

TECHFEST.PREFERRED.AI

11 September 2020

Supported by:



School of
Information Systems



About Us

PREFERRED.AI is a research group at SMU School of Information Systems (SIS). In this TechFest, we will be sharing recent projects that the group is actively pursuing, particularly those resulting from a collaborations between our researchers and SIS undergraduates.

Mission

Our mission is to ‘push the envelope’ on learning user preferences from data to improve the effectiveness and efficiency of recommendations using data mining, machine learning, and artificial intelligence. This encompasses designing algorithms for mining user-generated data of various modalities (e.g., ratings, text, images, social networks) for understanding the behaviours and preferences of users (individually and collectively), and applying the mined knowledge to develop user-centric intelligent applications.

Programme

OPENING (3.30pm to 4.00pm)

Preferred.AI – Get to know us, our activities, and how you can get involved

SESSION I – SENSING (4.00pm to 5.00pm)

- **FaceInMotion** – Understanding human emotions via facial expression in real time
- **MindReader** – Your personalized news recommendation engine
- **VisConcepts** – Image search with visual concepts

SESSION II – RECOMMENDING (5.00pm to 6.00pm)

- **Butler** – Personal shopping assistant at your fingertips
- **SnappyBuyer** – Make well-informed decisions in a snap
- **ThriftCity** – Finding the best offers

SESSION III – AUGMENTING (6.00pm to 7.00pm)

- **Slide++** – Power your academic slides
- **AutoExpander** – Putting more words into short texts
- **Neural Network Lab** – Deep learning in your browser

Face Emotion Detection



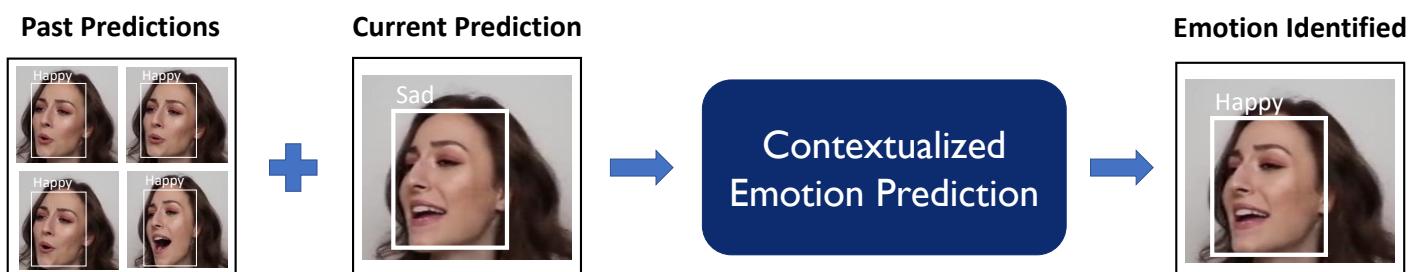
- FaceInMotion is built to detect human emotions from facial expressions.
- Accuracy for video analysis is further improved by considering the context.
- Emotion detection and consolidation are done in real-time.
- Intuitive graphs for further analysis and understanding of videos.

