

ENRICH4ALL Action

(E-goverNment [RI] CHatbot for ALL)

6th ELRC Conference

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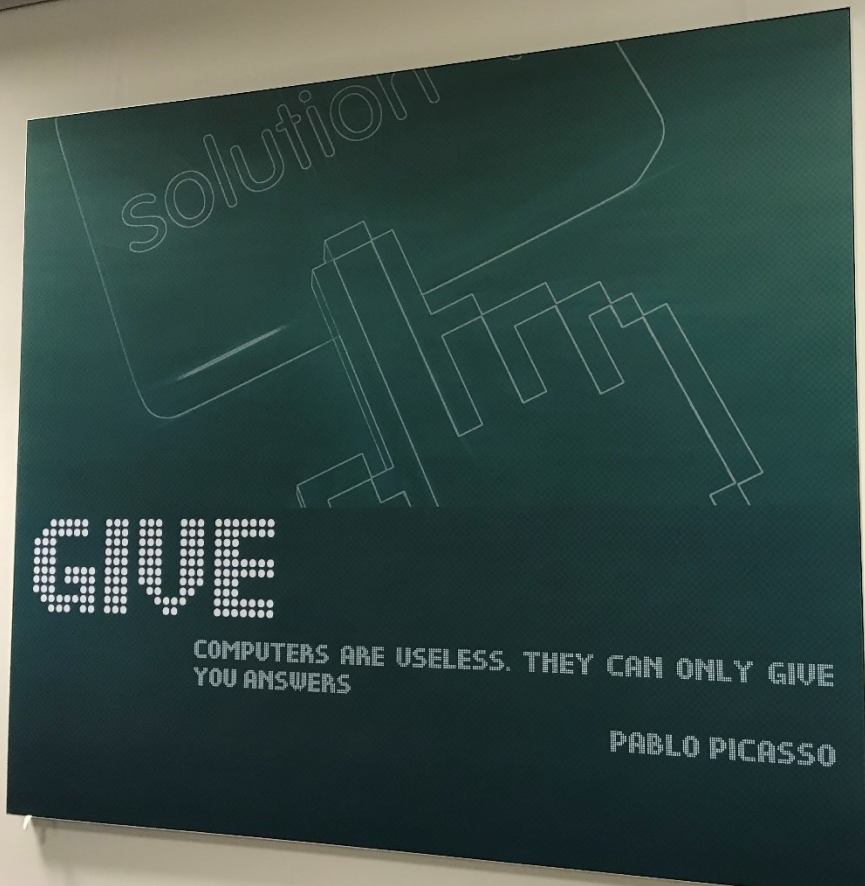
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LUXEMBOURG
INSTITUTE
OF SCIENCE
AND TECHNOLOGY





I am transferring you to customer support —————>

I am trying to solve a solution to your problem.

Agenda

- **Context of ENRICH4ALL**
- Benefits of an e-government chatbot
- eTranslation
- Domains / Datasets

ENRICH4ALL: Chatbot project

- European project CEF (Connecting Europe Facility) Telecom 2020 (Automated Translation): <https://ec.europa.eu/inea/en/connecting-europe-facility/cef-telecom/apply-funding/2020-automated-translation>
- Deploying / **Integration projects**
- Project duration: 24 months – Start: 01.06.2021
- Coordinator: LIST

PARTNERS

- **BEIA Consult International** (Romania) <https://www.beiaro.eu/>
 - Key supplier for ICT solutions/services in Romania, with experience in 10000+ commercial projects since 1991.
 - Has been working on many speech, text and data processing projects.
- **SupWiz**: <https://www.supwiz.com/> (Denmark)
 - University-spinout founded in the summer of 2017
 - AI product suite comprises chatbots, live chat, a ticket analyser, etc.
 - Consists of 20 multi-disciplinary experts
 - Nominated “Most Promising Start-Up” at the SIA 2018 (Search Industry Awards 2018), and in 2019, SupWiz was awarded the largest innovation prize by the Danish Minister of Science and Education
- **RACAI** (Research Institute for Artificial Intelligence, Romania) <http://www.racai.ro/en>
 - Established in 1994 as a small research centre in AI and became an institute in 2002
 - Largest group at RACAI (10 persons) is doing research and development in (multilingual) natural language and speech processing.



