

# FIGHT JOB SCAMS WITH JOBGUARDIAN

CC0002 T01 Group 3:

## INTRODUCTION



- Job scams in Singapore have shown an increasingly worrying trend
- Singapore Police Force: job scams are the most common scams reported in the 1st half of 2023, with 5737 cases reported, 2x of 2022 (Chua, 2023)
- 2022: victims lost \$117.4 million across 6,492 reported cases (Chua, 2023)
- 1/3 scam victims aged from 10-39 years old & 1/5 scam victims aged 40-59 years old (Chua, 2023)
- 3/5 scam attempts are made on social media and messaging apps (Chia, 2023)
- Job scam follow the same model, often involving dubious job offers that offer lucrative returns for minimal effort

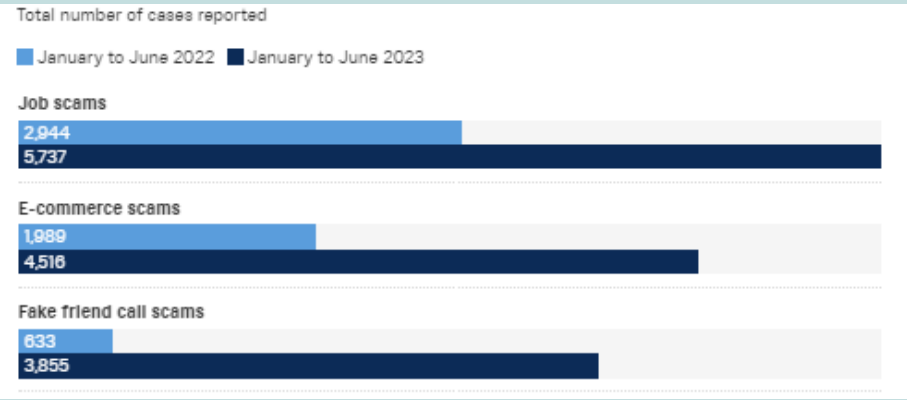


Fig 1. Total number of cases reported (Cue, 2023)

## BREAKDOWN



Computational Thinking Approach:

- Decomposition

Break down the text message into its constituent parts, such as the sender's phone number, message content, and any links or attachments included

Helps examine red flags better by dividing the issue into manageable chunks

- Pattern Recognition

Grouping of the text messages in terms of a particular set of criteria/similarities

Odd phrasing, generic salutations, or a sense of urgency

- Abstraction

Identify the main features of scam texts, prioritising common groups reflected in job scam messages at a high-frequency rate

Remove any irrelevant or flattering content and focus on the essential information in the text message

- Algorithm

Establish a process or set of guidelines for assessing employment offers

Create a set of criteria that a legitimate job offer should meet. This could include verifying the identity of the sender,

checking the job details, and ensuring you haven't applied for this position before.

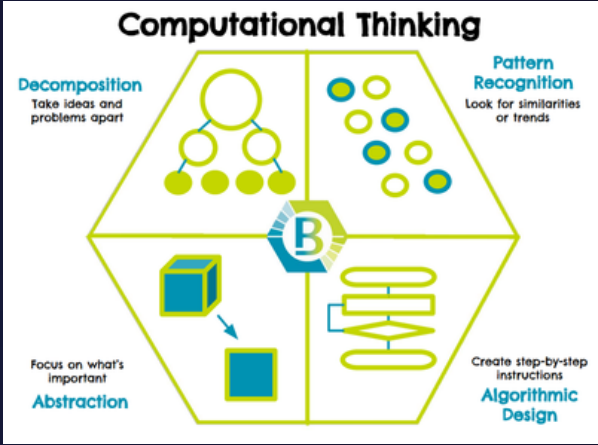
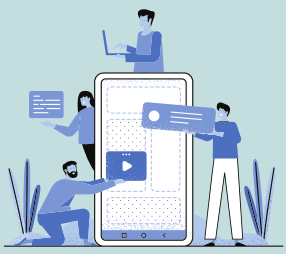


Fig 2. Computational thinking (BUGG MAGNET ELEMENTARY SCHOOL, n.d.)



Fig 3. AI (Hochreutner, 2022)

## SOLUTION APP (JOBGUARDIAN)



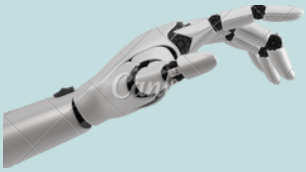
- Job Guardian: A new app developed as an extension of the government project Scamshield
- Purpose: Job Guardian serves as both a scam detection platform and job seekers platform
- Scam Reporting: Users can report suspicious messages, which are reviewed by the Singapore Police Force
- User-Friendly Scam Check: Users can easily check the legitimacy of text messages, social media posts, emails, or websites by copying and pasting or uploading screenshots
- Cross-Checking with Job Listings: Job Guardian partners with job listing sites/apps like Jobstreet and FastJobs to crosscheck the legitimacy of messages and listings from employers
- Realistic Job Recommendations: After identifying a potential scam, the AI in the app provides realistic job recommendations available on job listing sites
- Focus on Job Seekers: The app is tailored to the needs of job seekers, offering enhanced features compared to Scamshield
- Comprehensive Functionality: Job Guardian combines scam detection and to secure jobs in one platform, ensuring a safe and effective job search experience

