



Virtual Intelligent Chat Assistant (VICA)

BERTRAND LEE

GOVTECH MOL-VA TEAM

Introduction – Speaker (Bertrand)

- GovTech Smart Nation Fellow
- Attached to GovTech Moments of Life (MOL) – Virtual Assistant (VA) team
 - VICA – Virtual Intelligent Chat Assistant
 - Leading Business (Agency Engagement) & Engineering (Prod Delivery) functions
 - Team of 30+ business & engineering subject matter experts
- For more info
 - <https://www.tech.gov.sg/media/technews/a-conversation-with-bertrand-lee>
 - <https://www.linkedin.com/in/bertrandlee/>

Introduction - VICA

VICA = Virtual Intelligent Chat Assistant

- GovTech's next-generation multi-tenant Chatbot (Virtual Assistant) Platform
 - Replacement for current Ask Jamie chatbots (due to tech advances in past 5+ years)
 - Hosted in GCC-AWS, SaaS Cloud Service for 60+ govt agencies (ministries & stat boards)
 - VICA Platform v1.0 just went live (Dec 1, 2020)
 - Will migrate all Ask Jamie chatbots over to VICA in next 2 years, and build new VICA chatbots too
 - **Phase 1** (now onwards) - Text chatbot platform
 - **Phase 2** (2022 onwards) - Voice chatbots (a la Siri) & Call Center AI platform
- Product Vision
 - *“To leverage tech and AI to enrich all conversational interactions with the government”*

A Brief History

1950 – Alan Turing proposed the “Turing Test”

1966 – ELIZA invented at MIT AI Labs

- One of the first chatbots
- Virtual Psychotherapist
- Used keyword and pattern matching for NLU

1972 – PARRY developed at Stanford U

- Virtual patient with paranoid schizophrenia (eventually “met” ELIZA)

A Brief History (cont'd)

2000s – Early commercial chatbots/conversation AI

- Used pattern matching and basic ML models for NLU (eg. Logistic Regression, MaxEnt)

2011 – IBM Watson wins Jeopardy! Game show

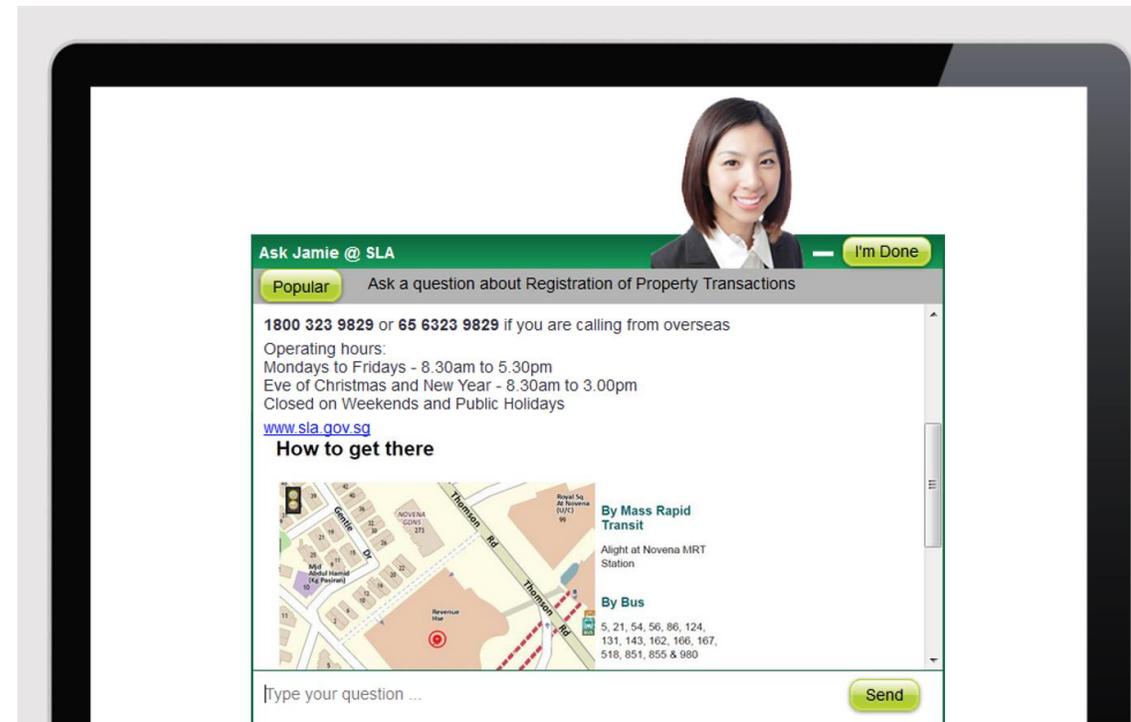
- Beats world's top human players

2010s to Present – Modern chatbots/conversation AI

- Siri, Alexa, Google Assistant, Microsoft Cortana
- Uses advanced ML models (neural networks, deep learning) for NLU
- Leveraged advances in cloud computing, big data and GPUs
- No AI has passed the Turing Test yet (in a comprehensive way)