Potential Applications

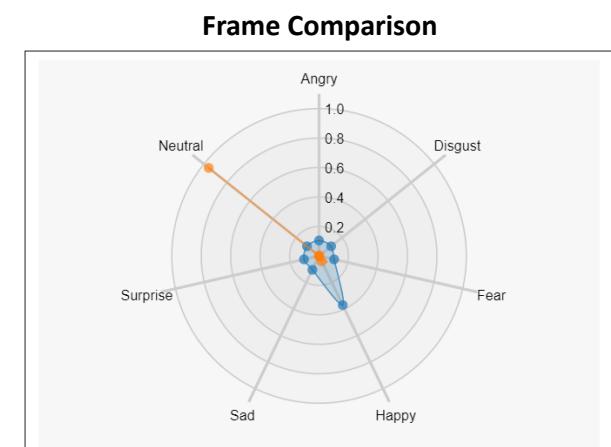
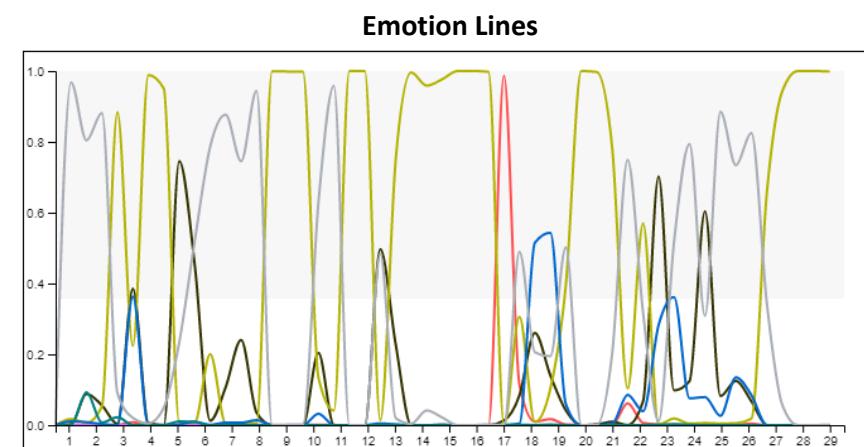


- Education
Monitoring students' learning (e.g., identifying learning difficulties)
- Market Research
Analysing customers' sentiment (e.g., customers' response to products)
- Interviews
Profiling interviewees (e.g., confidence level)
- Law Enforcement
Detecting malicious intent (e.g., hostility)

Emotion Detection Process



Analytical Tools



Angry

Disgust

Fear

Happy

Sad

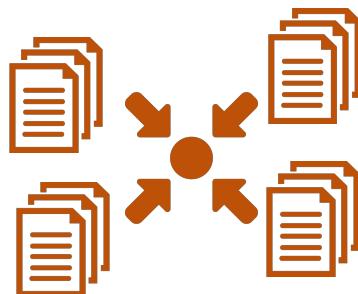
Surprise

Neutral

Your Personalized News Recommendation Engine

One-stop platform for searching, browsing, and discovering news you love, bringing you credible news tailored to your preferences.

Features



Aggregating articles from multiple reputable news sources.



Searching for latest articles of interest using keywords.



Reviewing reading history, **rating** articles, and **expressing** opinions.

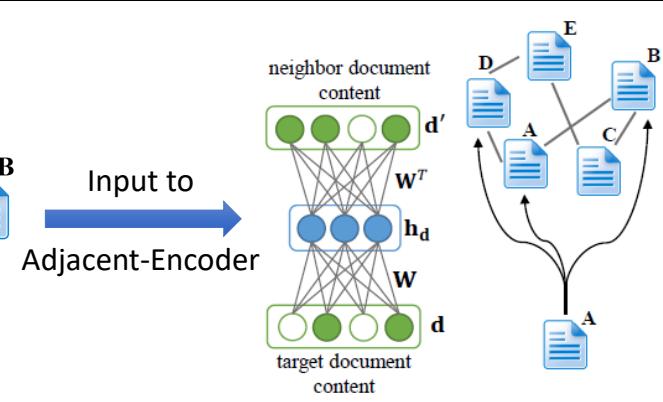
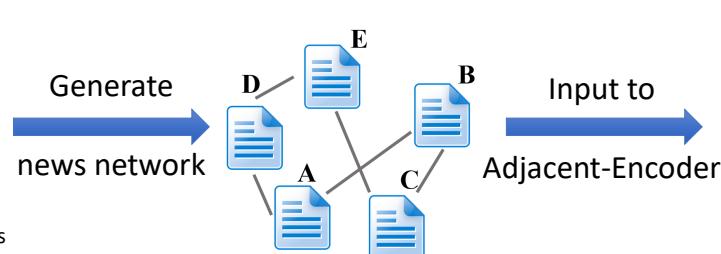


Recommendating news according to users' recent preferences.

