

Comparing different approaches for NLU-based call distribution and routing

Constantin Ehmanns, 19.08.2024, Master Thesis Kick-Off

Lehrstuhl für Software Engineering betrieblicher Informationssysteme (sebis)
Fakultät für Informatik
Technische Universität München
www.matthes.in.tum.de

- Motivation
- Research Question Derivation
- Approach
- Timeline

Call routing at center of insurance company's efficiency improvement efforts



Several value levers identified in call process with routing being most important



> **100 million**
insured **clients**



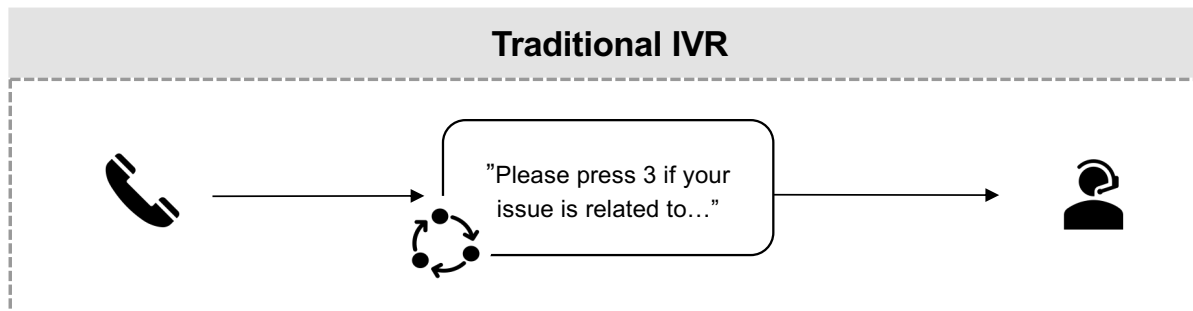
Millions of calls
per year



Very large number
of **call agents**

Interactive Voice Response (IVR) System Evolution

Traditional IVR



Intent-Based (under construction)

Repeatedly match intents/similarity of customers' utterance to certain path and route accordingly

LLM Conversation (experimental)

Use LLMs to steer the entire conversation until the objective of the call is clear and the customer can be connected to correct agent

"How can **call routing** in customer care services be **improved** by using **NLU** methods?"

How to improve customer engagement/acceptance in customer routing?

Which NLU method is more cost efficient?

Which NLU method is suitable for a certain IVR complexity?

Outline



- Motivation
- Research Question Derivation
- Approach
- Timeline

Effort for optimal routing yields related research questions



Research motivated by industry problem and findings used to guide the business process

What are relevant KPIs for comparing NLU solutions?

- Approach: Literature review and requirements interviews
- Solution: Model/framework for comparison of different approaches within corporate setting of customer care call routing (insurance company has potential internal testers that can use test system)

How to present an LLM Agent with input parameters?/How to build an LLM Agent in the given context?

- Approach: Literature review, requirements analysis and implementation
- Solution: Wrapper-system around NLU/AI-Agent which provides available tools, environment, restrictions and goals

How do NLU-solutions scale with increasing complexity of decision problem? (Evaluation)

- Approach: Employ comparison framework and use cases
- Solution: Guidance for adapting new systems based on the inherent complexity