Where are we today? (GovTech)

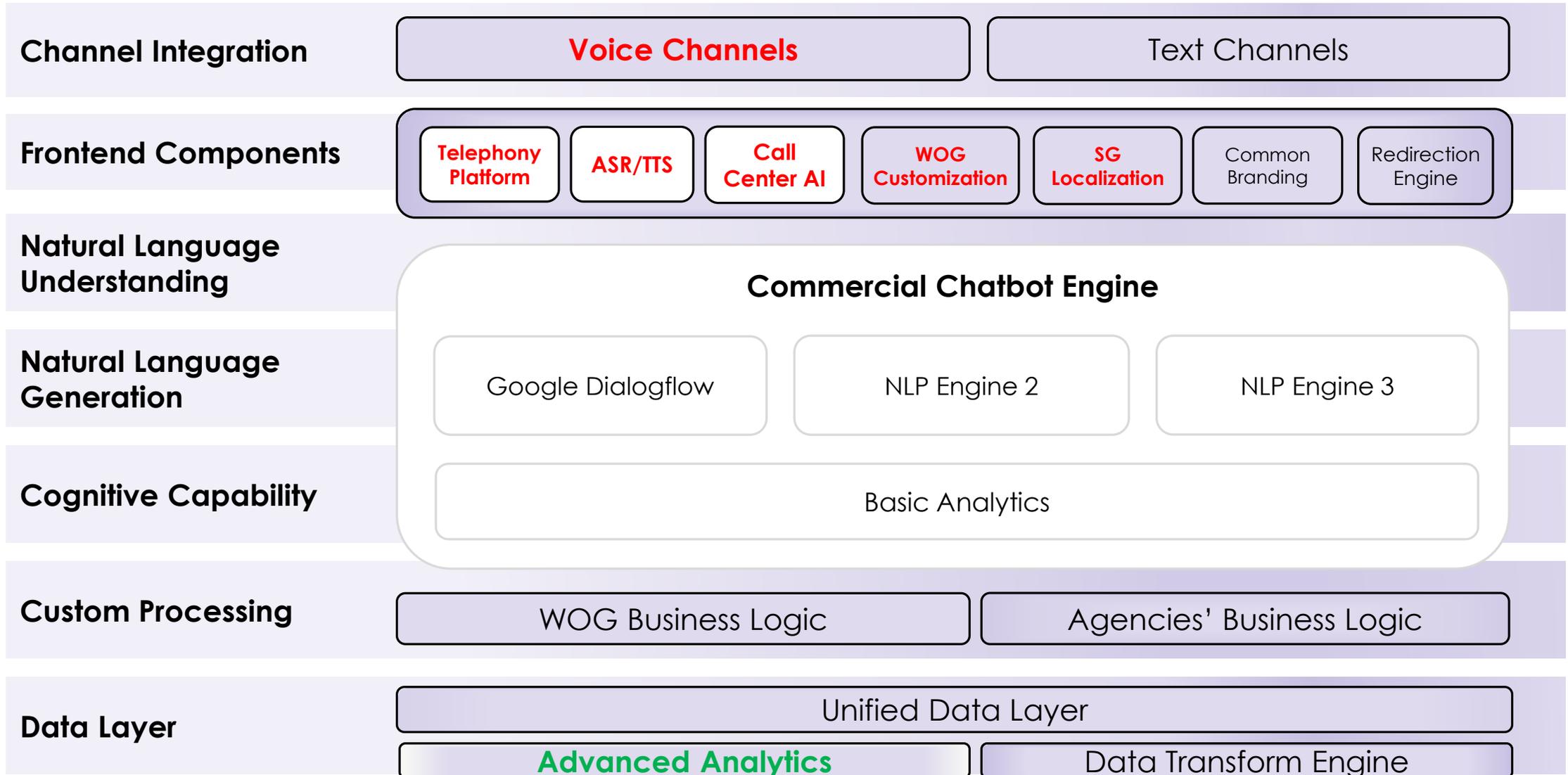
- 60+ Ask Jamie agency chatbots (Internet + Intranet)
- Using SG-based Chatbot Platform/NLP Engine provider



