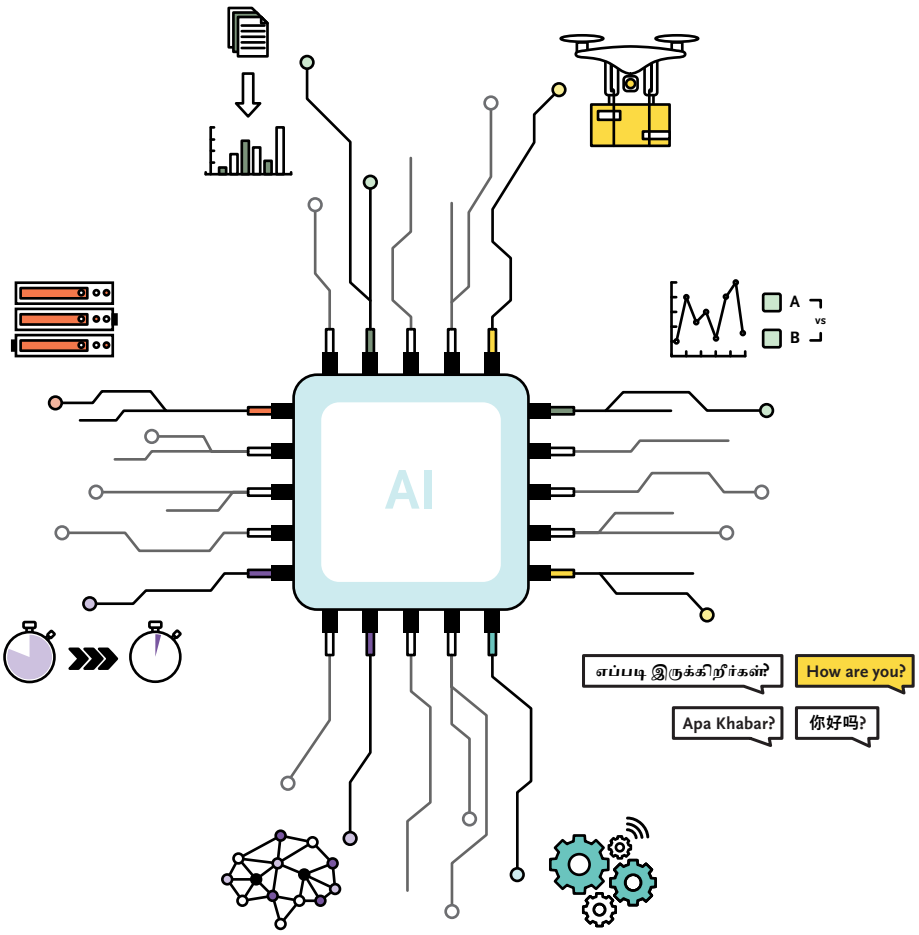
Public Sector AI Playbook



A Resource from the AI Strategy for the Government

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CHAPTER 1

Introduction

The Smart Nation Digital Government Group (SNDGG) has developed an Artificial Intelligence (AI) Strategy for the Government that seeks to drive the adoption of AI in the Government's core business areas to achieve significant benefits.

While many agencies in the Government have started to scope AI projects, significant value has yet to be delivered from the use of AI. Two key gaps identified in the strategy were (i) the lack of awareness of major AI use cases and (ii) the lack of ops-tech capabilities to initiate AI projects by public officers.

This playbook provides public officers, especially non-technical officers, a guide on how AI can be adopted in their area of work and shares a range of AI projects implemented throughout the public service. This playbook will enable you to:

- **Understand the basic concepts of AI**
- **Identify opportunities to adopt AI in your agency**
- **Learn how to start an AI project**
- **Leverage central support for AI adoption**

What are ops-tech capabilities?

Ops-Tech is the way ops and tech teams work together from early stages of planning and conceptualisation, to co-develop and co-deliver capabilities.

Why AI?

AI represents the next frontier of our Digital Government ambitions. Advances in machine learning have now brought practical applications of AI within reach. Machine learning enables AI systems to improve their ability to perform a particular task by learning from data over time.

As a general-purpose technology, there are significant opportunities to apply AI in the public sector.