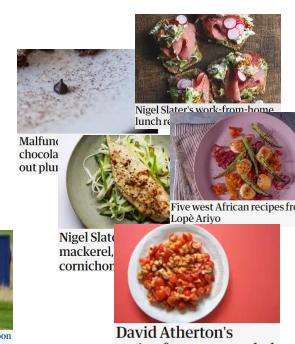
Generating Recommendations



Articles from reputable news sources



Display articles
ranked by topic similarity
and reading history



Output topics
of newly published articles

Image Search with Visual Concepts

A search engine that allows users to query by multiple images, predicts the search concepts, and retrieves relevant images



Query Images



Semantic Concepts



Recommendations



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Key Features



User-Curated Query

Enable users to define their query by a set of images that visually express their desired concepts. Concepts can be further refined by adding/removing images.



Concepts Predictor

Utilize machine learning architectures to infer the search concepts from the query images. Concepts change dynamically when query images are changed.



Recommendation

Recommend images that match the predicted concepts instantly. Recommended images can be directly added to the query to refine the suggested concepts.

Applications



Brainstorming
for content creators and designers



Thematic design suggestions
for event planners



Product recommendations
for shoppers

Personal shopping assistant at your fingertips

AI-powered conversational chatbot that learns from your preferences so you can find the right products with proper explanations

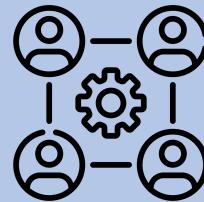
Challenges



As more people make mobile purchases,
how do we enhance their shopping
experience?



Most recommender systems provide little
to no explanation for recommendations



Generic product recommendations may
not keep track of individual preferences

Solutions



Interactive conversational shopping
assistant to search for products across
platforms all within a chatbot environment



Clear explanations alongside
recommendations for smarter decisions



Improved recommendations over time by
learning preferences from user sessions

Test it out:

- Butler leverages AI technologies to generate **natural language explanations** for its recommendations
- It has potential applications in providing explanations for travel recommendations / service reviews



Make well-informed decisions in a snap

Recommendations, tech product information and reviews in one place. With **SnappyBuyer**, you choose better products in less time.

The Problem



Product information is scattered across the Web, making product research difficult and inefficient

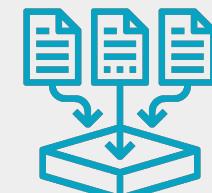


While looking for the right electronic product, we spend copious amounts of time reading user reviews



Too much information and too many options are given, leading to tough decisions and the paradox of choice

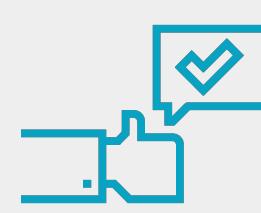
The Solution



Aggregate user reviews of electronic products from various sources in one place



Summarize key points of the product in a single page for easy reading



Concisely present the pros and cons of each product, such as red flags and user recommendations

What we do

- Leverage on ML and NLP technologies to **analyze the language of electronic product reviews** and **extract actionable information**
- Provide a **faster and simpler way to explore electronic products**

Finding the best offers



Wide Variety

Search a unified catalogue of products, integrated from multiple retailers.



Fast & Convenient

Check the latest prices with international shipping prices included.
Comprehensive information about products just within clicks.



Enjoy Savings \$

Compare all-in pricing for the same product in your preferred currency.

Why Thrift City?



More merchants means more choices to get your product!

Comparing prices and delivery information have never been easier! Rest easy knowing that you have gotten the best offer.



