

# 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

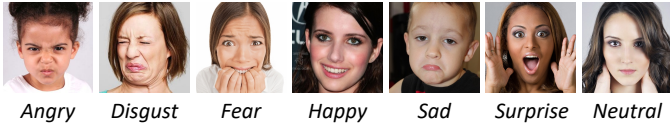
### **SESSION II – RECOMMENDING (5.00pm to 6.00pm)**

- **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



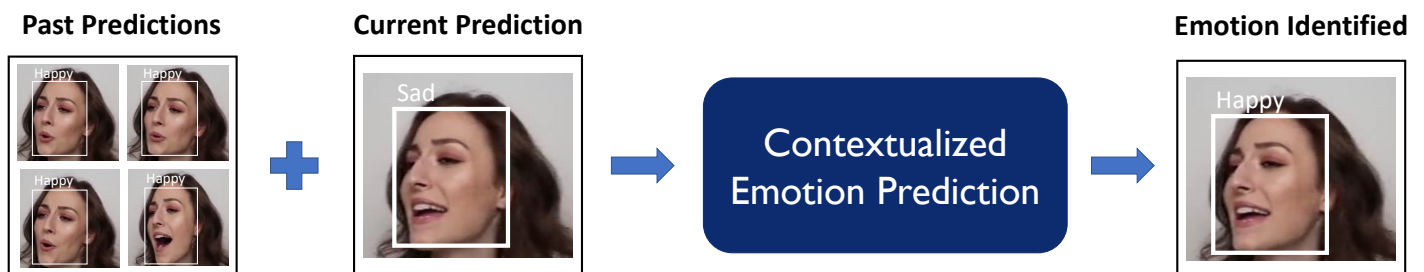
- FaceInMotion is built to detect human emotions from facial expressions.
- Accuracy for video analysis is further improved by considering the context.
- Emotion detection and consolidation are done in real-time.
- Intuitive graphs for further analysis and understanding of videos.

## Potential Applications



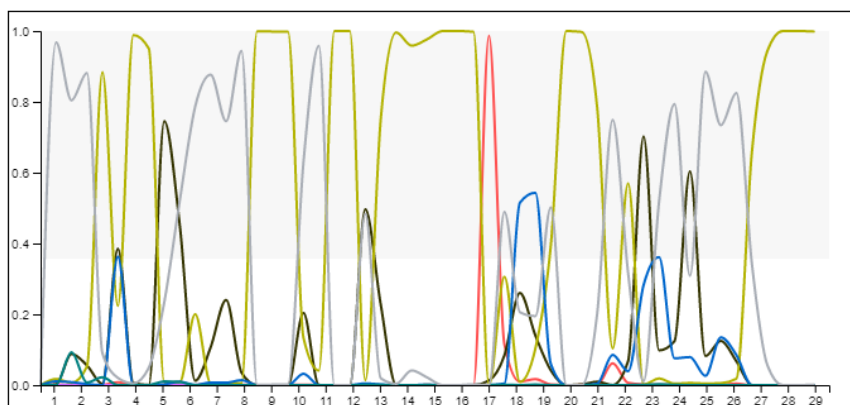
- Education  
*Monitoring students' learning (e.g., identifying learning difficulties)*
- Market Research  
*Analysing customers' sentiment (e.g., customers' response to products)*
- Interviews  
*Profiling interviewees (e.g., confidence level)*
- Law Enforcement  
*Detecting malicious intent (e.g.,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

