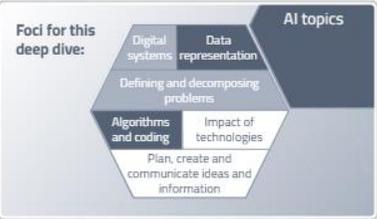


AI Professional Learning: Natural Language Programming for large text analysis (Yrs 7-10)

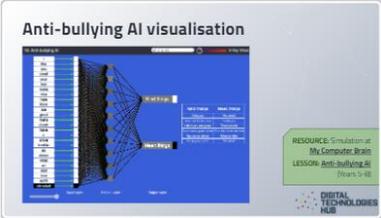
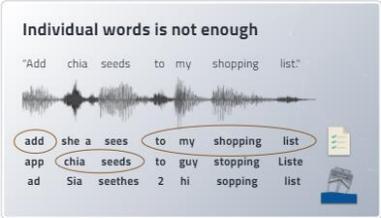
Session overview

DT Curriculum focus	Relevant slides	Covered in the session	Resources
		<p>During this session you will:</p> <ul style="list-style-type: none"> • 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. 	
<p>Defining and decomposing problems / Algorithms / Implementation</p>		<p>Curriculum connections</p> <ul style="list-style-type: none"> • Digital Technologies: Focus on defining and decomposing problems creating a digital solution that incorporates algorithms and implementation the related key concepts include: 	

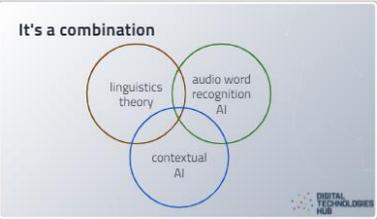
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	 <p>Foci for this deep dive:</p> <ul style="list-style-type: none">Digital systemsData representationAI topicsDefining and decomposing problemsAlgorithms and codingImpact of technologiesPlan, create and communicate ideas and information	<p>Defining and decomposing problems: the focus on the precise definition and communication of problems and their solutions.</p> <p>Implementation: the automation of an algorithm, typically by using appropriate software or writing a computer program.</p> <p>Algorithms: precise description of the steps and decisions needed to solve a problem.</p> <p>While focussing on implementation we can incorporate relevant general capabilities.</p> <ul style="list-style-type: none">• General capability: ICT capability• General capability: Critical and creative thinking	
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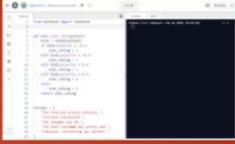
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		<p>We also include ways of thinking, particularly:</p> <ul style="list-style-type: none"> • Design Thinking • Computational Thinking 	
<p>Data representation</p>	 <p>Anti-bullying AI visualisation</p> <p>RESOURCE: Simulation at My Computer Brain LESSON: Anti-bullying AI (Years 7-10) DIGITAL TECHNOLOGIES HUB</p>	<p>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.</p>	<p>Downloadable resources/links</p> <ul style="list-style-type: none"> • Simulation at My Computer Brain • Lesson idea: Anti-bullying AI (Years 5-8) • Artificial Intelligence Explainers: Video 2: AI in our everyday life
<p>Defining and decomposing problems / Data representation</p>	 <p>Individual words is not enough</p> <p>"Add chia seeds to my shopping list."</p> <p>add she a sees to my shopping list app chia seeds to guy stopping Liste ad Sia seethes 2 hi sopping list</p>	<p>We discuss why speech recognition is not a simple matter of analysing the audio for individual words and sounds.</p> <p>Highly effective language recognition uses structural knowledge from linguistics theory as well as additional AI for context.</p>	

