

Initial Plan – Slackbot meets CE

Author: Andrew Dawson

Supervisor: Alun Preece

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Project Description

Human Computer Collaboration (HCC) is collaboration involving at least one human and one computational agent.¹

Historically, there have been two major approaches to human-computer collaboration, one more closely allied to AI, and the other to HCI.

Human emulation aims to endow computers with human-like abilities, the first step of this being to develop formal models of language, so that humans and computers can communicate on the same level

The Human complementary approach focuses on the things that computers and humans are respectively good at and assigns those roles to the appropriate agent.

The types of cognitive behaviour/task typically carried out by Slack users could be best described as Knowledge-based, which Cummings notes 'are better suited for human-computer collaboration.'² As Slack is used by humans to communicate and problem solve together, a machine does not have the knowledge available to replace them entirely. However, the machine can be a valuable partner by using automation to help organise, filter and synthesise data for the human agents. This will enable them to make decisions faster, and hopefully better.

To enable this collaboration to work in real time, we need a shared language that is easy for both machines and humans to use. One answer to this problem is the 'Controlled Natural Language technology ... for both machine and human agents, enabling both humans and machines to trivially "read" the information being exchanged.'³

Controlled English (CE) is a type of Controlled Natural Language (CNL); a restricted form of a language that is readable by humans and unambiguous to computers⁴

CE is underpinned by a 'conversational layer'. This layer is made up of a number of core interaction types such as 'ask/tell' and 'gist/expand'. Using these interaction types, a human can ask a machine a question such as 'why is the heating on?'. Conversely, a machine can use the same format to ask a human 'when are you leaving for work?'.

¹ (Terveen 1995)

² (Cummings 2014)

³ (O'Leary et al. 2016)

⁴ (IBM.com 2016)

'This means that agents with different operational domains can still communicate using a standard conversational model, so even if they cannot decode the items being discussed they are at least able to participate in the conversation.'⁵ This is especially important in this project as having the human users constantly explain the concepts behind the conversation to the machine would be incredibly disruptive. This makes CE a perfect choice for this project.

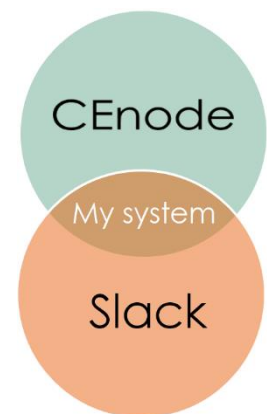
Controlled English Node (CENode) is a lightweight, natural language, knowledge-based system, implemented using JavaScript and designed to run effectively in a wide variety of contexts, from servers to mobile devices, and 'Internet things'.

CENode-based apps use CE to interact with users in conversational English. This allows non-technical users to use queries to perform complex tasks and receive easy to read results (ask and tell); the apps can also ask and tell the users things. Example CENode-based apps include SHERLOCK (Simple Human Experiment Regarding Locally Observed Collective Knowledge) for crowdsourcing knowledge bases.

Slack is a cloud based team collaboration tool billed as 'Team communication for the 21st century'.⁶ Slack comes with the SlackBot, a simple chatbot built into the system that provides a basic tutorial to new users and tips to existing users. It has a very basic conversational interface in the fact that it can recognise pre-programmed keywords, such as 'help', and users can tell it things by clicking on the options provided, e.g 'Is this email address correct? Yes – No'

The goal of the project is to integrate CENode with Slack, possibly using a SlackBot, so that Slack teams can benefit from conversational interaction with a natural language knowledge base. For example, team leaders could query CENode to find out what their team is currently working on, issues they are facing, lessons learned from a similar project, etc.

Ultimately the aim is to demonstrate that CE, using a conversational interface, can improve user performance with Slack in a measurable, clearly defined way.



Project Aims and Objectives

- Create an initial prototype linking CENode and Slack in some way that when a user asks a question Slack can access the knowledge base and display the correct answer.
- Develop a final system whose features try to bridge the gap between human and machine collaboration.
- Evaluate whether or not the new system does indeed bridge the gap in some measureable way

There is a low probability, high impact risk that it may not be possible to link the Slack system with CENode. This is addressed in week 2 of the work plan. From initial review

⁵ (O'Leary et al. 2016)

⁶ (Wikipedia 2016)

of the Slack documentation, it does appear as though this project is achievable but this will not be ultimately decided until the prototype is created.

If this project is not achievable in its current form, there are a few alternatives such as designing a SlackBot without the use of CENode or designing a CENode based system that does not incorporate Slack.

The design of the evaluation task will take into account certain ethical issues that may arise. It is unclear at this point what access a SlackBot or SlackApp will have to existing user data. It might be possible for a SlackBot to access users private Direct Messages without their express permission or knowledge. To ensure there is no breach of privacy, I will assign users synthetic tasks to be carried out on new accounts that I have created specifically for the evaluation task. This way I can make sure that no personal or personally identifiable information is collected.

Work Plan

Meetings are scheduled for roughly every 2 weeks in addition continual supervision and support will be provided via an online Slack channel

Week Commencing: 25/01 – Week 1	Deliverable: Initial Project Plan 29/01
Create and submit the Initial Project Plan	

Week Commencing: 01/02 – Week 2	
Explore the feasibility of creating this system. Research similar projects / existing Slack Bots	

Week Commencing: 08/02 – Week 3	
Build a prototype demonstrating that connectivity between Slack and CENode works	

Week Commencing: 15/02 – Week 4	Milestone – Working prototype 19/02
Finish the prototype	

Week Commencing: 22/02 – Week 5	Review meeting 1 - 23/02
Gather user stories. Design the system around desirable features taken from user stories	

Week Commencing: 29/02 – Week 6	
Begin development of final system	

Week Commencing: 07/03 – Week 7	
Continue development / testing	

Week Commencing: 14/03 – Week 8	Review meeting 2
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Continue development / testing. Plan / set up evaluation task	
Week Commencing: 21/03 – Week 9e	Milestone - User testing report 25/03
Conduct evaluation task, compile results	
Week Commencing: 28/03 – Week 10e	
Finalise system	
Week Commencing: 04/04 – Week 11e	Milestone - System completed 08/04
	Deliverable – Demonstrable system
Start writing final report	
Week Commencing: 11/04 – Week 12	Review meeting 3
Continue writing final report	
Week Commencing: 18/04 – Week 13	
Continue writing final report	
Week Commencing: 25/04 – Week 14	Milestone - Report completed 29/04
Proofreading / editing	
Week Commencing: 02/05 – Week 15	Deliverable: Final Report
Deadline Final Report 06/05. Prepare for viva	

References

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