AISG SMART CITY IDEATION CHALLENGE

FINAL RESULTS

Date of Announcement: 3 March 2023
Venue: ACM WSDM-23 Smart City Day

On 12 October 2022, AI Singapore launched the AISG Smart City Ideation Challenge, which aimed to crowdsource ideas for AI Challenge focused on Smart City Sustainability. The challenge featured two topics: Spam & Misinformation, and Sustainability & Carbon Neutrality. Over the course of seventy days, 21 unique proposals were submitted by 58 participants from around the world. The Technical Review Committee (TRC) assessed each proposal and selected six teams with the highest scores (three per topic) to advance to the final round which was held at the ACM WSDM Conference in Singapore. During the final round, the six teams presented their proposals in person and were ranked based on scores from the TRC as well as votes from the live audience. As a result, Team Jump Jump Tiger (represented by Rui Cao from SMU) and Team The Ape-prentice (represented by Darren Lee from AIAP) were awarded first place; Team InfoSentinel (represented by Zhouhan Chen from NYU) and Team Robo-hai (represented by Zhao Yue from SJTU) won second place; and Team RumorBusters (represented by Hongzhan Lin from HKBU) and Team Food Waste Warriors (represented by Carine Ng from SGH) received third prize. AI Singapore warmly congratulates all the winners and looks forward to developing some of the winning proposals into future AI Challenges.

Below are the details on the winning teams and their proposals.

Topic 1: Spam & Misinformation

1st Place Winner

Title	Online Misinformation Detection in Live Streaming Videos
Team Name	Jump Jump Tiger
Team Member(s)	• Rui Cao, PhD Candidate, School of Computing and Information Systems,Singapore Management University (Singapore)
Abstract	Online misinformation detection is an important issue and methods are proposed to detect and curb misinformation in various forms. However, previous studies are conducted in an offline manner. We claim a realistic misinformation detection setting that has not been studied yet is online misinformation detection in live streaming videos (MDLS). In the proposal, we formulate the problem of MDLS and illustrate the importance and the challenge of the task. Besides, we propose feasible ways of developing the problem into AI challenges as well as potential solutions to the problem.

2nd Place Winner

Title	Fake News Detection via Cross-Platform Information Tracing
Team Name	InfoSentinel
Team Member(s)	• Dr. Zhouhan Chen, Founder & CEO, Safe Link Network (USA) • Swapneel Mehta, PhD Candidate, Centre for Data Science, New York University (USA)
Abstract	Fake news spreads fast and deep on social media. Increasingly, fake news content is created on one platform, and re-posted on another. Current detection algorithms mostly focus on one platform, which ignores the full scope and

severity of a campaign. To tackle this problem, we propose a cross-platform fake news detection challenge. Our data set will consist of social media posts related to thousands of fake news URLs and trustworthy URLs. Participants are required to build models that do not rely on the news content itself, but the context around news spread. Any feature derived from our data set is acceptable. We evaluate each submission based on its accuracy, robustness against data corruption and against data manipulation. We plan to host this challenge over a period of three month. We aim to deploy promising solutions to make a lasting impact.

3rd Place Winner

Title	Multilingual Misinformation Detection in Low-Resource Domains with Conversation-based Reasoning
Team Name	RumorBusters
Team Member(s)	• <u>Hongzhan Lin</u>, PhD Candidate, Computer Science, Hong Kong Baptist University (China)
	• Mingfei Cheng, PhD Candidate, Computer Science, Singapore Management University (Singapore)
Abstract	This proposal aims to explore a principled and intelligent way for multilingual misinformation detection in low-resource domains. The challenges of this proposal lie in two aspects: (i) misinformation detection is generally mono-lingual supervised learning and requires sizeable semantically annotated data, which is a daunting task especially for emerging events spreading in different languages; and (ii) How to reason over misinformation storyline representation with conversation structures on social media, by mining both shallow and hidden dependencies among relevant contexts, which embed valuable domain-invariant signals about credibility and evidence. In this proposal, we present a problem statement and demonstrate existing popular solutions widely used in the field of misinformation detection on social media. Also, we provide the value proposition, feasible suggestions about data construction and evaluation metrics for our proposed problem. We conduct a feasibility analysis of this problem for future misinformation detection on social media as a conclusion.

