Implementation

01 Object Detection & Optical Character Recognition

02 Text Analysis (SMS)
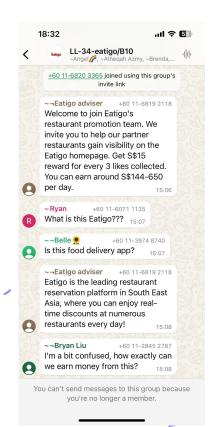
03 Speech-to-Text Translation

04 Text Analysis (Phone Calls)

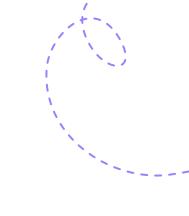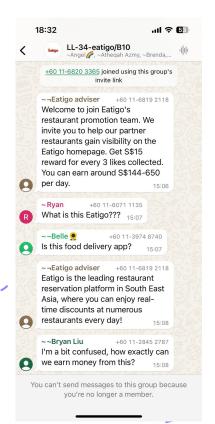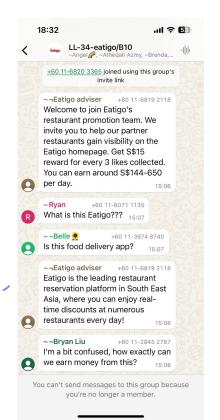# Optical Character Recognition

OCR

Text Analysis
SMS
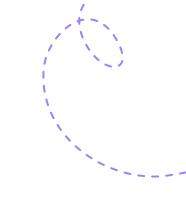
Text Analysis (SMS)

Speech to Text
Phone Calls

Speech to Text
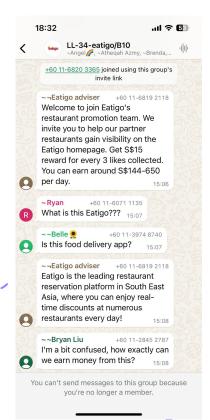
Text Analysis
Phone Calls

Text Analysis (Phone Calls)

Thank You

Articles On The Topic

Scam victims in Singapore lost S$651.8 million in 2023, with record high cases

Published Sun, Feb 18, 2024 · 07:29 PM

Broken English no longer a sign of scams as crooks tap AI bots like ChatGPT: Experts

ChatGPT
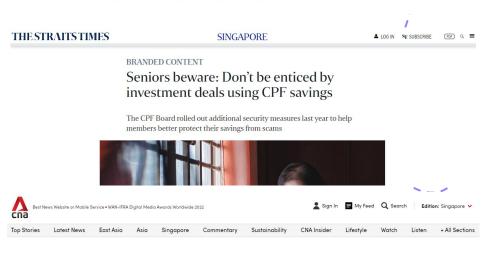
Singapore

Elderly man nearly loses S$3.7 million to scammers; was targeted thrice in under two months

A 20-year-old involved in all three scam cases targeting the elderly man was arrested.

BRANDED CONTENT

Seniors beware: Don't be enticed by investment deals using CPF savings

The CPF Board rolled out additional security measures last year to help members better protect their savings from scams

Singapore

More than S$370,000 recovered after banks, Singapore and Hong Kong police foil scam

The 70-year-old victim divulged his bank credentials to a scammer after being told his computer had been hacked and his bank accounts were used for illegal activities.

Our Persona: **Sum Ting Wong**
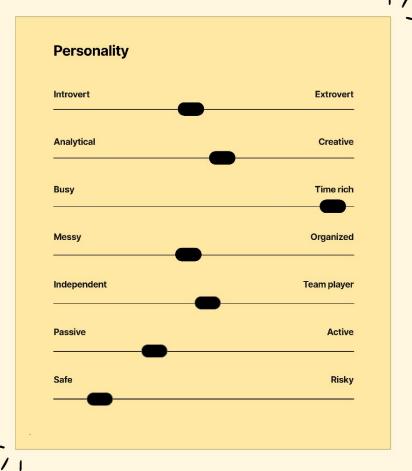
Sum Ting Wong

I want to spend more time with my family

- User Group: Elderly
- Age: 80 Year Old
- Occupation: retired
- Hobbies: Spending time with his family/friends

Bio

Sum Ting Wong is an elderly that is interested in spending time with his family and partaking in his hobbies such as cooking, watching shows, and doing light sports activities. He spends time playing Mahjong with friends and bonds with his family often. He finds difficulty differentiating between spam and regular SMSes as he is not the most tech savvy. He simply wants to get on with it and go back to the things he loves

Personality

Introvert	Extrovert

Analytical	Creative

Busy	Time rich

Messy	Organized

Independent	Team player

Passive	Active

Safe	Risky

More About Sum Ting Wong

Needs & Expectations

1. Spam Messages to be filtered
2. Easy to use
3. Works in real-time
4. Blocks unwanted spam messages

Pain Points

1. Not Technologically Literate Enough
2. Energy spent trying to understand mobile devices is too high
3. Cannot understand the language on digital media

Problem Statement

How might we help elderly in differentiating spam from ham messages?