Policy-Making & Planning: **AI can be used to support decision-making through more accurate predictions and ground sensing**

Service Delivery: **AI can enable more personalised, responsive and anticipatory services**

Internal Operations: **AI can optimise processes to drive manpower, cost and time savings**

AI Strategy for the Government

The vision is for Government agencies to use AI to deliver high impact outcomes in their core business. To achieve this vision, we will need to define and prioritise high impact AI use cases.

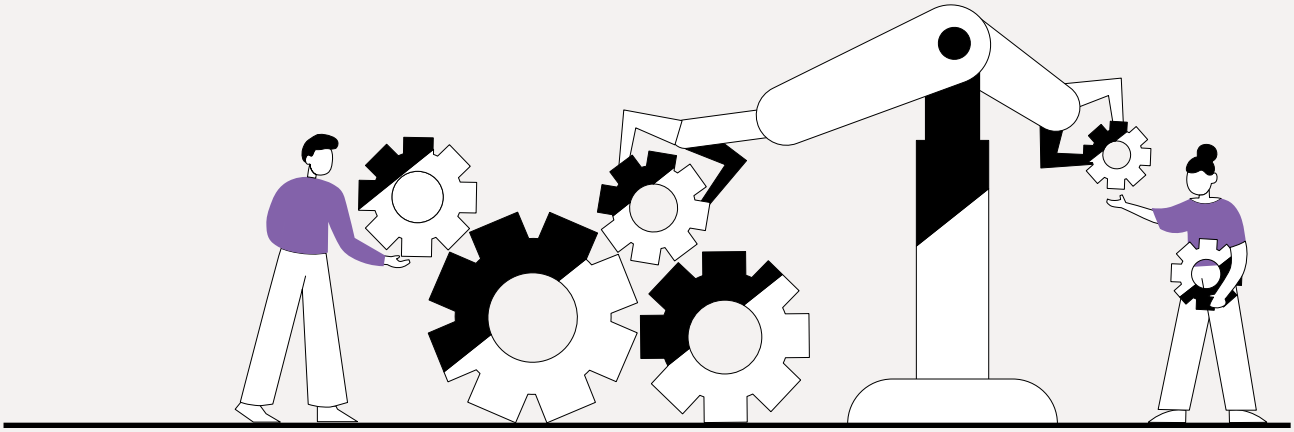
This playbook focuses on recommendations #1, #3 and #4. The full AI Strategy for the Government can be found here.

The AI Strategy for the Government has five recommendations:

1. **Identify common AI applications that can be proliferated**
2. **Productionise AI tools by building centrally**
3. **Identify signature AI use cases to demonstrate impact**
4. **Proliferate AI capabilities by broadening and deepening technical capabilities**
5. **Strengthening trust in the Government's use of AI by establishing governance**

CHAPTER 2

Understanding AI



How AI works

A *What is AI*

AI is a field referring to the collective advancements around building systems that mimic what humans can do – see, speak, hear, move and most importantly, learn. This means that AI systems are able to adapt their approach to solving a problem based on new data without the need for manual reprogramming of the system.