## THEORY



- Spam Detection using NLP
  - NLP Algorithm: Natural Language Processing (NLP) is the ability of a computer program to understand human language as it is spoken and written (Lutkevich, 2023), the algorithms employ techniques like text classification to identify spammy job listings
  - Two main phases of natural language processing: data processing and algorithm development
  - Data processing is where raw text data is cleaned, formatted, and prepared for analysis
  - Algorithm development involves creating and fine-tuning machine learning models that can accurately classify job listings as either legitimate or fraudulent
- Pattern Recognition: NLP algorithms recognize patterns and linguistic cues commonly used in fraudulent postings, including suspicious keywords, phrases, and sentiment analysis to detect inconsistencies
- Anomaly Detection: AI identifies anomalies in the language, which is indicative of scams like unusual language, generic salutations, or a sense of urgency (International, 2023)
- Statistical Analysis: NLP algorithms apply statistical models to assess linguistic patterns, helping to recognise scams
- AI-Powered Company Verification:
  - Data Cross-Referencing: Verifies the authenticity of companies offering job opportunities by cross-referencing information with official databases and online sources
  - Pattern Matching: Identifies patterns and discrepancies in the data, helping to ensure legitimacy
  - Knowledge Graphs: Use knowledge graphs to establish the relationships and reputations of companies (OpenAI, 2023)
- Trustworthiness Scores:
  - Feature Engineering: AI performs feature extraction to identify relevant information in job listings (Patel, 2021). For trust scores, it may consider features such as company reputation, user reviews, and the content analysis of job postings
  - Machine Learning Models: Machine learning models analyze these features to assign trust scores to job listings. These models are trained to weigh the importance of different features
  - Real-time Feedback Loop: AI continuously updates trust scores based on real-time user feedback and new data, ensuring that trustworthiness scores remain current
- User Feedback Loop:
  - Feedback Collection: AI encourages users to provide feedback on job listings. This feedback may include user reports, comments, and experiences
  - Feedback Analysis: AI processes and analyzes the feedback data to identify emerging scam patterns and improve its detection capabilities
  - Continuous Learning: This feedback loop (Lutkevich, 2023) ensures that AI continually refines its models and adapts to evolving scam tactics

## FUTURE POSSIBILITIES



- AI-Powered Chatbots: interact with job seekers, answer questions, and provide guidance on how to spot scams
- Multilingual Support: detect scams in multiple languages to cater to a diverse user base
- In-App Messaging: communication between job seekers and employers within the app, detect and flag suspicious messages
- Machine Learning for User Behavior Analysis: analyze user behavior to detect suspicious activity or patterns
- AI-Powered Resume Analysis: assist job seekers in creating their resumes using AI recommendations and tailoring them for specific job postings
- Partnerships with Job Platforms: Collaborate with popular job search platforms to integrate AI scam detection technology



## LIMITATIONS

- High cost to develop
- Small amount of users
- AI systems may not always keep up with the latest scam techniques
- AI's effectiveness can vary in different languages and dialects



## REFERENCES

1 CHUA, N. (2023, SEPTEMBER 13). MORE THAN HALF OF SCAM VICTIMS ARE YOUNG ADULTS, MOST FELL FOR JOB SCAMS. THE STRAITS TIMES. <https://www.straitstimes.com/singapore/courts-crime/more-than-half-of-scam-victims-are-still-young-adults-most-fell-for-job-scams>

2 CHIA, O. (2023, SEPTEMBER 13). WHATSAPP, FACEBOOK AND INSTAGRAM EMERGE AS PLATFORMS OF CHOICE FOR SCAMMERS. THE STRAITS TIMES. <https://www.straitstimes.com/tech/whatsapp-facebook-and-instagram-emerge-as-platforms-of-choice-for-scammers>

3 TRACYRENEE. (2021, MARCH 22). HOW ARTIFICIAL INTELLIGENCE CAN DETERMINE IF A TEXT MESSAGE IS HAM OR SPAM. MLEARNING.AI. <https://medium.com/mllearning/ai/how-artificial-intelligence-can-determine-if-a-text-message-is-ham-or-spam-6a69d2c84af4>

4 HOCHREUTNER, CLAUDE. (2022, MARCH 3). ARTIFICIAL INTELLIGENCE DOING MORE TO INCREASE DRIVER SAFETY. WARDSAUTO. <https://www.wardsauto.com/vehicles/artificial-intelligence-doing-more-to-increase-driver-safety/>

5 BUGG MAGNET ELEMENTARY SCHOOL. (n.d.) COMPUTATIONAL THINKING. <https://www.wccps.net/domain/7203>

6 CUE, J. (2023, SEPTEMBER 13). MORE VICTIMS SCAMMED IN FIRST HALF OF 2023 BUT AMOUNT LOST DIPS TO \$334M. THE STRAITS TIMES. <https://www.straitstimes.com/singapore/courts-crime/more-victims-scammed-in-first-half-of-2023-but-amount-cheated-falls-from-342m-to-334m-7u1m>

7 INTERNATIONAL, F. (2023, MARCH 30). ARTIFICIAL INTELLIGENCE—HOW IT'S USED TO DETECT FINANCIAL FRAUD. FRAUD.COM. SCAMSHIELD OPEN GOVERNMENT PRODUCTS (2023). RETRIEVED NOVEMBER 3, 2023. FROM <https://www.scamshield.org.sg/>

8 LUTKEVICH, B. (2023). WHAT IS NATURAL LANGUAGE PROCESSING? AN INTRODUCTION TO NLP. ENTERPRISE AI. RETRIEVED NOVEMBER 3, 2023. FROM <https://www.techtarget.com/searchenterpriseai/definition/natural-language-processing-nlp>

9 OPENAI. (2023). CHATGPT (LARGE LANGUAGE MODEL). <https://chat.openai.com>

10 PATEL, H. (2021, SEPTEMBER 2). WHAT IS FEATURE ENGINEERING? IMPORTANCE, TOOLS AND TECHNIQUES FOR MACHINE LEARNING. MEDIUM. <https://towardsdatascience.com/what-is-feature-engineering-importance-tools-and-techniques-for-machine-learning-208b0269f10>