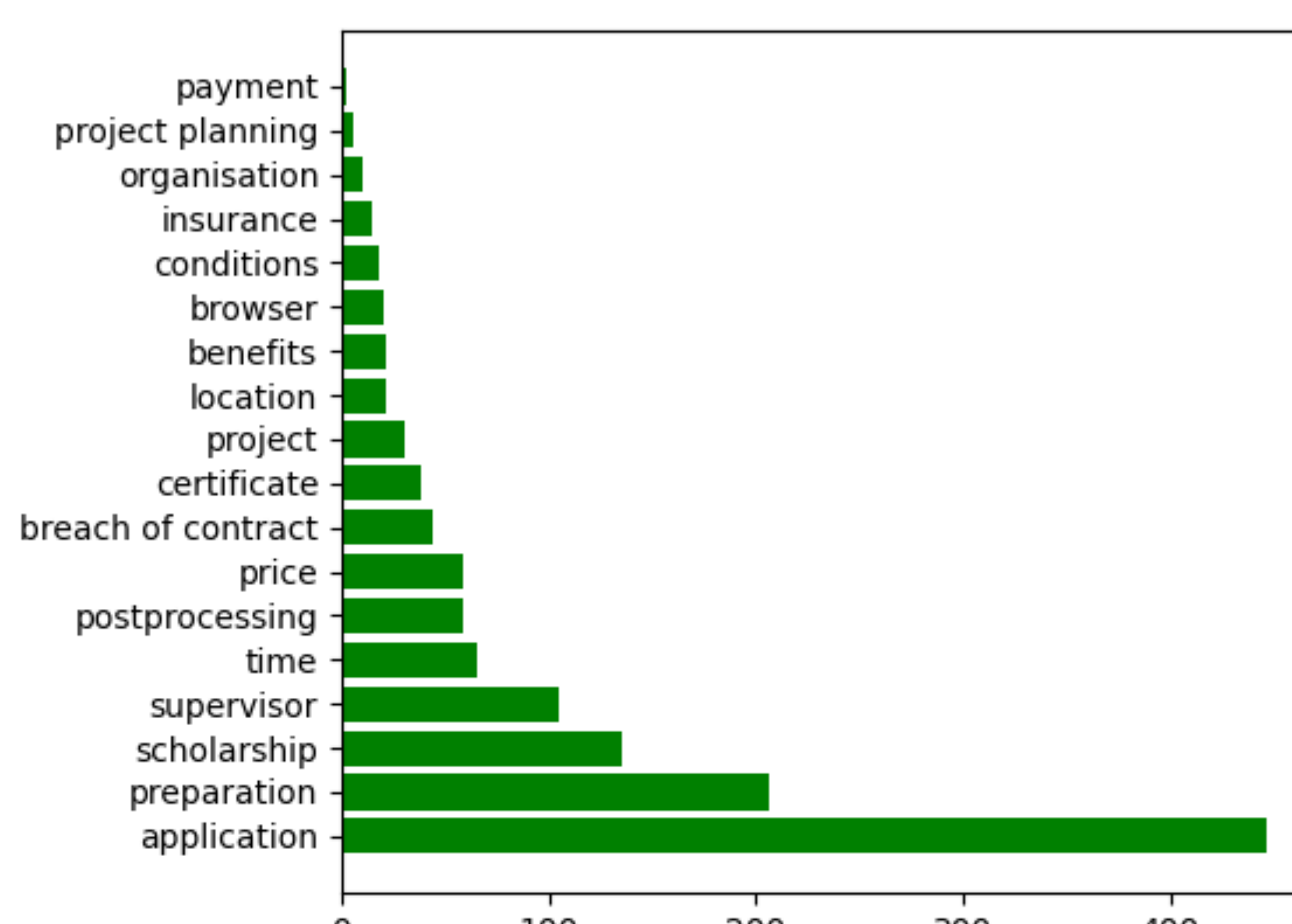
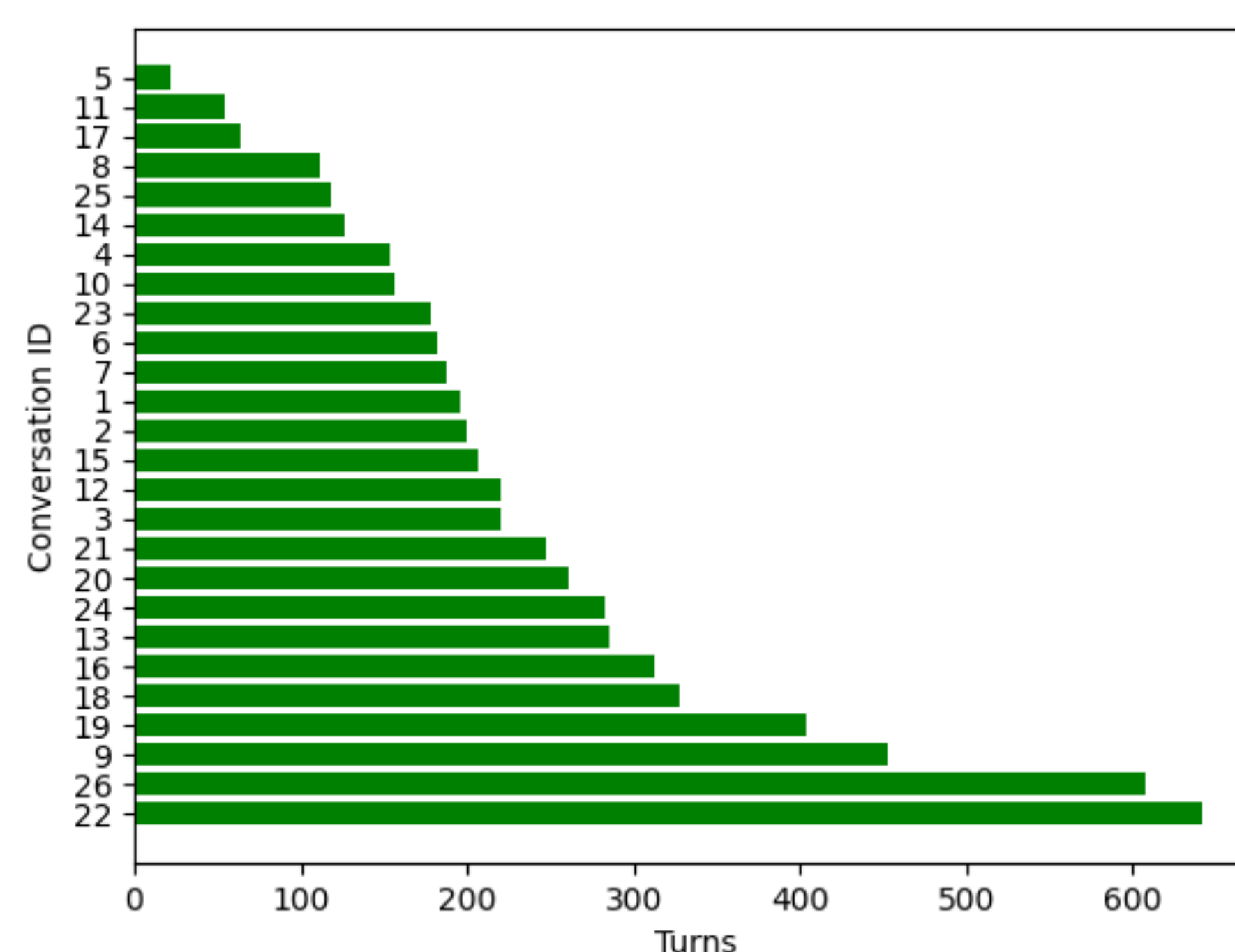
Mitarbeiter/Employee: <https://<Organisation>-org/opportunity/984743>
<https://<Organisation>-org/opportunity/1002581>

