# Intelligent Chatbot for ANPR (license plate recognition) industry

## Study 1: Semi-Structured Interview

### Background

A major problem for technology product vendors (like ANPR product vendor) is after-sales (and pre-sales) support, that is, when a customer who purchases a complex technical product has a problem with the device or the software (it does not work as expected).

In this case, the technical support division of the company becomes very important to avoid losing clients (called churn). However, building such a 7/24 service from such highly trained IT professionals is very expensive (or not possible due to missing IT experts on the field).

To resolve the problem detailed above we can do:

a. Add more Human Resources. Advantage: very adaptive, creative, human. Disadvantage: high cost, it can be scaled slowly

b. FAQs, how-to videos on the company website. Advantage: Scalable, low update cost. Disadvantage: static, only certain types of people are inclined to read manuals, not responsive

c., **Intelligent AI bot**. Advantage: scalable, adaptive, cheap Disadvantage: need very good input data, need monitoring in training and deployment period

### Research Goal

I want to learn about how ANPR (term is industry specific: license plate recognition) customers use digital tools like how-to-video, user manuals, FAQs and chatbot services to solve their daily technical problems to use ANPR products.

I want to determine what opportunities and needs might exist for intelligent chatbot products, so that, we can use these findings to help us shape the direction we take in developing our product.

### Research Questions

- **[Needs]** What is essential for ANPR customer for technical support?
    - What are users' current pain points?

- **[Behaviors]** How do ANPR customer currently solve their technical problems?
    - How do they interact with existing (human) Technical support teams?

- Do users really need digital technical support service?

- How do users feel about existing human technical support vs machine based technical support?

# Method & Recruiting

15-minute in-person or video-based semi-structured interview to gather in-depth qualitative data. The researcher will use the interview script as a guide and ask follow-up questions based on answers from the users.

Recruiting: 5-6 participants
Adults with a full-time job who: use ANPR products and have got technical issues with these products.
To recruit participants, we will email, and call potential participants based on ANPR technical ticket database.

# Tips for Interview Questions (based on nanodegree program)

1., *DO ask users about their most recent experience*
By asking about their most recent experience, you're asking for something specific, concrete, and easy to remember.
● "In the past week, how often did you used any ANPR technical portal? What did you study?"
● "When was the last time you paid for human-based technical support?"
● "What was the last time you bought any ANPR product?"
2., *DO ask users to show, not just tell*
● "Could you walk me through how you created a technical support ticket in ARH portal for your technical issue?"
● "Could you show me some of the notes you took while learning ANPR product?"
● "Could I take a photo of these notes?"
3., *Ask why users like a solution*
Try to find the needs or pain points that are the root cause
● User: "The xxx chatbot app should give me answers asap."
● Interviewer: "Why do you want this feature?"
● User: "Because fixing our products on the field cost 2000$/hour."

# Script

## Introduction

My name is Tibor Zahorecz.
Thank you very much for participating in this study. I am currently working on a project related to building a technical virtual assistant (Chatbot) to support our ANPR customer. I would love to learn more about your experience with ANPR products and related technical issues. This interview will take about 15 minutes. If you want to leave the session or take a break at any point, please let me know. Do you have any questions before we start?

Do you mind if I record this session for note-taking purposes? The recording won't be shared with anyone outside of our team.

***Warm-up Questions*** *[Build rapport. Start with easy questions to get to know the participant]*
Could you tell us more about yourself and your company?

***Probe into needs and behaviors***
How did you solve your technical problems of ANPR products? *[Motivation: what did participants hope to achieve?]*

1., How long have you been working with ANPR products?
（When did you buy the first product?)

2., How often do you have technical question(s) or problems with the product? What motivates you to continue using this ANPR product?

3., What do you use to solve your technical problem with the ANPR product now?
- Have you used other products/tools?
- What was the very first product you were using? Why did you switch to other products? *[Pain points]*
- (If participant is using more than 1 product concurrently) What do you use each product for? *[Needs]*

4., You mentioned you are currently using xxx, in which situation usually use xxx? *[Does participant have a daily routine? Is it spontaneous?]*
Follow-up questions:
- Ask participants about the context *[when and where]*
- Ask participants why they choose to use the product

5., When was the last time you used xxxx product/solution? Could you walk me through how you were using this product? *[How do current ANPR customer interact with existing tools. Better to ask participants to show than tell]*
Observation & follow-up questions:
- Observe what features the participant is using and how the participant uses them.
- Ask what participants like or dislike about each feature, why they like/dislike each feature.
- Which features do participants not use and why?
- What's on participants' wishlist for the solution?
- If participants talk about frustrations, ask why and their current workarounds *[Unmet needs]*

## Wrap-up

Thank you so much for sharing your experience and insights. Your answers will help our team build a better product. If you have any additional thoughts and comments, I would love to hear about them at any time. I can be reached at [name@gmail.com]. Hope you have a wonderful day.

# Study 2: Survey

## Background

In our previous study, we learned that ANPR customers like to get real-time technical feedback to their daily technical problems. This is a promising opportunity we may be able to target with our product, but more data is needed to better understand the needs and whether they generalize to the larger population of all ANPR customers.

## Research Goal

This study focuses on better understanding users needs related to building a real-time technical support assistant (Chatbot).

## Research Questions

How can ANPR chatbot service best support ANPR customer in solving technical support?
- Which features/functions are useful?

## Method & Recruiting

Use surveys to collect data from at least 20 ANPR customers
- Test survey questions with 5 volunteers recruited from our engineering team
- Send surveys to Company's ANPR customer base whose answers in our screener meet our recruiting criteria: Have been technical problems in the last 3 months

## Survey Questions

Questions:

1. Which ANPR solutions are you using currently? *[Assumption: customers might use different vendor solutions in their applications]*
a. ARH
b. Tatille
c. Dahua
d. Hickvision
e. others (specify)

2. In the past month, how did you solve your techical issues? (Select all that apply.)
a. Use user manuals
b. Use FAQs, how-to-videos
c. Use human technical support service (ticketing systems)
d. ChatBot service (Virtual Agent)

3. In the past month, how often did you use digital technical support? *[Frequency]*
a. A few times per day
b. About once per day
c. 4-6 times per week

d. 2-3 times per moth
e. Once per moth

4. Which of the following best describes when you use technical support solutions? *[Do participants have a routine?]*
a. I search through FAQs when I need something or write an email/ticket [Spontaneous]
b. I set aside time for studying materials like user manual [Has a routine]
c. I participate on training programs to be prepared for technical problems
d. I use real-time chatbot services
e. Other (Specify__)

5., What do you expect from digital virtual assistant (Chatbot) as a basic function?
a. Just basic Q&A functions
b. Showing videos for my problem
c. Answering coding issues
d. Real-time, human level of communication
e. Other (Specify_)

6., Based on your experience with the technical solutions you are using, how essential were the following features? *[What types of achievements/milestones do customers care about?]*
a. Show on ANPR product user manual whats setting I should apply
b. Show the total number of options of troubleshooting
c. Offer customized support

**Demographic Questions**

What is your age? *[Assumption: People in different age groups might have different learning styles.]*
a. Under 18
b. 18–25
c. 26–35
d. 36–65
e. Above 65

13. What is your education level? *[Assumption: Education level affects learning style.]*
a. Less than a high school degree
b. High school degree or equivalent
c. Associate's degree
d. Bachelor's degree
e. Graduate degree