

# smart medication™ - a pilot study for investigating the feasibility of speech recognition of natural language to access electronic patient diary

A. Rösch, D. Schmoltdt, W. Mondorf, R. Fischer

### Background:

smart medication™ was successfully implemented in haemophilia home treatment. Until now patients enter treatment data using either a smartphone-app or a web-browser. The aim of this study was to analyse and evaluate the use of speech recognition as an additional interface to the electronic diary.

### Method:

An additional interface to the smart medication™ platform was implemented to allow patients to use natural language to enter treatment data into the electronic diary. The technology used is based on the well-established Alexa speech recognition framework provided by Amazon Inc. Similar results can be achieved using frameworks from i.e. Microsoft (Cortana), Google (Assistant) or Apple (Siri).

### Results:

It is shown that a set of about ten speech commands is sufficient to provide easy diary access for patients to handle their daily treatment documentation. This includes documentation of recurrent prophylactic treatments as well as more complex commands like change of product, dosage or batch information. The speech commands implemented can be easily used by patients and allow even faster documentation compared to smartphone-app or web-browser data entry. Patient feedback also indicate a much better compliance to documentation due to ease of use of natural language. However, patients need to be precisely informed how their personal data is handled. In particular complete and thorough transparency in accordance to GDPR (DSGVO) is mandatory.

### Conclusion:

Natural speech allows even faster treatment documentation into smart medication™ electronic diary compared to the usage of smartphone-app or web-browser. The objective of optimal patient compliance including instant and complete treatment documentation can be further improved by using natural language and a speech interface into electronic diaries.

Alternative speech intends to document prophylaxis treatment:

- "document a new prophylaxis"
- "new prophylaxis"
- "document a new prophylaxis treatment"
- "new prophylaxis treatment"
- "document a new treatment"
- "new treatment"
- "document a new syringe"
- "new syringe"

FIG. 1 Speech Intends to Document a Prophylaxis Treatment

### Patient Utterances

1. „Open smart medication!“



3. „New Prophylaxis!“



5. „Yes!“



### Smart Speaker Answers

2. „Hello and welcome to smart medication! I am now opening the diary of the patient with ID 12345. The last entry was yesterday, Sunday, 10.02.2019. How can I help you?“

4. „Should I enter a new prophylaxis treatment, just like the last treatment with 3000 units with the drug Factor VIII? Say yes or no!“

6. „Okay, I put a prophylaxis treatment in your diary. What else can I do for you?“

FIG. 2 Speech Interaction to Document a New Treatment