## Emotion Detection Process

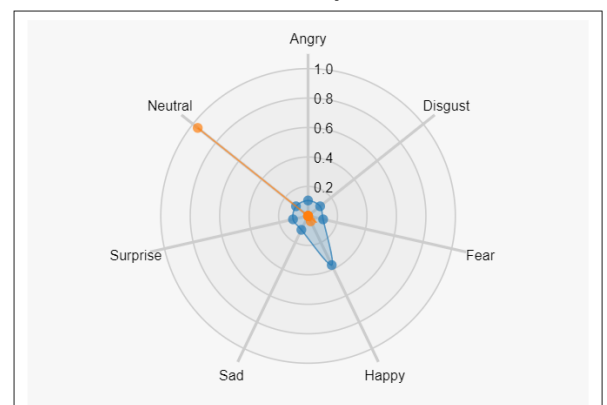


## Analytical Tools

Emotion Lines



Frame Comparison



Angry

Disgust

Fear

Happy

Sad

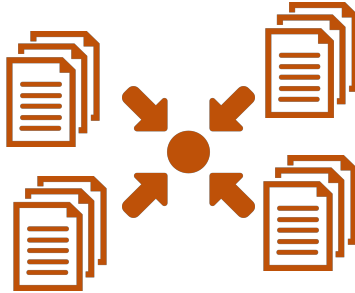
Surprise

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.

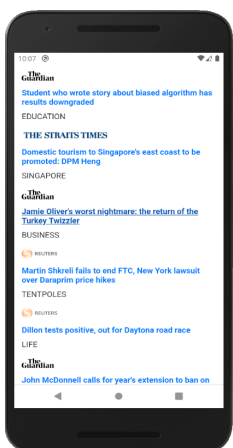
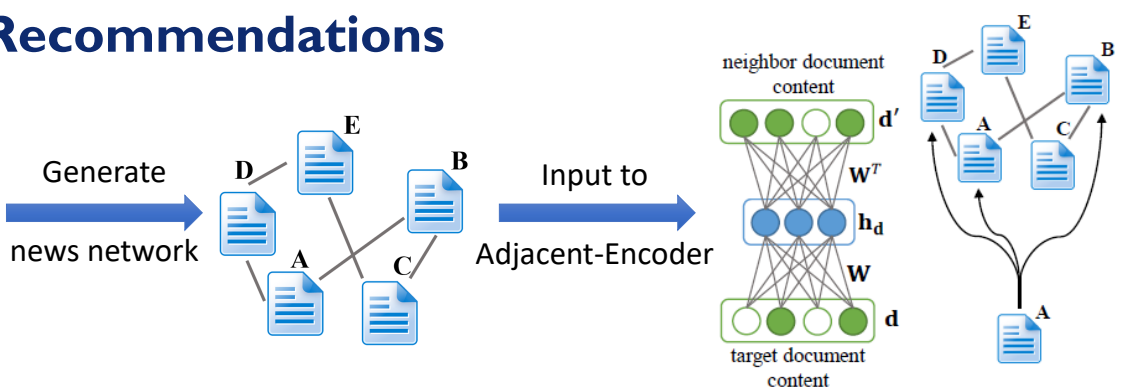
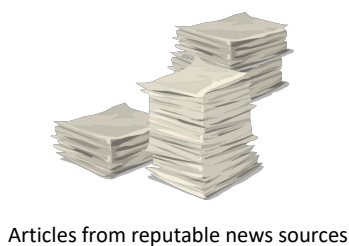


**Reviewing** reading history, **rating** articles, and **expressing** opinions.

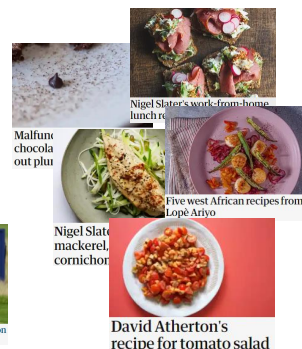
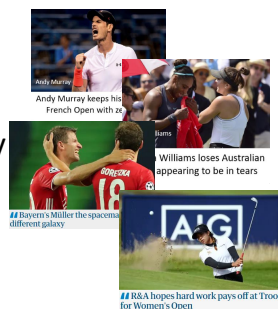