Topic 2: Sustainability & Carbon Neutrality

1st Place Winner

Title	The Case for AI in Food Waste
Team Name	The Ape-prentice
Team Member(s)	• <u>Darren Lee</u>, AIAP Apprentice, AI Singapore (Singapore)
	• Wei Yi Teo, AIAP Apprentice, AI Singapore (Singapore)
	• Angus Saw, AIAP Apprentice, AI Singapore (Singapore)
	• Justin Lim, AIAP Apprentice, AI Singapore (Singapore)
	• Weihan Feng, AI Apprentice, AI Singapore (Singapore)
Abstract	Food waste is a significant contributor to greenhouse gas emissions, and a major socio-economic concern for countries like Singapore, which imports more than 90% of its food and is vulnerable to fluctuations in the global food supply. To address this problem, the paper proposes using artificial intelligence (AI) to improve demand forecasting in food establishments, enabling them to better manage their inventory and reduce food waste. While various demand forecasting methods exist, food establishments may not have the digital expertise or resources to leverage them. Furthermore, advanced deep learning

methods often require a large amount of training data, which may raise privacy concerns if data pooling is used, preventing competing food establishments from collaborating. To tackle these challenges, we devised an on-premise data collection pipeline, leveraging existing data infrastructure and online open sources. We further propose the use of federated learning, which allows businesses to preserve their data privacy while having access to a larger pool of data to improve demand predictions. To evaluate the performance of the proposed solution, a weighted evaluation metric is introduced. This metric takes into account error and privacy and is further tested on different test scenarios. We conclude by conducting a feasibility analysis of our proposed methodology and an experiment using an open-source dataset.

2ⁿᵈ Place Winner

Title	Automatic Domestic Solid Waste Sorting System with Multiple Sensors
Team Name	Robo-hai
Team Member(s)	• <u>Yue Zhao</u>, Master Student, China-UK Low Carbon College, Shanghai Jiao Tong University (China)
	• Xi Lu, Master Student, China-UK Low Carbon College, Shanghai Jiao Tong University (China)
	• Ziqi Jin, Master Student, China-UK Low Carbon College, Shanghai Jiao Tong University (China)
	• Wenjie Tan, Master Student, China-UK Low Carbon College, Shanghai Jiao Tong University (China)
	• Prof. Jia Li, Assistant Dean, China-UK Low Carbon College, Shanghai Jiao Tong University (China)

Abstract	In this paper, we investigated how to utilise AI for the recovery of local resources from recyclable urban household waste in Singapore, specifically the aspect of smart waste sorting. According to our research, a waste sorting platform based on the coupling of sensors and detection algorithms will considerably reduce the cost of recycling waste. Some state-of-art findings on detection algorithms were introduced and compared. Then we proposed a method about how to construct a valid dataset towards the system with such algorithms and presented how we had approached in our Lab. To assess the potential solutions, evaluation metrics including detection performance, sorting efficiency and Input-Output analysis are required. The feasibility of our proposed AI toward solutions was analyzed from three perspectives: technology, effectiveness, and social welfare. Finally, we pointed out the approximate direction to find such potential solutions for waste amount reduction and resource reclamation.

3ʳᵈ Place Winner: Team "Food Waste Warriors"

Title	The Smart Software Application for Food and Beverage Businesses
Team Name	Food Waste Warriors
Team Member(s)	• <u>Carine Ng</u>, Database Coordinator, Department of Urology, Singapore General Hospital (Singapore)
	• Joel Quek, Deputy Cybersecurity Lead, Cybersecurity Operations, PSA Corporation Limited (Singapore)

Abstract	Food waste is one of the major waste streams in Singapore. It has impacts on food security, land resource usage and environmental conservation efforts. Therefore, there is a need to encourage more Food & Beverage (F&B) businesses to join in the efforts on food waste management to work towards zero food waste. There is a myriad of information/ resources available and it could be

overwhelming for businesses that are new to food waste management. A government-based one-stop service software application could provide a step-by-step guide for businesses in implementing food waste management strategies. The proposed software application features an easily set up system using basic equipment to aid businesses in identifying main sources of food waste, incorporates Artificial Intelligence (AI) to provide insights/recommendations, and creates an ecosystem that encourages sharing and collaboration amongst industry partners.

Note: The names of the final presenters are underscored.