Our Solution

An automatic scam detection application powered by AI

- Capable of detecting scams for SMS and phone calls; communication methods elderly use
- Notifies user if suspected scam is detected
- Able to translate messages from Chinese to English
- Has a chatbot that educates user on how to detect scams
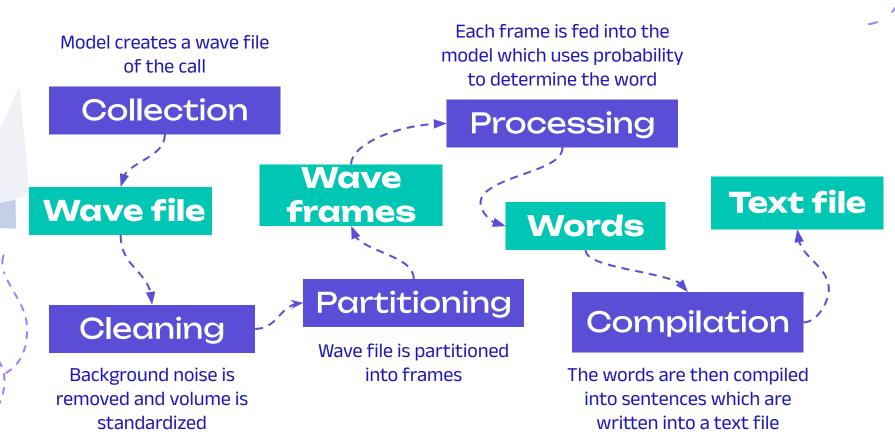
What it does

Takes in audio from phone calls and converts it into text

- Model has difficulty analyzing audio files
- Convert to text format to make it easier for model to read

How This Is Done

Model creates a wave file of the call

Collection

Each frame is fed into the model which uses probability to determine the word

Processing

Wave file

Wave frames

Words

Text file

Cleaning

Partitioning

Compilation

Background noise is removed and volume is standardized

Wave file is partitioned into frames

The words are then compiled into sentences which are written into a text file

Why AI?

Advantages over traditional transcription:

- More efficient and cost-effective
- Easily scalable
- Frees up human workload

Additional Feature

A chatbot that educates users on scams and how to better detect them

- Chatbot has various options detailing various types of scams and how to tell if something is a scam
- Users can ask the chatbot questions regarding scams

What it Does
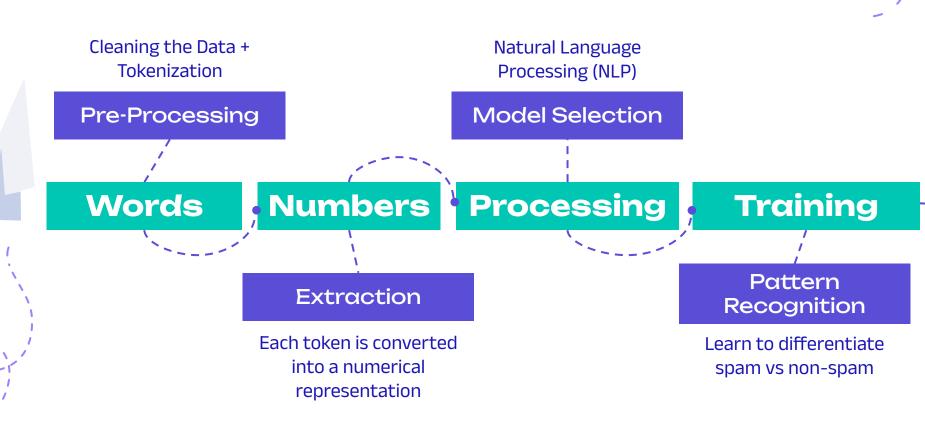
After converting **Speech-to-Text**,
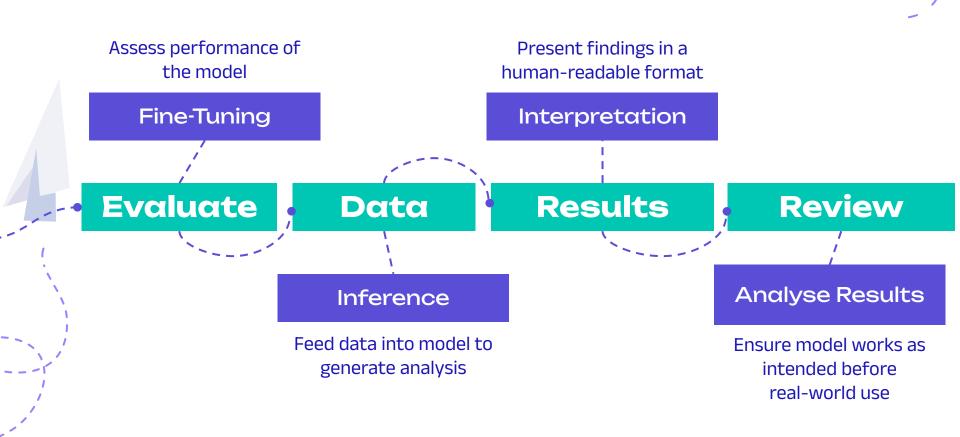
Text Analysis will extract information to identify patterns and indicators of spam & scam calls.