**Recommending** news according to users' recent preferences.

### Generating Recommendations



Display articles  
ranked by topic similarity  
and reading history

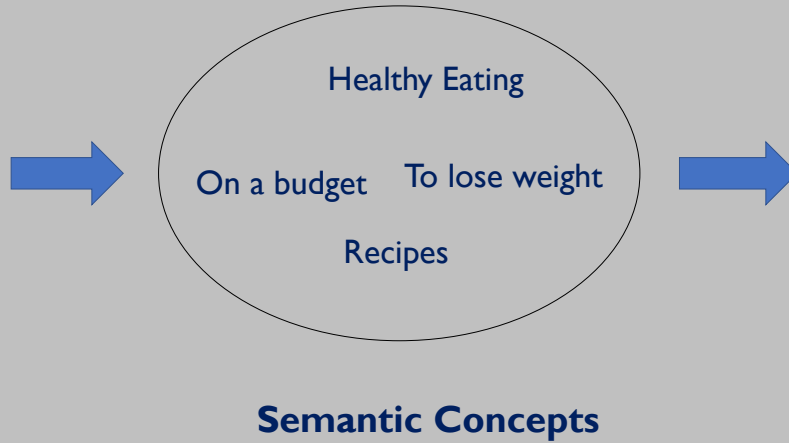
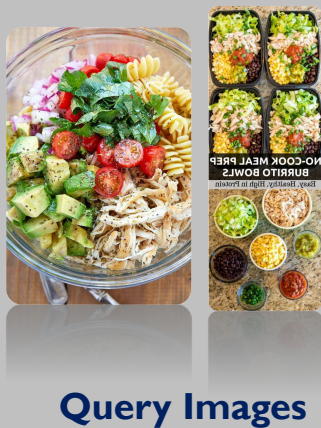


Output topics  
of newly published articles



## Image Search with Visual Concepts

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



## 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.

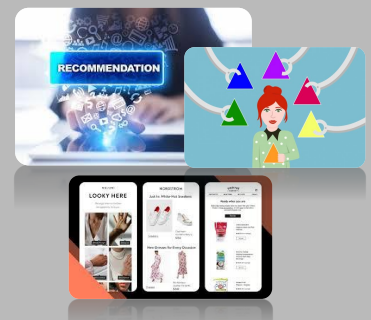
## Applications



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

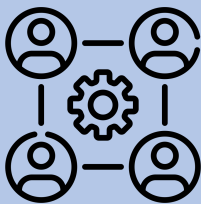
### Challenges



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

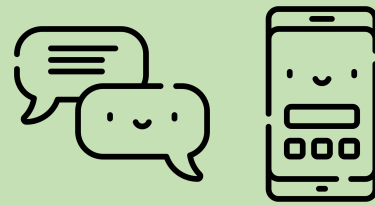


Most recommender systems provide little to no explanation for recommendations

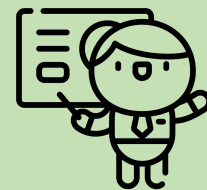


Generic product recommendations may not keep track of individual preferences

### 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

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

Test it out:



## 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

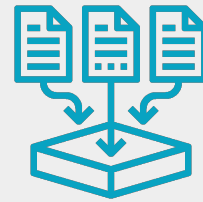


While looking for the right electronic product, we spend copious amounts of time reading user reviews



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?