KundeVierzehn: Hallo Mitarbeiter, ich habe mich gerade beworben.
Customer Fourteen: Hello Employee, I just applied.

Mitarbeiter: Ah super! Ich kümmere mich darum dass du schnell kontaktiert wirst :)
Employee: Ah great! I will make sure that you will be contacted quickly :)

FAQ 1
"Question": "wann kann ich ein projekt machen?"
"When can I do a project?"
"Answer": "projekte sind jederzeit möglich".
"Projects can be done at any time"

FAQ 55
"Question": "was mache ich nun nachdem ich mich beworben habe?"
"what do I do after I have applied?"
"Answer": "prozess: bewerben - kontakt mit auslandspartner - akzeptiert - vertrag und gebühr - approved".
"process: apply - contact with foreign partner - accepted - contract and fee - approved"



ML TASK

- Information retrieval task
- Fetch correct FAQ given current conversation

MODELS

- BM25 based label matching
- Deep Passage Retrieval

EVALUATION

Model/Setting	no-suggestions	faq
Dumb	1.0	0.02
Random	0.04	0.06
BM25	0	0.27
Fb-multiset-english		
Mean	0.12	0.40
Highest-freq	0.35	0.48
Sum	0.81	0.44
Original	0.96	0.33
Deepest-german		
Mean	0.12	0.58
Highest-freq	0.42	0.57
Sum	0.84	0.50
Original	0.95	0.38

CONCLUSION

- Human agents interviewed found it useful
- Real time feedback and learning requested
- Silent class poses unique challenge
- Imbalance in dataset requires special handling