ENRICH4ALL Summary

- We aim to develop an **e-government chatbot (eChat)** which lowers the language barriers in the EU and the CEF Associated countries. Since it is a virtual assistant, it is continuously available and can instantly reach large amounts of people, irrespective of age, gender, educational background, and geographical barrier.
- **Multilingual bot:** The Machine Translation tool **eTranslation** will be integrated in the **eChat** bot, so that the user can interact with the **eChat** in their own mother tongue.
- Deployment of the eChat in **Luxembourgish, Romanian, and Danish** public administration
- ENRICH4ALL is an initial Action towards a **unified, broad EU-wide eTranslation-based bot**, which is currently missing in public administration in many countries.

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Government chatbot



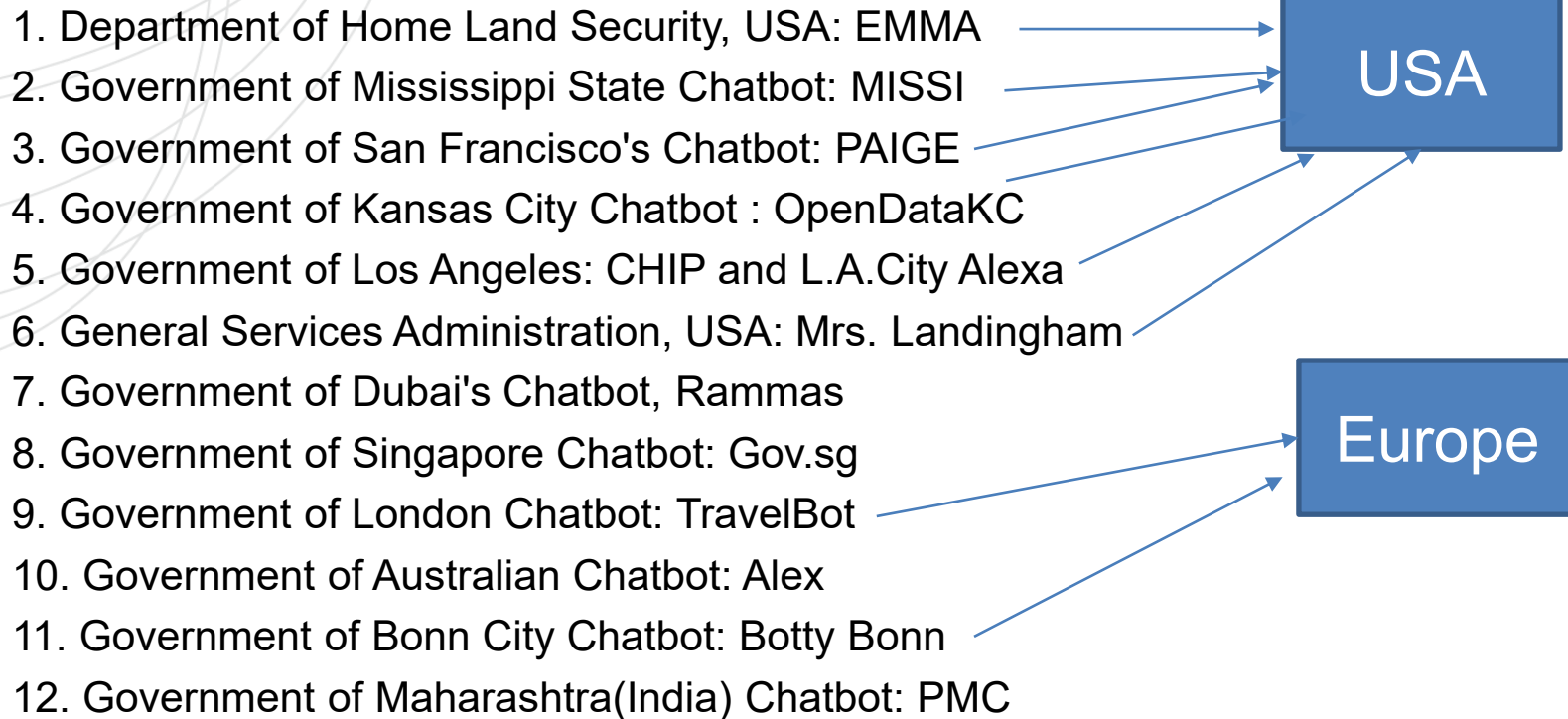
Benefits:

- Process service request in huge numbers
- Work 24/7
- Target large amounts of people irrespective of language, geographical barrier, COVID situation
- Lower cost for public administration
- Always timely and up-to-date information

Personal data security is an essential requirement for the deployment and viability of e-government chatbots.