### Multiple Merchants

**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.



### Regional

**Product offers from multiple countries**

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

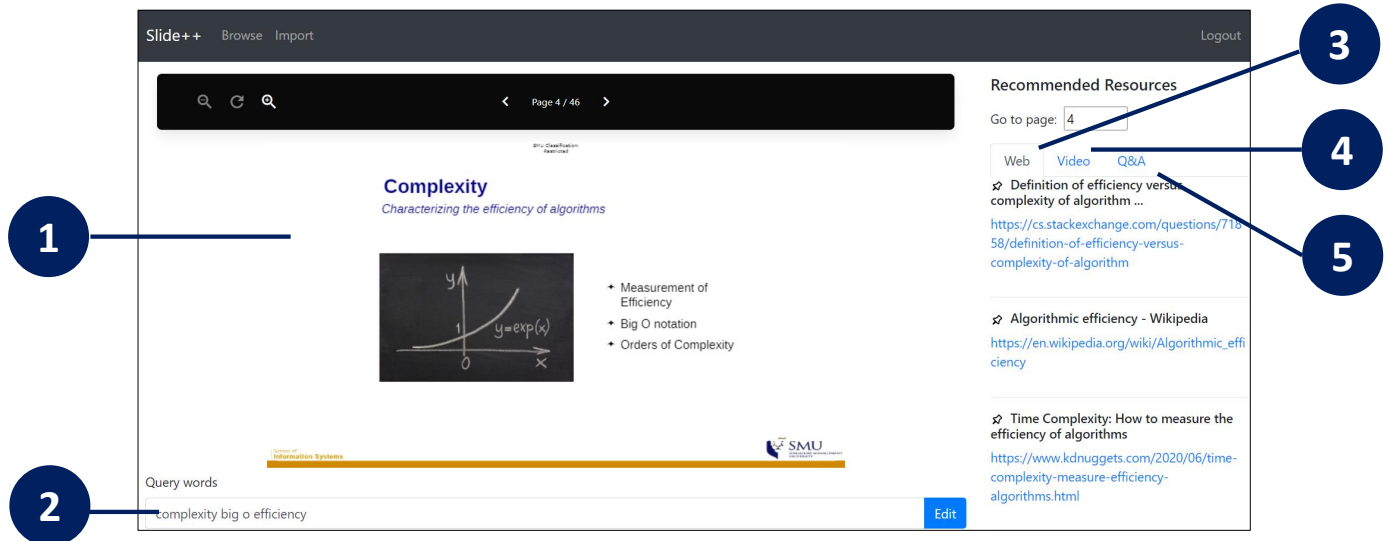


### Tracking List

**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



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



### 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

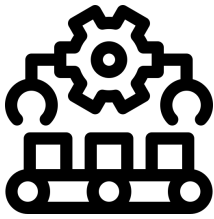
By identifying key ideas within a given short text, AutoExpander provides a pool of words that resonates with the given idea

### Transform any input...

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

### Into a pool of usable words!

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



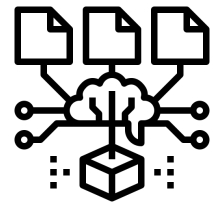
#### Preprocessing

Short text is filtered and  
tokenized



#### Latent Semantic Encoding

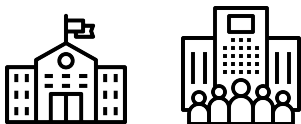
Text undergoes  
dimensionality reduction