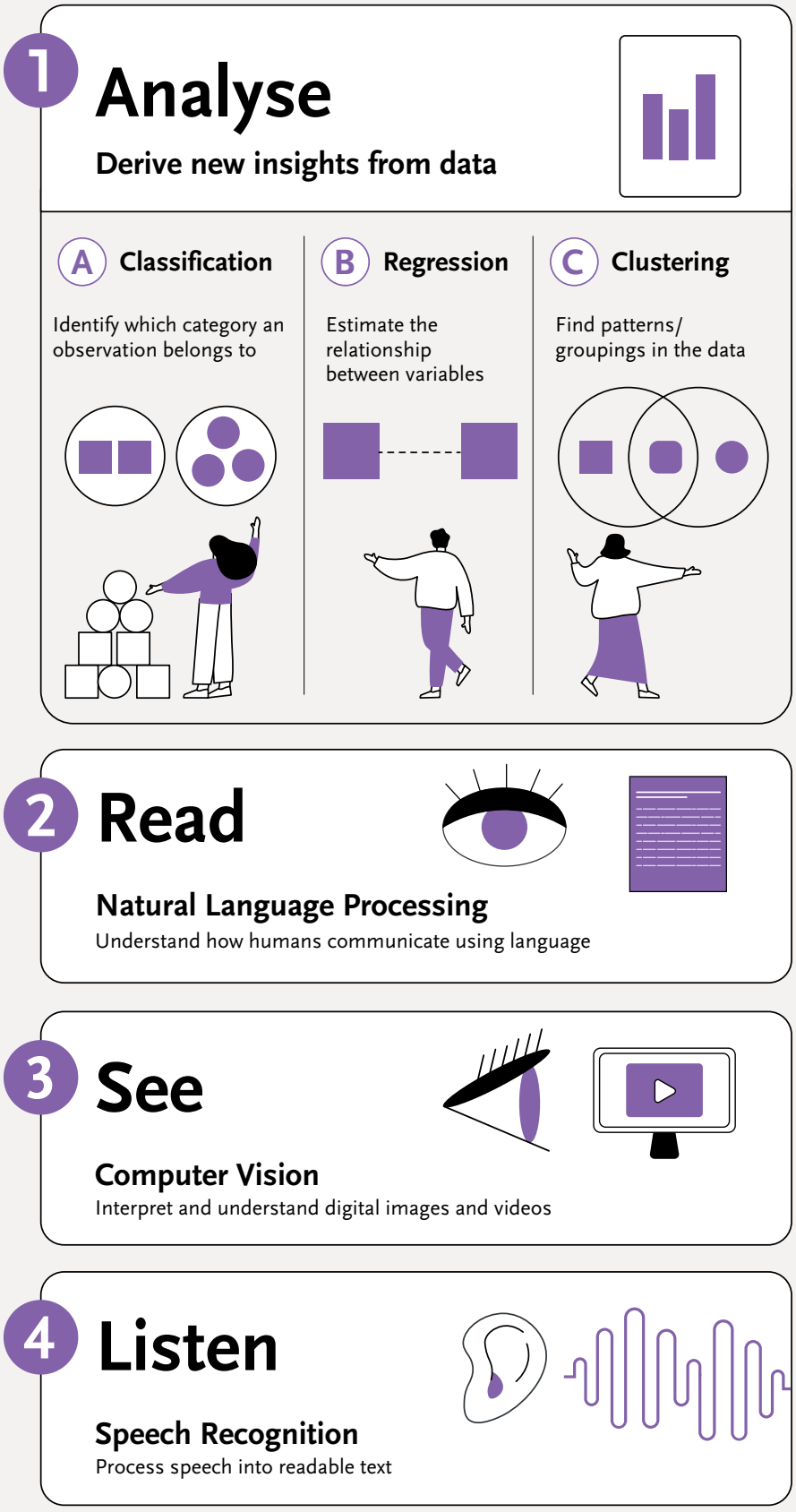
B *What AI can and cannot do*

Science fiction has created an impression that an AI system should understand or learn any intellectual task that a human being can, and even attain self-awareness and consciousness. This form of AI is called Artificial General Intelligence (AGI), which most experts would consider decades or even hundreds of years away from realisation. The truth is, as of now, AI algorithms remain far from "true intelligence" and can only perform a specific set of tasks. For one, AI algorithms cannot distinguish between cause and effect or draw inferences outside of the data on which it is trained. Indeed, AI algorithms remain a "curve-fitting exercise", drawing best fit lines to successfully classify different data points or to predict the next data point.[1]

[1] Professor Judea Pearl, winner of the Turing Award (the "Nobel Prize of computing") has argued that "All the impressive achievements of deep learning amount to just curve fitting."