Government chatbot: How chatbots can improve citizens' experience: <https://www.virtualspirits.com/government-chatbot-improve-citizens-experience.aspx>

Government agencies that use chatbot



Source: <https://blog.vsoftconsulting.com/blog/15-governments-agencies-that-use-chatbots>

eTranslation integration

User selects
language of the query
and domain

eTranslation translates
the query to EN/FR/DE,
LZ/RO/DA

BotStudio accesses the
query in the QA dataset

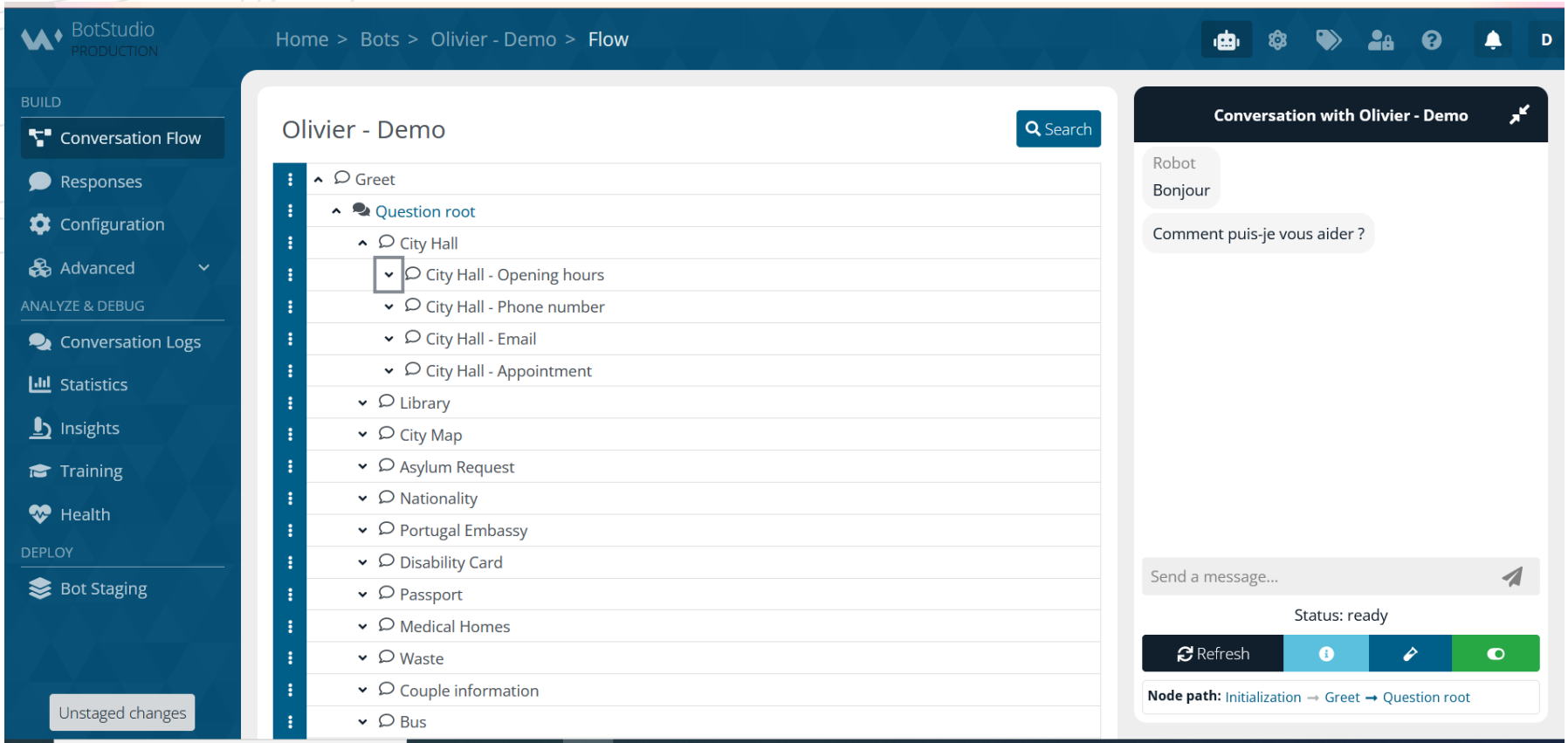
Language identification for EN,
DE, FR, LTZ, RO, DA

