Virtual Forests
Bordeaux multiplier event
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IO5 -
Chatbot development for student information and buddy teaching assistant for leveling students

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Overview of Intellectual Output 5 (IO5)

Chatbot development for student information and buddy teaching assistant for leveling students

1. Create a chatbot that provides information on master studies in the domain of Forestry Engineering
   - Which masters are available, how long they are, how much they cost, who is the coordinator…

2. Create a chatbot that acts as a teaching assistant to answer doubts
   - Focused on introductory levels

T5.1 Selection of technology

- **Libraries to build stand-alone bots**
  - Rasa, ChatScript, Chatterbot
- **Cloud platforms to build and host bots**
  - Pandorabots, Wit.ai, IBM Watson Assistant, Azure Bot Services, Amazon Lex and Google DialogFlow
- **Google DialogFlow was selected**
  - Easy development
  - Powerful language processing (three years ago)
  - Easy training
  - Compliance to GDPR as for the messages sent

T5.2 Definition of scenarios

- **Scenario 1:**
  - Prospective master students in the field of Forestry Engineering at Universidad de Valladolid
  - They want to know which masters are available, what they are about, which are entry requirements, etc.
  - Chatbot in Spanish
- **Scenario 2:**
  - Students in course *Introduction to Mediterranean Forestry and Natural Resources* demand definitions or examples of key concepts
  - Chatbot in Spanish and English
    - Could be translated to any other language supported by DialogFlow

T5.3 Development of agent models (I)

- Chatbot 1: information on master studies (in Spanish)
  - Developed in 2021, updated in 2023
  - It deals with 12 main areas:
    - Existing master programs, details on the masters, access requirements, language requirements, programming languages, ECTS and price, scholarships, in campus vs. remote modalities, duration, international mobility, internships and contact person
  - Information from UVa website and interviews with teachers
- Available in Telegram
  - @ForestalesUva, https://t.me/ForestalesUvaBot
- Soon integrated in the iuFOR website for masters
  - https://iufor.uva.es/masterdataforest/
- Web interface (test only)
  - https://bot.dialogflow.com/c3ad3f22-6c2c-4c71-a51b-93c3d54561f9

T5.3 Development of agent models (II)

- Chatbot 2: teaching assistant (in Spanish)
  - Developed in 2021, updated in 2023 (almost finished)
  - Around 150 answers (concepts or additional explanations or examples)
    - Forest ownership, ecosystem services, non-timber forest products, stand, Reineke index, Hart-Becking index, LiDAR...
- Available in Telegram
  - @ConceptosForestales, https://t.me/ConceptosForestalesBot
- Integrated in UVa's Moodle for the course
  - Private access for students only
- Soon integrated in the VirtualForest project website
- Web interface (test only)
  - https://bot.dialogflow.com/127af530-0cb9-436f-99fc-f615b9273491

T5.3 Development of agent models (III)

- Chatbot 3: teaching assistant (in English)
  - Being translated from Spanish
    - Requires the translation of training sentences and output
  - It will be completed soon
- Available in Telegram
  - @ForestryConcepts, https://t.me/ForestryConceptsBot
- Soon integrated in the VirtualForest project website
- Web interface (test only)
  - https://bot.dialogflow.com/6ac33d57-5744-44ab-b9c8-1018609b4f25

T5.3 Development of agent models (IV)

- Concepts for chatbot 2 (and 3) have been extracted from
  - UN Food and Agriculture Organization (FAO)
  - SECF (*Sociedad Española de Ciencias Forestales*, Spanish Society for Forestry Sciences)
  - A famous book on silviculture by Rafael Serrada Hierro
  - A dictionary on pasture management
- The person acting as "knowledge engineer" is a Forest Engineer working for FAO

T5.4 Evaluation and refinement

- Both chatbots 1 & 2 have been tested by instructors on Forestry Engineering at Universidad de Valladolid
  - Dialog history is checked to refine the chatbots and avoid inconsistencies
- Chatbot 3 needs to be finished (by translating chatbot 2) and evaluated

Chatbots in the era of ChatGPT

- **GPT advantages**
  - Language models are much more powerful
  - Context (i.e., what was said earlier in the conversation) is managed by ChatGPT automatically
    - While in DialogFlow, the chatbot designer must program it (i.e., anticipate possible paths of conversation)
- **This generates the feeling that ChatGPT is understanding you better**
- **However**
  - ChatGPT always provides an answer, and can make it up
    - It has hallucinations, it produces outputs that sound plausible but are factually incorrect
    - This is **very** problematic in the educational domain
  - Instead, in our bots all the answers have been introduced by the bot designer
    - They are correct!!!

Demo time

- If you speak Spanish, you may test chatbots 1 & 2
- If you don't, you may test chatbot 3
  - Consider it only knows about types of forest ownership, ecosystem services, payments for ecosystem services and non-timber forest products
- Telegram: @ForestalesUVa, @ConceptosForestales, @ForestryConcepts
- Chatbot 1: https://bot.dialogflow.com/c3ad3f22-6c2c-4c71-a51b-93c3d54561f9
- Chatbot 2: https://bot.dialogflow.com/127af530-0cb9-436f-99fc-f615b9273491
- Chatbot 3: https://bot.dialogflow.com/6ac33d57-5744-44ab-b9c8-1018609b4f25

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Thanks!

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