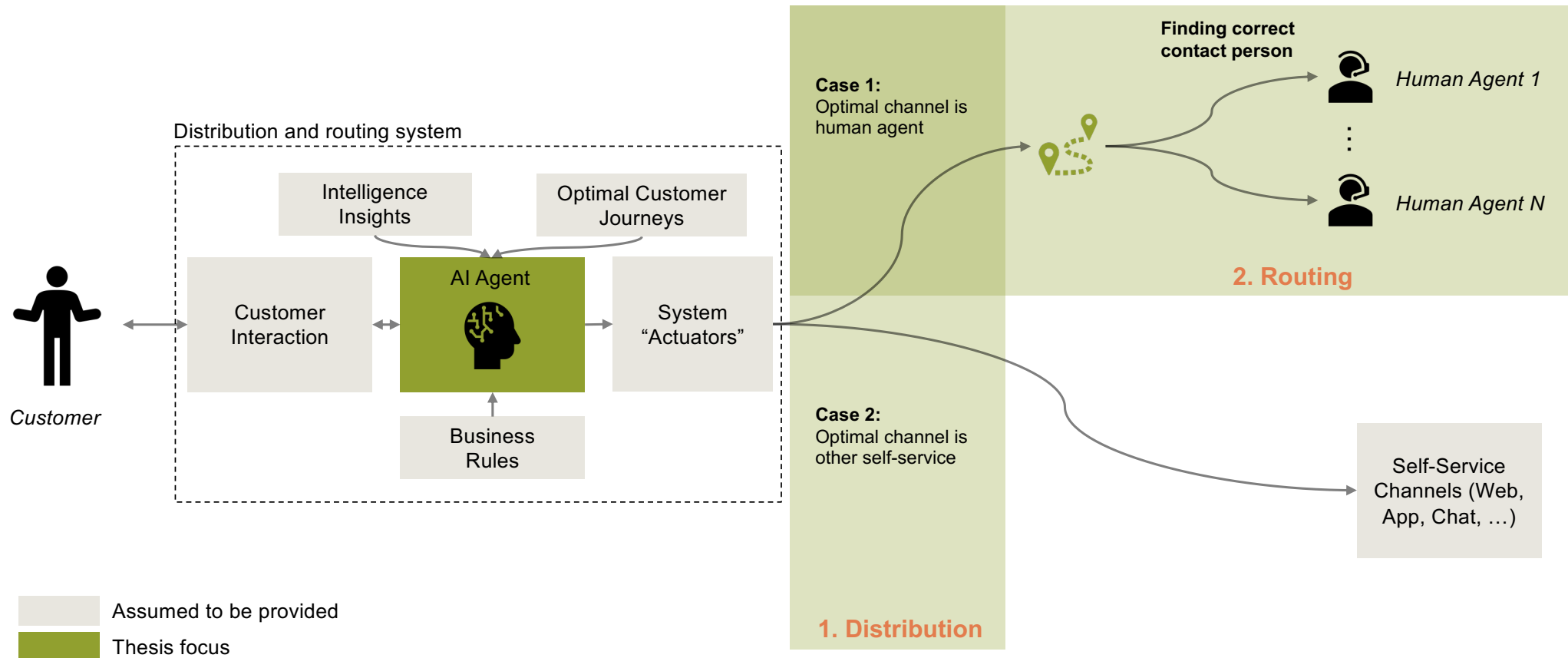
Outline



- Motivation
- Research Question Derivation
- Approach
- Timeline

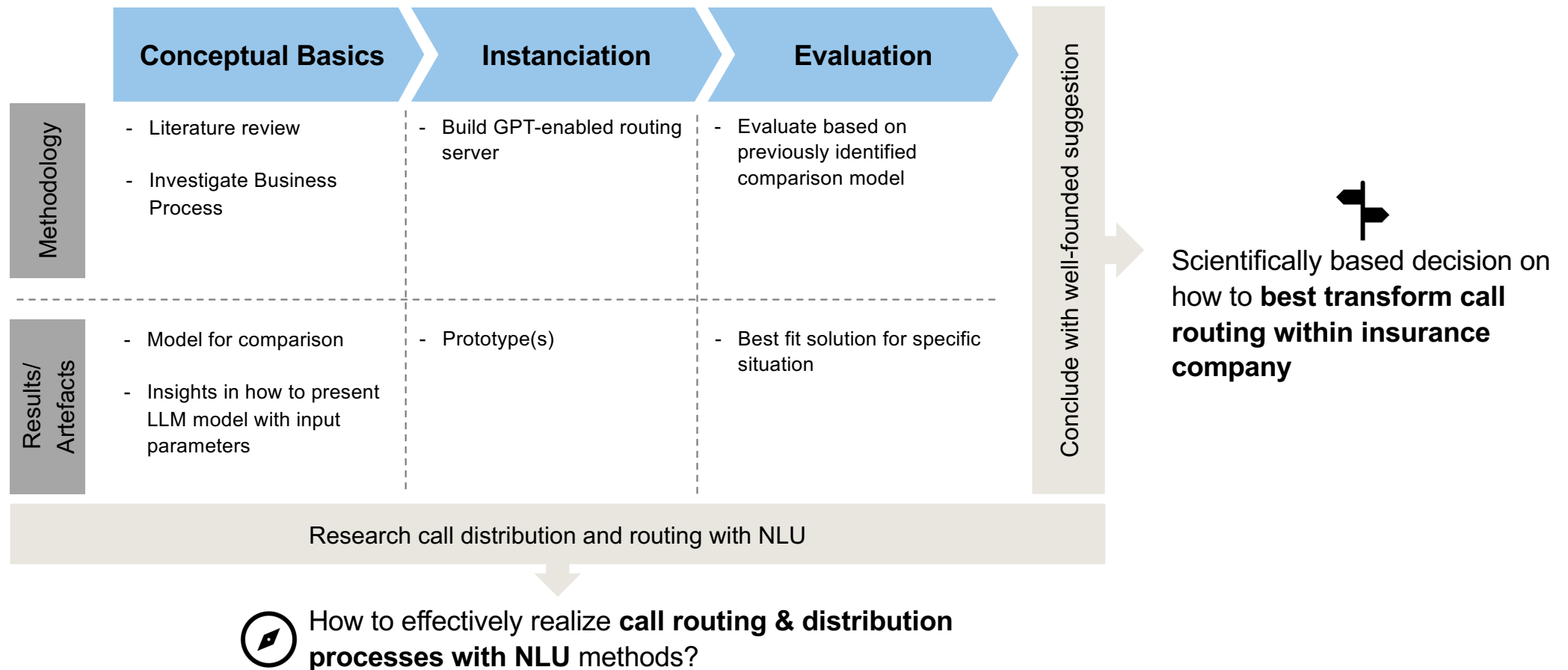
Envisioned solution has two objectives: finding channel & routing correctly

After the right channel has been identified, the correct contact person (in case of call) is determined



Design-science inspired approach to address RQs

Methodology and anticipated results



Note: Design Science approach pertains to use of guidelines in designing artefacts in information systems research developed by *Hervner et al., 2004*

Outline



- Motivation
- Research Question Derivation
- Approach
- Timeline

Proposed thesis timeline until mid-February 2025



Start writing early on & use literature research as guiding tool during development