Using keyword & phrase detection, contextual analysis and pattern recognition.

How This Is Done

Cleaning the Data +
Tokenization

Pre-Processing

Natural Language
Processing (NLP)

Model Selection

Words **Numbers** **Processing** **Training**

Extraction

Each token is converted
into a numerical
representation

**Pattern
Recognition**

Learn to differentiate
spam vs non-spam

How This Is Done

Assess performance of the model

Fine-Tuning

Present findings in a human-readable format

Interpretation

Evaluate

Data

Results

Review

Inference

Feed data into model to generate analysis

Analyse Results

Ensure model works as intended before real-world use

Additional Feature

After **Text Analysis** is completed,

the results will be shown to the user through a Chatbot.

From there the user can interact with the Chatbot to decide on his follow-up actions.

Actions such as asking for further clarification of the legitimacy or even making a police report.

What it does
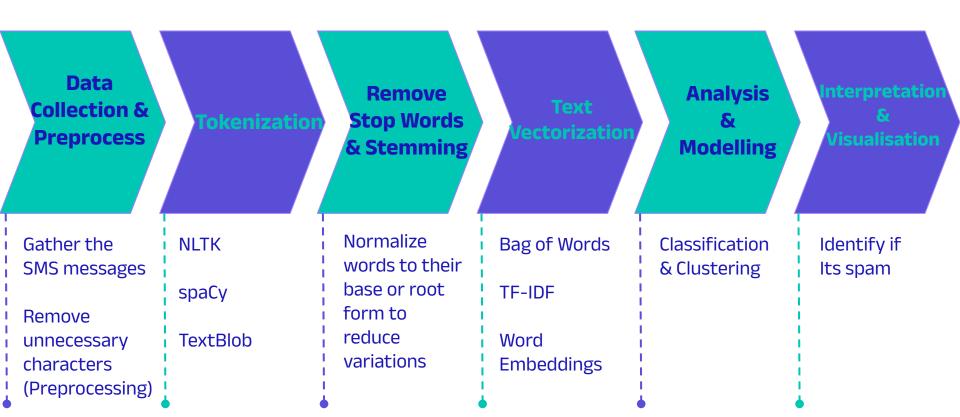
SMS Text Analysis involves examining and processing text messages to extract:

- Useful information
- Identify patterns
- Gain insights

Our use case:

Identify spam messages using **classification & clustering** techniques. This helps filter out unwanted messages and improve user experience.

How This Is Done

Data Collection & Preprocess	Tokenization	Remove Stop Words & Stemming	Text Vectorization	Analysis & Modelling	Interpretation & Visualisation
Gather the SMS messages Remove unnecessary characters (Preprocessing)	NLTK spaCy TextBlob	Normalize words to their base or root form to reduce variations	Bag of Words TF-IDF Word Embeddings	Classification & Clustering	Identify if Its spam

Why AI?

Accuracy
AI can understand the context of messages reducing false positives and improving precision

Adaptability
AI can adapt to new patterns and trends in the constantly evolving spam landscape

Additional Feature

Chatbot

The chatbot answers the user's queries on why the SMS received was detected as spam
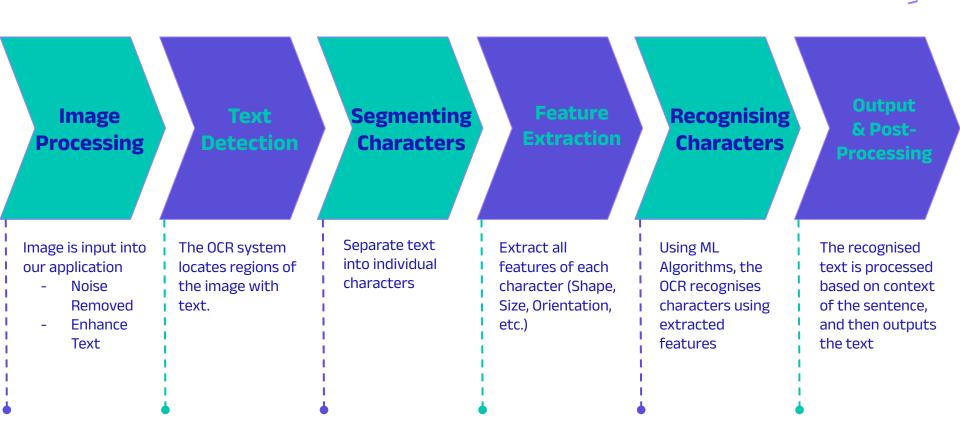
What it does