Product offers from multiple countries

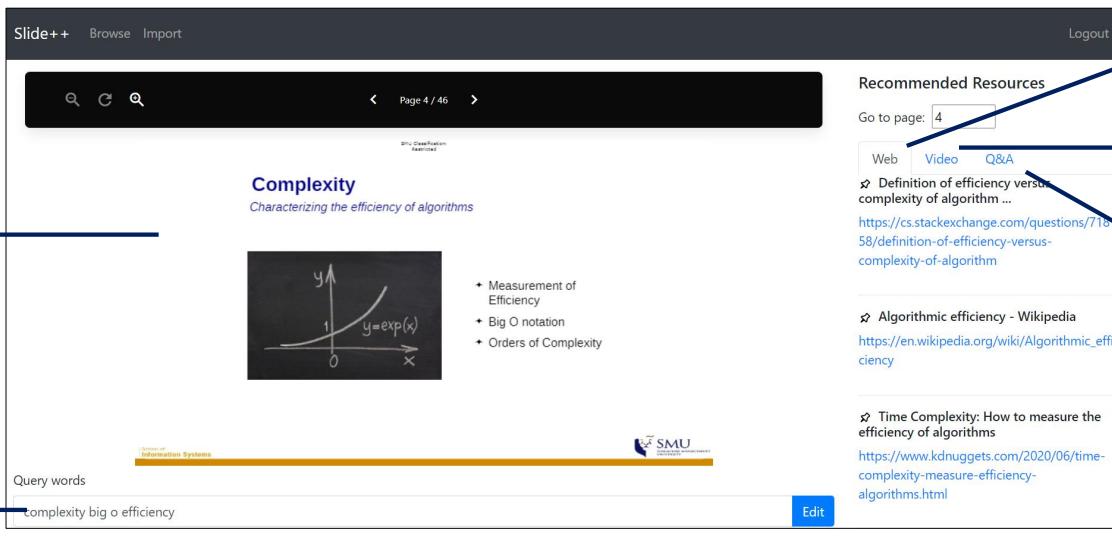
We have included overseas shipping fees into the calculations. Compare across borders and you may get a better deal!



All your favourite products in one list

Your wishlist helps you to keep track of products that you may want. Keep tabs on their prices over time!

Power Your Academic Slides



The screenshot shows a slide from the 'Complexity' section, characterized by the efficiency of algorithms. It features a graph of the exponential function $y = \exp(x)$. Below the graph, there is a list of concepts: Measurement of Efficiency, Big O notation, and Orders of Complexity. To the right, a sidebar titled 'Recommended Resources' is displayed, listing five types of resources:

1. Academic PowerPoint slides provided by the instructors
2. Salient keywords that capture the essence of the slide, produced by text mining technologies
3. Websites that discuss that similar content from different perspectives
4. Videos that explain the concepts in a clearer manner
5. Common questions that are answered by experts around the world

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Benefits for Teachers

- Keywords and relevant resources automatically curated from PowerPoint slides
- Fine-tuning of keywords
- Highlighting of favourite resources



Benefits for Students

- Richer resources that explain the course materials from multiple angles
- Support for independent learning experience outside of classroom