Where are we today? (Industry)

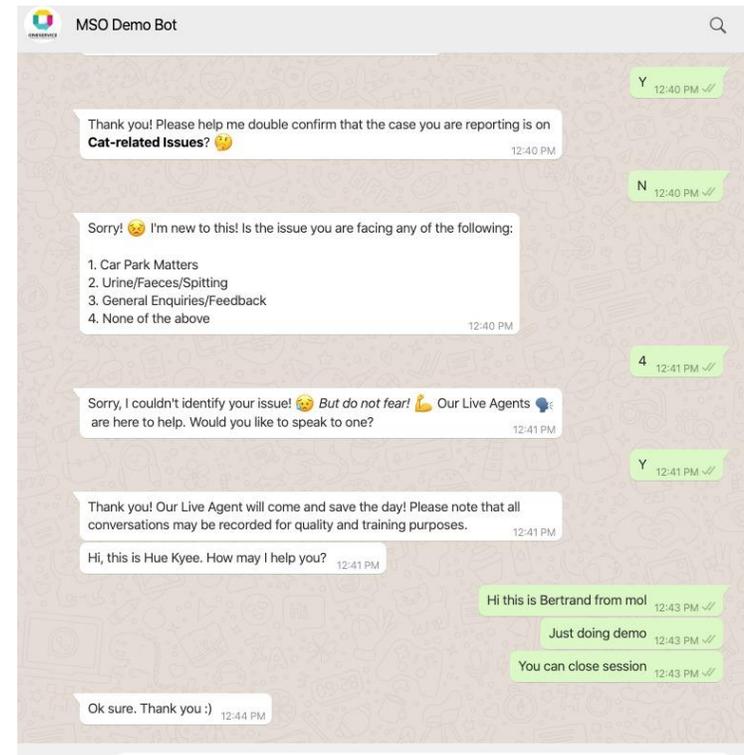
- Proliferation of Chatbot Platforms/NLP Engines, eg.
 - Google Dialogflow
 - Microsoft Luis
 - IBM Watson
 - Amazon Lex
 - Rasa (open-source)
 - Etc.
- Leverages Deep Learning models
- Supports advanced conversational authoring
 - Contextual understanding
 - Named Entity Recognition
 - Slot-Filling

VICA Functional Architecture



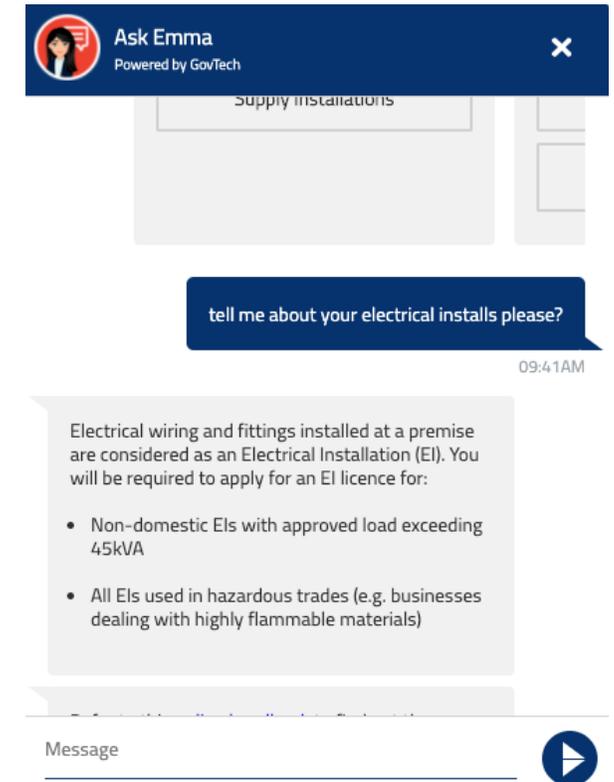
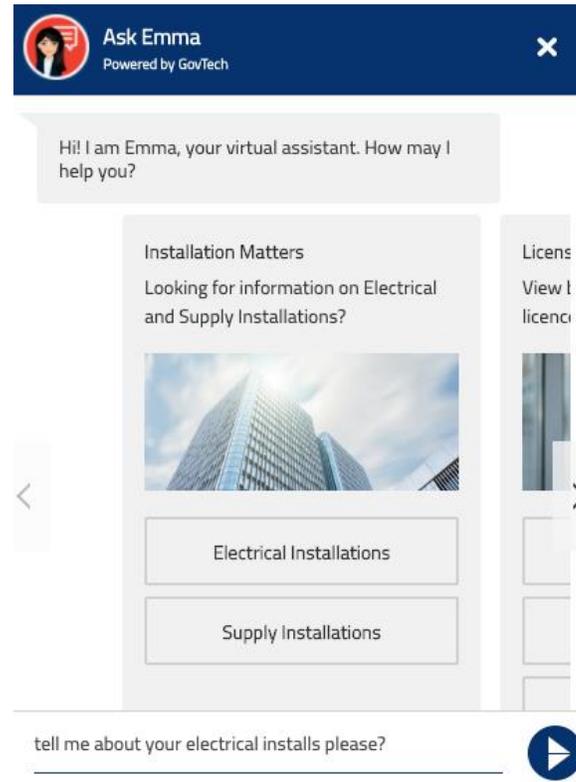
MSO Chatbot