Manual selection for all other
languages

eTranslation translates
the query back in the
user's selected language

BotStudio provides
this as output

BotStudio



The screenshot shows the BotStudio interface for a bot named 'Olivier - Demo'. The top navigation bar includes 'Home > Bots > Olivier - Demo > Flow'. The left sidebar contains sections for 'BUILD' (Conversation Flow, Responses, Configuration, Advanced), 'ANALYZE & DEBUG' (Conversation Logs, Statistics, Insights, Training, Health), and 'DEPLOY' (Bot Staging). The main area displays a tree view of the bot's flow, with 'City Hall - Opening hours' selected. The right panel shows a chat window titled 'Conversation with Olivier - Demo' with a message from the robot: 'Bonjour' and 'Comment puis-je vous aider?'. The chat input field is empty, and the status is 'ready'. The node path is 'Initialization → Greet → Question root'.

BotStudio PRODUCTION

Home > Bots > Olivier - Demo > Flow

BUILD

- Conversation Flow
- Responses
- Configuration
- Advanced

ANALYZE & DEBUG

- Conversation Logs
- Statistics
- Insights
- Training
- Health

DEPLOY

- Bot Staging

Unstaged changes

Olivier - Demo

Search

- Greet
 - Question root
 - City Hall
 - City Hall - Opening hours**
 - City Hall - Phone number
 - City Hall - Email
 - City Hall - Appointment
 - Library
 - City Map
 - Asylum Request
 - Nationality
 - Portugal Embassy
 - Disability Card
 - Passport
 - Medical Homes
 - Waste
 - Couple information
 - Bus

Conversation with Olivier - Demo

Robot

Bonjour

Comment puis-je vous aider ?

Send a message...

Status: ready

Refresh

Node path: Initialization → Greet → Question root

Natural Language Understanding

NLU

- NLU understands the *context*: no need to type in tons of examples of wording to manipulate the model.
- NLU understands *typos and synonyms*: users should not worry about typos, misspellings and synonyms for your specific keywords.
- We have been testing BERT models for i) question labeling and ii) question similarity
 - *CamemBERT* for French language model: <https://camembert-model.fr/>
 - Dumitrescu, S.D., Avram, A.-M., & Pyysalo, S. (2020). The birth of the Romanian BERT. [arXiv:2009.08712v1](https://arxiv.org/abs/2009.08712v1)
 - Avram, A.M., Catrina, D., Cercel D.C., Dascălu, M., Rebedea, T., Păiș, V., & Tufiș, D. (2021). Distilling the Knowledge of Romanian BERTs Using Multiple Teachers. arXiv:2112.12650v1 [cs.CL] 23 Dec 2021
 - BERT medium for Luxembourgish: <https://huggingface.co/raduion/bert-medium-luxembourgish>

Agenda

- Context of ENRICH4ALL
- Benefits of a government chatbot
- ELRC and eTranslation
- **Domains**

Datasets of ENRICH4ALL

- General administrative questions (based on Guichet.lu) (LTZ, EN, DE, FR)

Wou muss ech d'Gebuert vu méngem Bébé umellen?	Where should I declare the birth of my baby?
Wat ass de soziale Mindestloun zu Lëtzebuerg?	Which is the minimum wage Luxembourg?
Ech wëll fir e Pass rembourséiert ze kréien.	I want to be reimbursed for a passport.

- Construction permits - 2200 questions based on a corpus of 500,351 words
 - Bună ziua, [vreau/aș dori/doresc] [să-mi/să] [refac/repar/reabilitez/modific] fațada [casei/locuinței] mele. Am nevoie de autorizație pentru [aceasta/această lucrare/această operație/această operațiune] și dacă da, [cum se obține/cum se procedează/ce trebuie făcut/ce trebuie să fac]? (“Hello, I want to redo the facade of my house. Do I need a construction permit for that and, if yes, what do I have to do?”)
- COVID-19 /eHealth (RO), 171 Qas based on a corpus of 147,297 words
 - **Q:** Vremea caldă [previne/ne ferește de/ne protejează de] infectarea cu Coronavirus? (“Does the warm weather protect us from the Coronavirus?”)

Ideal vs. Reality

- I am a café owner. Is my entire establishment, including the outside area, automatically placed under the 2G+ system?