Putting more words into short texts

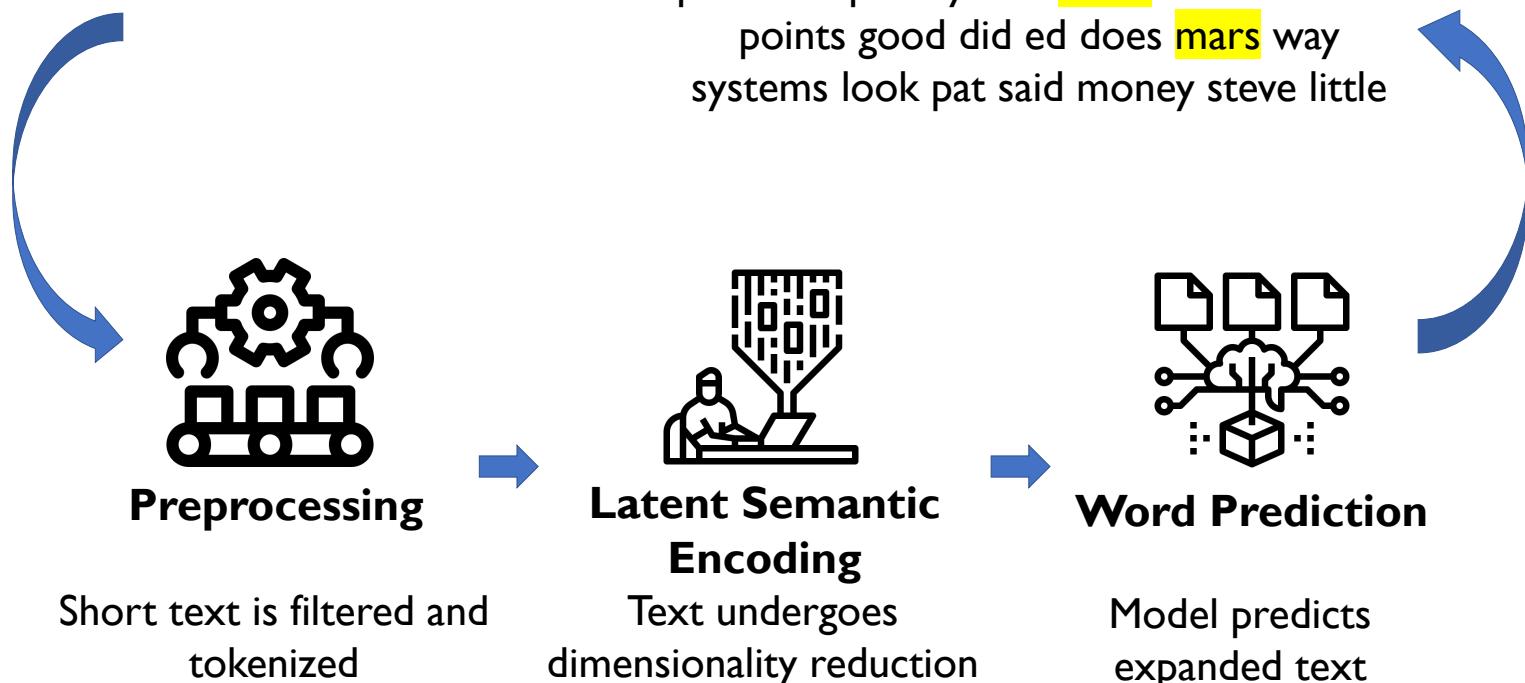
By identifying key ideas within a given short text, AutoExpander provides a pool of words that resonates with the given idea

Into a pool of usable words!

Transform any input...

I want to learn more about the moon, sun and stars.

comet orbit astronomy think x space
 moon course Jupiter know nasa center
 new lunar object reply people make green
 point temporary test earth edu time bike
 points good did ed does mars way
 systems look pat said money steve little