- Chatbot version of OneService mobile app
- One of govt's 5 National AI Strategy projects
- Collaboration with GovTech DSAID team
- In prototype stage, go-live 2H2021



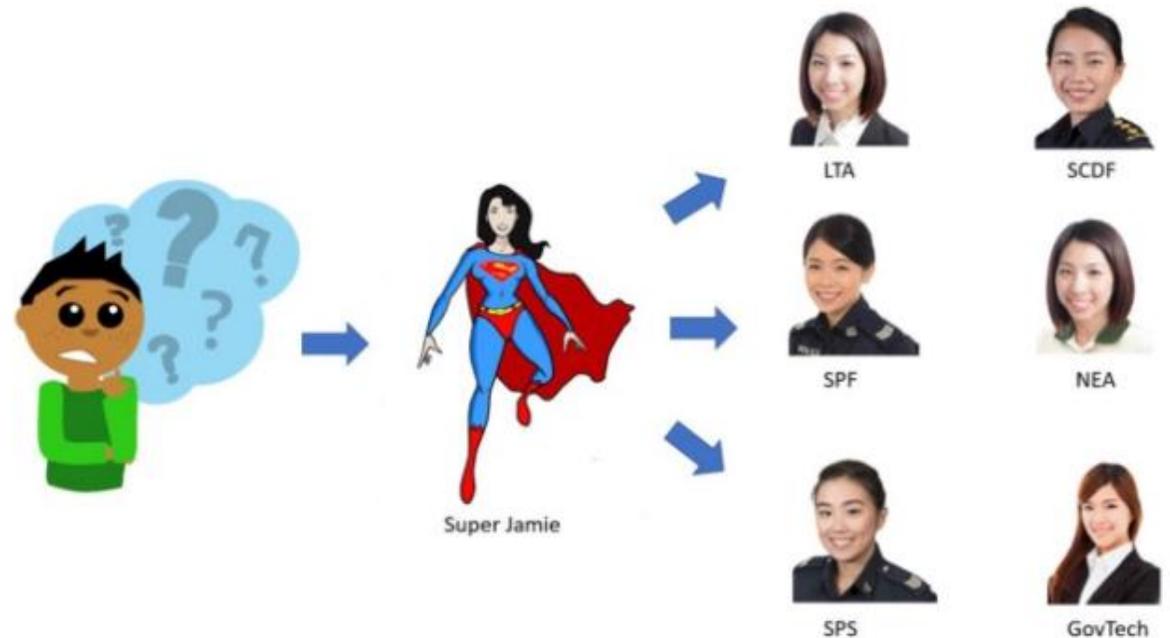
EMA Chatbot (Ask Emma)