- I have Pizzeria Italia. I must have 2G+, yes or no?
- 2G
 - Sanitary measures
 - Shops/Restaurants

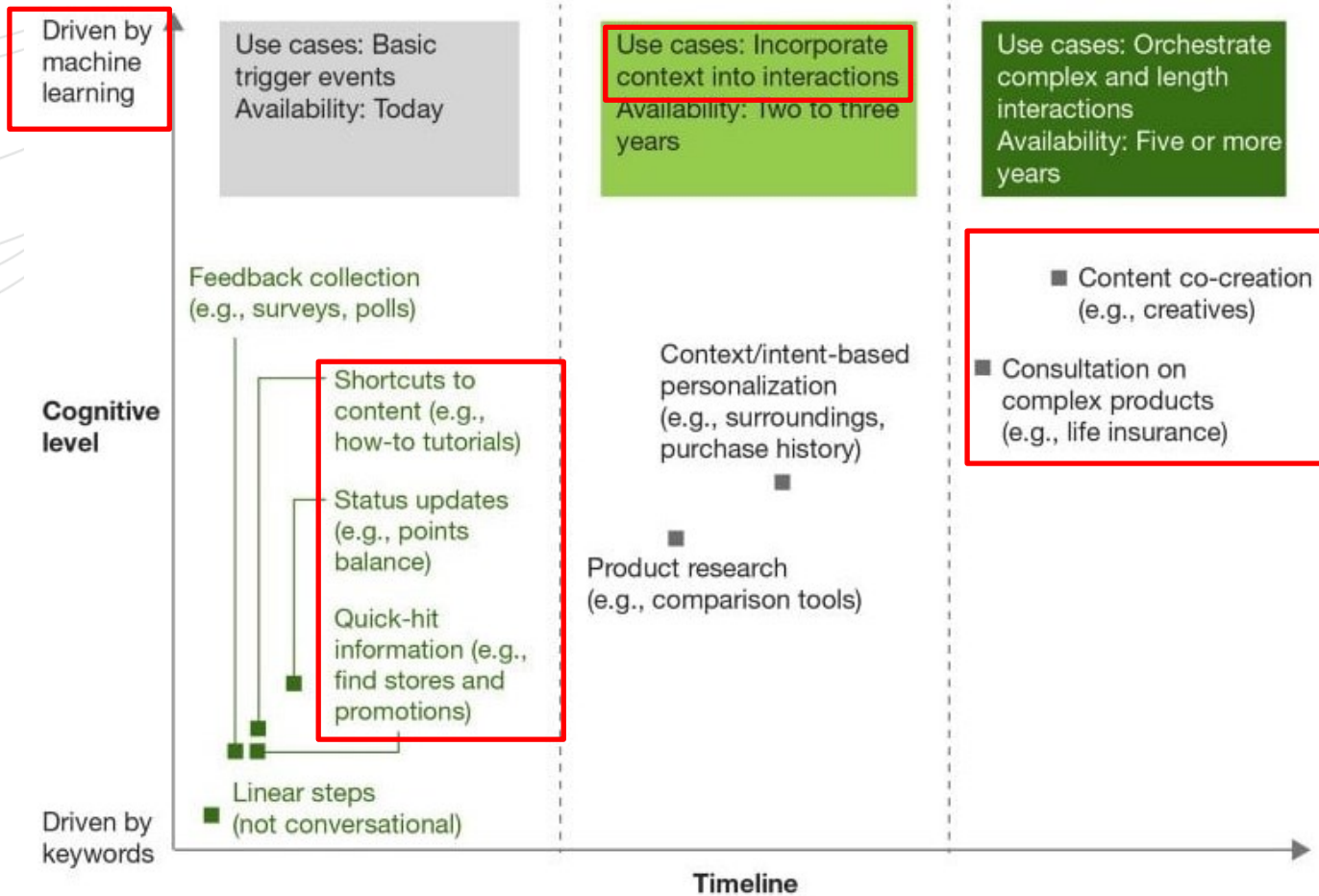
- My kid just tested positive. What do I need to do??
 - Missing info: *where (at school/home/work)? Kind of test?*
- I want to go to a restaurant. Do I need a test?
 - Missing info: *restaurant in Luxembourg, indoors/outdoors?*

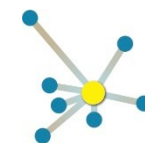
Domain-specific
customized
conversation agent

- Who brings me groceries when I am in quarantine? -> Social conversation
- I have coughing, do I have COVID? ->no diagnostic tool

Future of chatbots

AI advancements move chatbot potential from “question and answer” to “human-like”





European Language
Resource Coordination
Connecting Europe Facility

Get in touch

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ENRICH4ALL

E-GOVERNMENT [RI]
CHATBOT FOR ALL



EUROPEAN
LANGUAGE
GRID



EUROPEAN
LANGUAGE
EQUALITY