Potential Applications



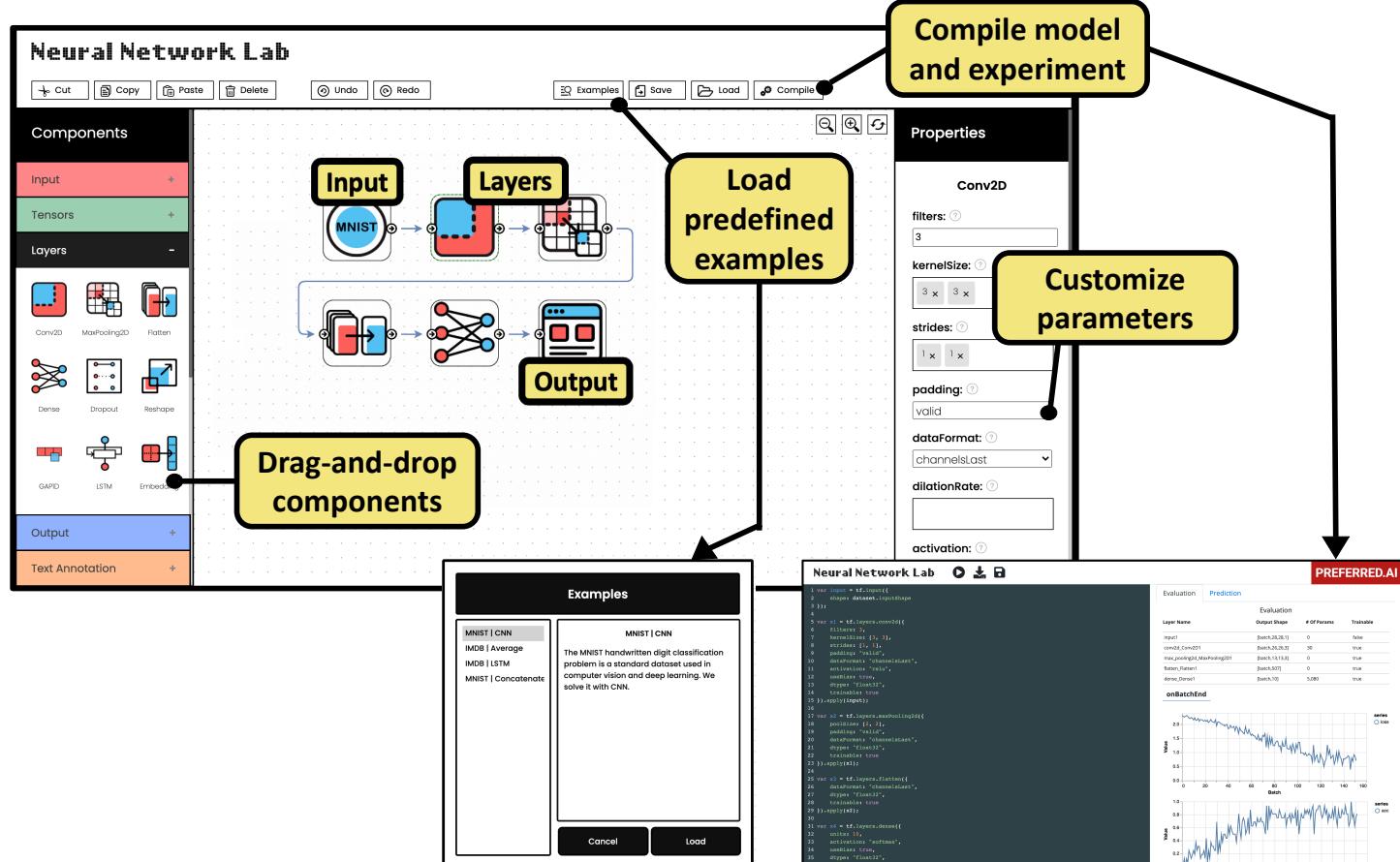
Promotes better writing with a larger array of vocabulary



Text Corpus Augmentation to improve machine learning models

Deep Learning in Your Browser

Neural Network Lab is a web-based interactive visual development environment for neural network and deep learning models



The screenshot illustrates the Neural Network Lab interface. On the left, a sidebar lists components: Input, Tensors, Layers (with sub-options like Conv2D, MaxPooling2D, Flatten, Dense, Dropout, Reshape, GAP2D, LSTM, Embedding), Output, and Text Annotation. The main workspace shows a flowchart with 'Input' (MNIST) connected to 'Layers' (Conv2D, MaxPooling2D, Flatten, Dense, Dropout, Reshape, GAP2D, LSTM, Embedding) which then connect to 'Output'. A callout box labeled 'Drag-and-drop components' points to the workspace. Another callout box labeled 'Load predefined examples' points to a modal window titled 'Examples' containing 'MNIST | CNN' and 'IMDB | LSTM' examples. A callout box labeled 'Compile model and experiment' points to the top right toolbar. A callout box labeled 'Customize parameters' points to the 'Properties' panel for a 'Conv2D' layer, which includes fields for filters, kernelSize, strides, padding, dataFormat, dilationRate, and activation. Below the workspace is a code editor window showing Python code for a CNN model and two line graphs for 'Evaluation' and 'Prediction'.

Key Features



Customizable

Upload your own data and change the layer parameters accordingly



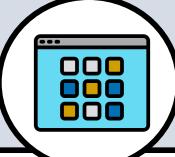
Time Saving

Codes will be written for you based on your model



Easy to Use

Drag-and-drop the components to build your model



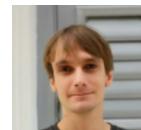
Feature Rich

Includes tensors, layers, comments and many more

TECHFEST.PREFERRED.AI 2020 Organizing Team



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We would love to hear your comments:

<https://techfest.preferred.ai/feedback>