Captures text found within images

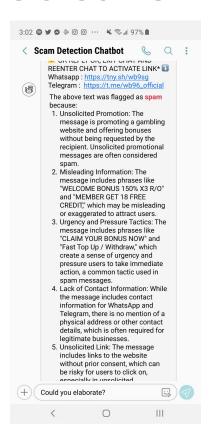- Elderly might send screenshots of text messages to friends and family to double check its validity
- Text might be too long to be inputted manually into a text box for analysis

How This Is Done

Image Processing
Image is input into our application
- Noise Removed
- Enhance Text

Text Detection
The OCR system locates regions of the image with text.

Segmenting Characters
Separate text into individual characters

Feature Extraction
Extract all features of each character (Shape, Size, Orientation, etc.)

Recognising Characters
Using ML Algorithms, the OCR recognises characters using extracted features

Output & Post-Processing
The recognised text is processed based on context of the sentence, and then outputs the text

Text Translation

Text Translation

Output text can be translated into another language for the user to understand

3:02 🎧 🐦 💬 ✦ 📷 🔵 ⋯ 🔇 📶 97% 🔋

< **Scam Detection Chatbot** 📞 🔍 ⋮

Could you translate the spam text into chinese?

Of Course, here it is

💎WEBET9 SG💎
欢迎奖金150% X3 R/O
✨会员获得18免费信用额✨

在线游戏

钓鱼
$老虎机
现场赌场
‒ ‒ ‒ ‒ ‒ ‒ ‒ ‒ ‒
🔷 24小时营业时间
🔶 快速存款/提款
🔷 最低充值10 最低提现50
🔶 成立于2020年。 ‒ ‒ ‒ ‒ ‒ ‒ ‒ ‒
⚠️回复OK以激活链接
并立即领取您的奖金

⚠️或回复OK，退出聊天然后
重新进入聊天以激活链接 ⬇️
Whatsapp：https://tny.sh/wb9sg
Telegram：https://t.me/wb96_official

Why AI?

Accuracy
Meaning of sentences may change based on context

Scalability
AI can scale to handle large volumes of text

Wireframes

Service Blueprint

Service Blueprint For Final Product

Customer & Scenario

Customer & scenario

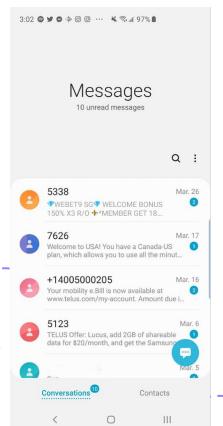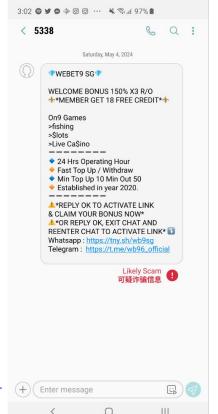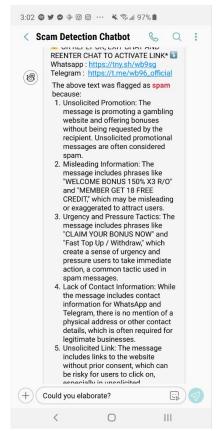|	Customer persona:	Scenario:
	Elderly	Elderly receives a Spam Call/SMS

Evidence

Physical evidence	Phone Vibrating/Ringing	→	SMS App/Phone Call	→	SMS/Phone Call	→	Pop-up At Side Of Message	→	Bank Account

Customer actions

Customer actions	Elderly receives SMS/Call	Elderly opens SMS app/accepts call	Elderly reads the SMS he opened/ listens to the call	Elderly reads AI Prediction	Elderly decides to trust prediction
	Anonymous 15	Dish	Dish	Dish	Dish

Line of interaction

Frontstage actions

Frontstage actions	User is shown SMS interface/ call is accepted	App sends content to AI model	App flags call/ SMS as spam based on the AI model
	Anonymous 15	Anonymous 15	Anonymous 15

Line of visibility

Backstage actions

Backstage actions	AI model predicts whether content given is spam and sends back result
	Anonymous 15

Support processes

Support process	Maintenance of AI model
	Anonymous 15