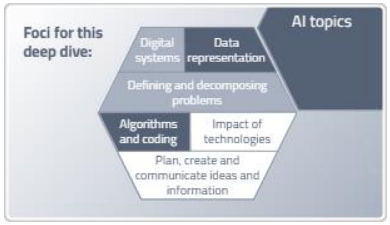
AI Professional Learning: Natural Language Programming for large text analysis (Yrs 7-10)

Session overview

DT Curriculum focus	Relevant slides	Covered in the session	Resources
		During this session you will: • Explore why understanding language is more than turning speech into text. • Observe / try a hands-on example of writing a Python program to rate sentiment of texts. • Access learning sequences to analyse large texts.	
Defining and decomposing problems / Algorithms / Implementation		Curriculum connections • Digital Technologies: Focus on defining and decomposing problems creating a digital solution that incorporates algorithms and implementation the related key concepts include:	

		**Defining and decomposing problems:** the focus on the precise definition and communication of problems and their solutions. **Implementation**: the automation of an algorithm, typically by using appropriate software or writing a computer program. **Algorithms:** precise description of the steps and decisions needed to solve a problem. While focussing on implementation we can incorporate relevant general capabilities. • General capability: ICT capability • General capability: Critical and creative thinking	

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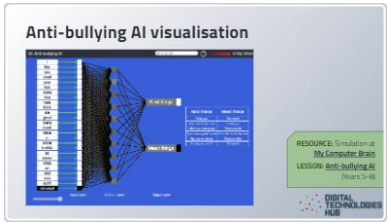
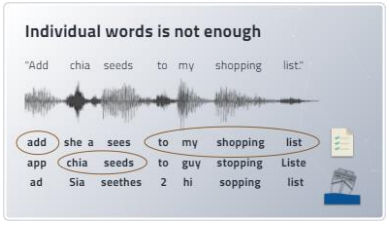
		We also include ways of thinking, particularly: • Design Thinking • Computational Thinking	
Data representation		We visualise a machine learning scenario that takes a simple approach to categorising phrases as positive or negative, based on keywords fed into the neural net.	Downloadable resources/links • Simulation at My Computer Brain • Lesson idea: Anti-bullying AI (Years 5-8) • Artificial Intelligence Explainers: Video 2: AI in our everyday life
Defining and decomposing problems / Data representation		We discuss why speech recognition is not a simple matter of analysing the audio for individual words and sounds. Highly effective language recognition uses structural knowledge from linguistics theory as well as additional AI for context.	

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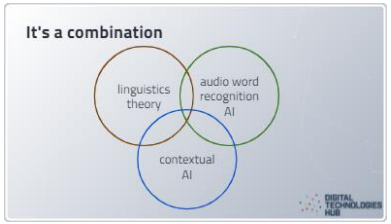
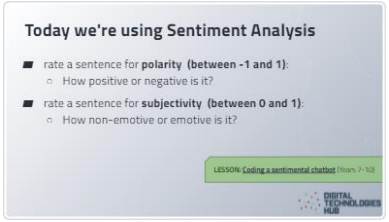
			
Data representation		We introduce the concept of sentiment analysis: a way of assessing text for **polarity** (how positive / negative the sentiment is) and **subjectivity** (how non-emotive / emotive the sentiment is). We describe the first of two lessons available on the Digital Technologies Hub, creating a sentimental chatbot. The lesson contains video tutorials and lectures, as well as activities.	Downloadable resources/links • Lesson idea: Coding a sentimental chatbot (Years 7-10)
Data representation / Algorithms / Implementation/ Computational Thinking		We begin our coding example: a solution to assign star ratings to brief restaurant reviews based on sentiment analysis. We use pseudocode (structured English) to describe our algorithm, then the code is done in Python, using the replit.com online	Downloadable resources/links • The replit.com online environment • The TextBlob library

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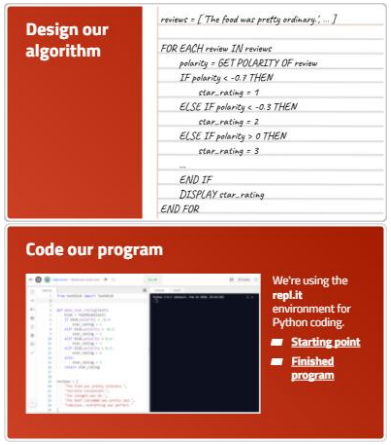
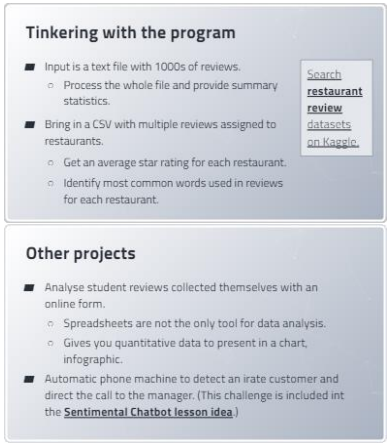
		environment. The functions and objects for textual analysis are provided by the **TextBlob** library. Sentiment functionality in TextBlob relies on research by CLiPS (Computational Linguistics, Psycholinguistics and Sociolinguistics) research center, University of Antwerp.	• Starting point for our program • The finished program
Data collection and analysis / Algorithms / Implementation/ Computational Thinking		We explore ways to tinker and expand on our project, as well as alternate projects students might do. In particular, this type of coding offers an alternative to spreadsheets for certain types of data analysis. It is an example of automating the process of "quantitising" - converting qualitative data to quantitative data.	Downloadable resources/links • Lesson idea: Coding a sentimental chatbot (Years 7-10)

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Data representation / Algorithms / Implementation / Computational Thinking		We describe another, more advanced, lesson available on the Digital Technologies Hub, which employs sentiment analysis as part of investigating full texts. An out-of-copyright text like *Alice in Wonderland* is broken down (tokenised) into words, sentences and paragraphs. Then, sentiment analysis is used to: • examine polarity over the course of the book • find frequent pronouns to identify characters • classify characters as heroes and villains	Downloadable resources/links • Lesson idea: Book analysis with AI techniques (Years 7-10)