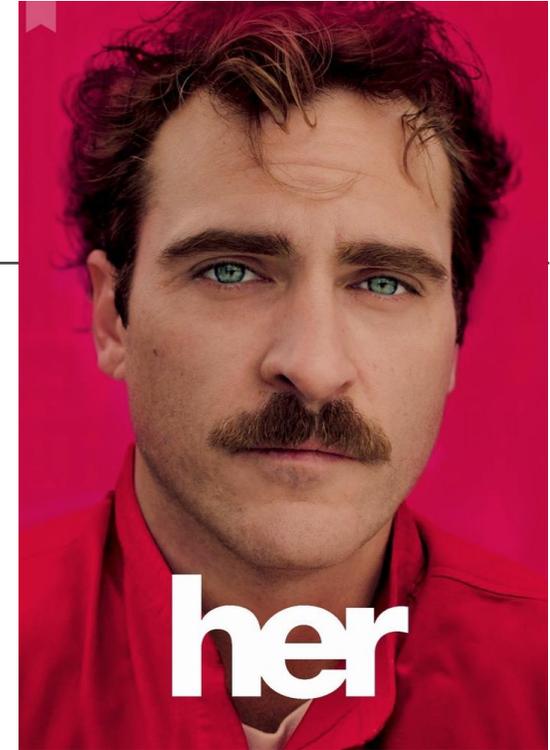
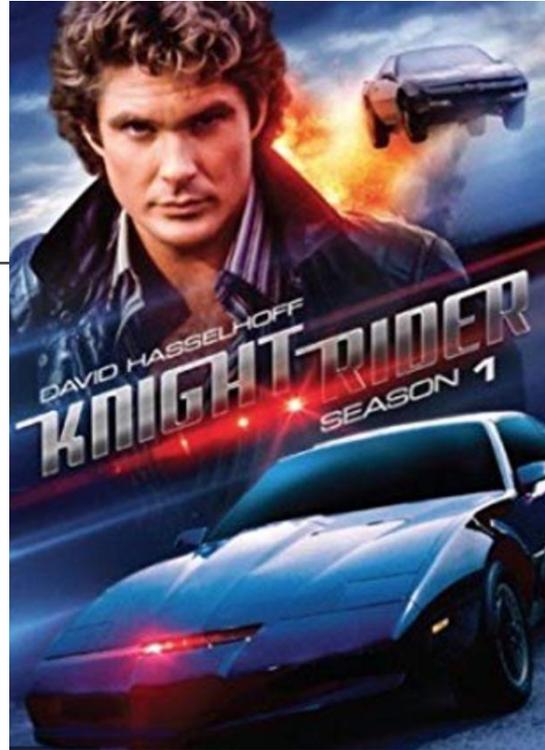
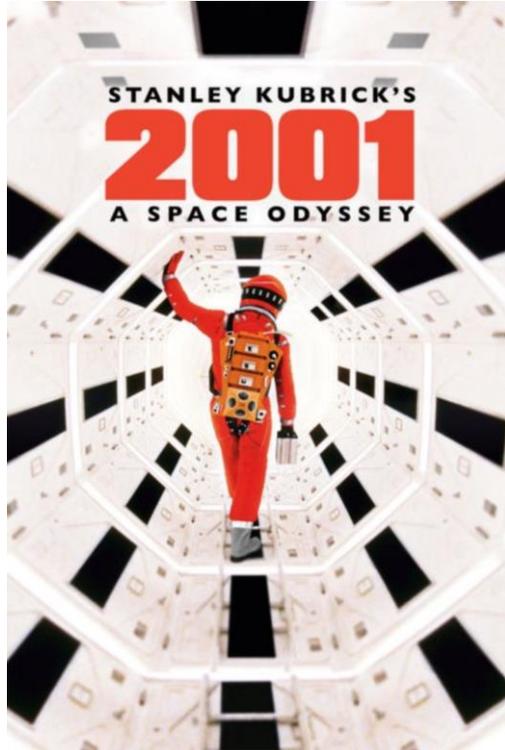
- <https://www.ema.gov.sg>
- Branded as “Ask Emma”, with “Powered by GovTech” on side
- Based on VICA platform, uses modern Rich Media Elements (Cards, Carousels, etc.)
- Much improved NLU accuracy over existing Ask Jamie chatbots



Superbot (WoG e-Concierge)

- “One bot to rule them all”
- Uses DSAID-developed Redirection Engine DNN model (with Google BERT)
- <https://medium.com/dsaid-govtech/using-bert-to-build-a-whole-of-government-chatbot-1afa826a3323>





Future Virtual Assistants

What is the future?

- The future is anyone's guess, but here are some thoughts
 - ML and AI will continue to improve, thus chatbots will too
 - Neural Networks have limitations, but new AI technologies will be discovered
 - One day, the Turing Test may be comprehensively passed
 - After that, who knows? The sky/universe is the limit...