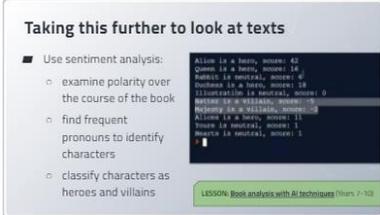
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	 <p>It's a combination</p> <p>linguistics theory, audio word recognition AI, contextual AI</p> <p>DIGITAL TECHNOLOGIES HUB</p>		
<p>Data representation</p>	 <p>Today we're using Sentiment Analysis</p> <ul style="list-style-type: none"> rate a sentence for polarity (between -1 and 1): <ul style="list-style-type: none"> How positive or negative is it? rate a sentence for subjectivity (between 0 and 1): <ul style="list-style-type: none"> How non-emotive or emotive is it? <p>LESSON: Coding a sentimental chatbot (Years 7-10)</p> <p>DIGITAL TECHNOLOGIES HUB</p>	<p>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).</p> <p>We describe the first of two lessons available on the Digital Technologies Hub, creating a sentimental chatbot.</p> <p>The lesson contains video tutorials and lectures, as well as activities.</p>	<p>Downloadable resources/links</p> <ul style="list-style-type: none"> Lesson idea: Coding a sentimental chatbot (Years 7-10)
<p>Data representation / Algorithms / Implementation/ Computational Thinking</p>	 <p>Our hands-on example</p> <p>A star rating assigner for restaurant reviews.</p> <p>Five short reviews are provided.</p> <p>Each one needs to be assigned a star rating between 1 and 5.</p>	<p>We begin our coding example: a solution to assign star ratings to brief restaurant reviews based on sentiment analysis.</p> <p>We use pseudocode (structured English) to describe our algorithm, then the code is done in Python, using the replit.com online</p>	<p>Downloadable resources/links</p> <ul style="list-style-type: none"> The replit.com online environment The TextBlob library

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	<div data-bbox="510 279 887 496"> <p>Design our algorithm</p> <pre> review = ['The food was pretty ordinary', ...] FOR EACH review IN reviews polarity = GET POLARITY OF review IF polarity < -0.7 THEN star_rating = 1 ELSE IF polarity < -0.3 THEN star_rating = 2 ELSE IF polarity > 0 THEN star_rating = 3 ... END IF DISPLAY star_rating END FOR </pre> </div> <div data-bbox="510 502 887 715"> <p>Code our program</p>  <p>We're using the repl.it environment for Python coding.</p> <ul style="list-style-type: none"> Starting point Finished program </div>	<p>environment.</p> <p>The functions and objects for textual analysis are provided by the TextBlob library.</p> <p>Sentiment functionality in TextBlob relies on research by CLiPS (Computational Linguistics, Psycholinguistics and Sociolinguistics) research center, University of Antwerp.</p>	<ul style="list-style-type: none"> Starting point for our program The finished program
<p>Data collection and analysis / Algorithms / Implementation/ Computational Thinking</p>	<div data-bbox="510 746 887 965"> <p>Tinkering with the program</p> <ul style="list-style-type: none"> Input is a text file with 1000s of reviews. <ul style="list-style-type: none"> Process the whole file and provide summary statistics. Bring in a CSV with multiple reviews assigned to restaurants. <ul style="list-style-type: none"> Get an average star rating for each restaurant. Identify most common words used in reviews for each restaurant.  </div> <div data-bbox="510 973 887 1189"> <p>Other projects</p> <ul style="list-style-type: none"> Analyse student reviews collected themselves with an online form. <ul style="list-style-type: none"> Spreadsheets are not the only tool for data analysis. Gives you quantitative data to present in a chart, infographic. Automatic phone machine to detect an irate customer and direct the call to the manager. (This challenge is included in the Sentimental Chatbot lesson idea.) </div>	<p>We explore ways to tinker and expand on our project, as well as alternate projects students might do.</p> <p>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.</p>	<p>Downloadable resources/links</p> <ul style="list-style-type: none"> Lesson idea: Coding a sentimental chatbot (Years 7-10)

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<p>Data representation / Algorithms / Implementation / Computational Thinking</p>	 <p>Taking this further to look at texts</p> <ul style="list-style-type: none">■ Use sentiment analysis:<ul style="list-style-type: none">○ examine polarity over the course of the book○ find frequent pronouns to identify characters○ classify characters as heroes and villains <pre>Alice is a hero, score: 42 Queen is a hero, score: 19 Rabbit is neutral, score: 0 Cheshire is a hero, score: 18 Illustration is neutral, score: 0 Madness is villainous, score: 0 Madness is a villain, score: 0 Alice is a hero, score: 11 Queen is neutral, score: 1 Madness is neutral, score: 1</pre> <p>LESSON: Book analysis with AI techniques (Years 7-10)</p>	<p>We describe another, more advanced, lesson available on the Digital Technologies Hub, which employs sentiment analysis as part of investigating full texts.</p> <p>An out-of-copyright text like <i>Alice in Wonderland</i> is broken down (tokenised) into words, sentences and paragraphs.</p> <p>Then, sentiment analysis is used to:</p> <ul style="list-style-type: none">• examine polarity over the course of the book• find frequent pronouns to identify characters• classify characters as heroes and villains	<p>Downloadable resources/links</p> <ul style="list-style-type: none">• Lesson idea: Book analysis with AI techniques (Years 7-10)
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