#### Word Prediction

Model predicts  
expanded text

## Potential Applications



Education Workplace

Promotes better writing with a larger array of vocabulary



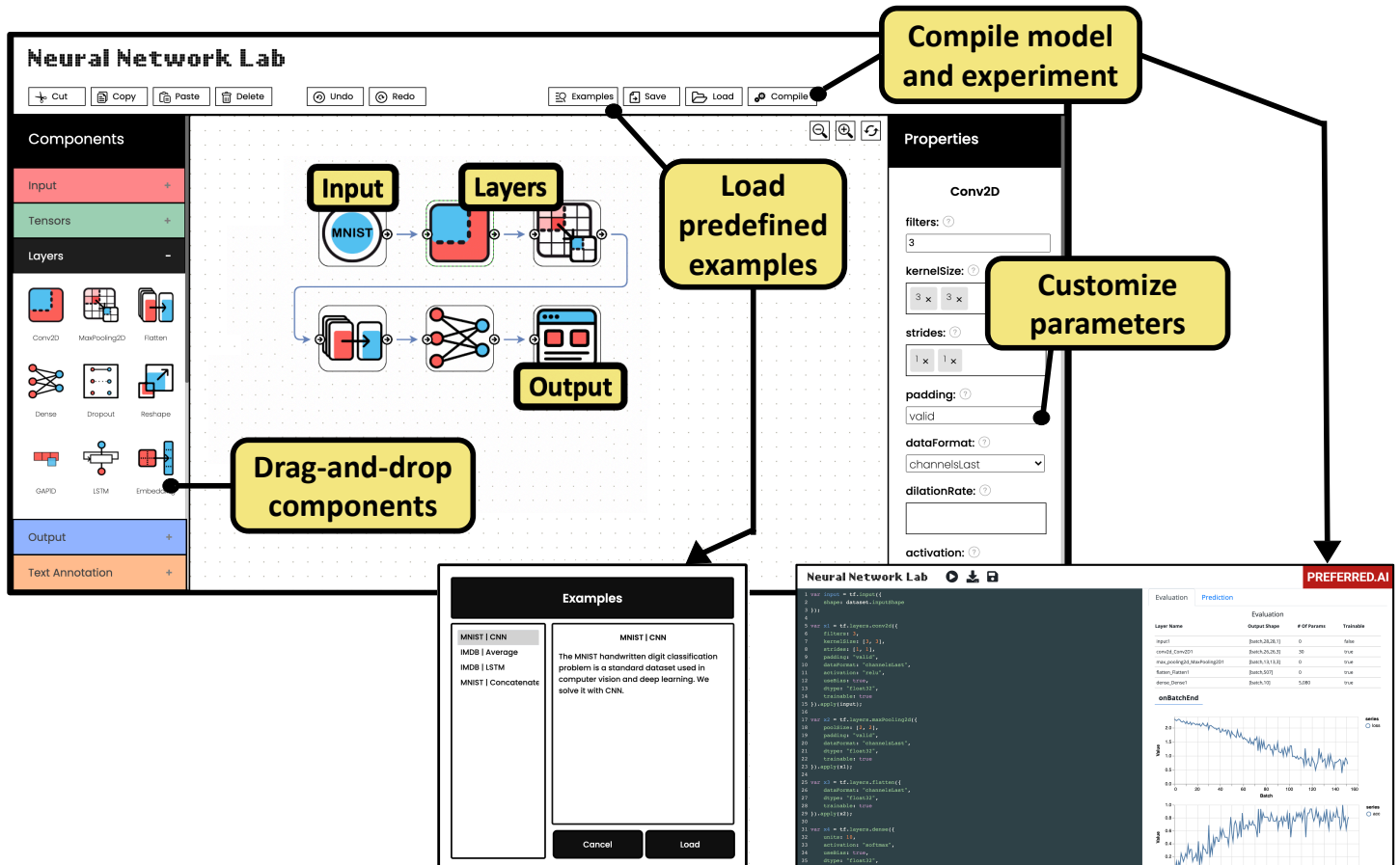
Research

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



## 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

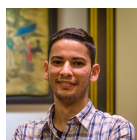


### Feature Rich

Includes tensors, layers, comments and many more



# TECHFEST.PREFERRED.AI 2020 Organizing Team



Aghiles Salah



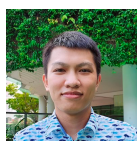
Andrew Le Duy Dung



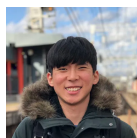
Le Trung Hoang



Zhang Ce



Do Dinh Hieu



Darryl Ong



Chu Wei Hao



Don Tan Kok Jun



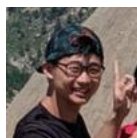
Josh Lim Kai Yao



Liu Ziyuan



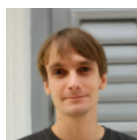
Patrick Lim Yan Hong



Yar Khine Phyo



Christopher Lim Sheng Yong



Maksim Tkachenko



Truong Quoc Tuan



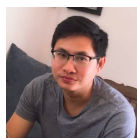
Chia Chong Cher



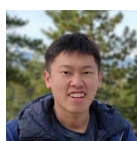
Lee Ween Jiann



Tran Nhu Thuat



Tran Thanh Binh



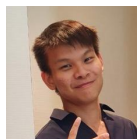
Dion Ang Wei Xuan



Goh Wan Xuan



Lim Jia Peng



Ng Kang Jin



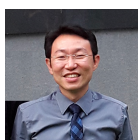
Steffi Tan Xin Rong



Yeo Qi Xun



Tay Huan Lin



Hady W. Lauw

*We would also like to acknowledge the other contributors to the various projects exhibited in this TechFest, who though unnamed are much appreciated.*

# PREFERRED.AI

**We would love to hear your comments:**

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