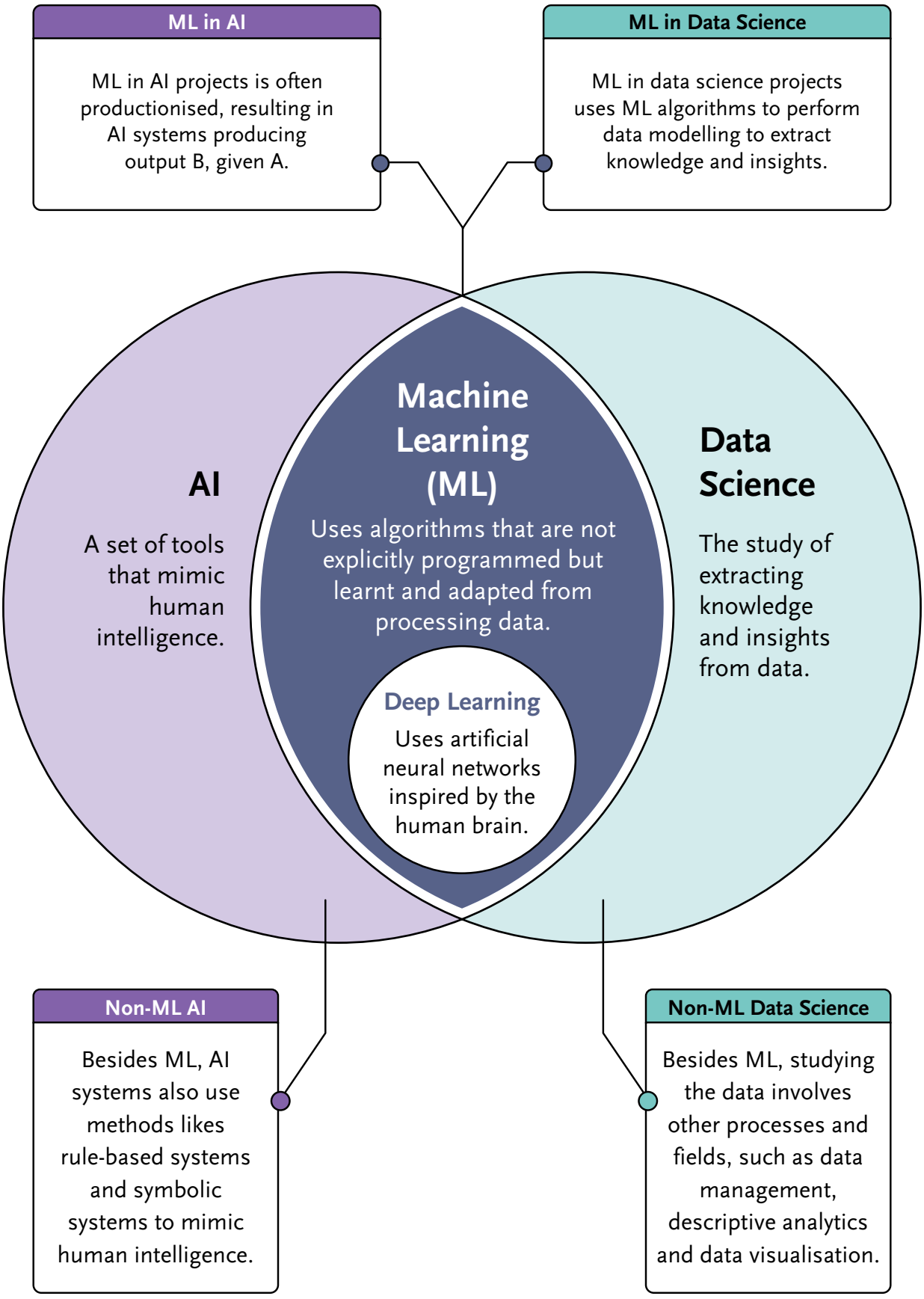
Even with these current limits, there are many things AI can do and do better or faster than a human could.

Here are some things that AI systems CAN do very well:



C *Defining terminology*

Let's try to clarify some terms:



Additionally, there are a few different types of Machine Learning methods:

	What is it	When it's used	How it works	Use Cases
Supervised Learning	The algorithm uses labelled data to learn the relationship between inputs and outputs.	You know how to classify the data and want to define the output of the AI system.	1. Label the training data and define the output variable 2. The algorithm is trained on the data to learn the connection between input and output 3. Trained model is applied to new data	• Predict the call volume in call centres • Understand the factors for driving the sales of a product
Unsupervised Learning	The algorithm organises the data by searching for common characteristics.	You do not know how to classify the data or would like to uncover patterns.	1. Unlabelled data is given to the algorithm 2. The algorithm infers a structure to the data 3. The Algorithm identifies groups of data exhibiting similar behaviour	• Recommender systems • Segment customers for targeted marketing • Identify topics from a text
Reinforcement Learning	The algorithm learns to perform a task and maximise rewards by trial and error.	To learn a series of actions that will lead to the best outcomes.	1. The algorithm takes an action in the environment 2. It receives a reward or punishment 3. The algorithm optimises the best series of actions for maximising total rewards available	• Optimise the driving behaviour of self-driving cars • Balance the load of electricity grids in varying demand cycles

Deep Learning

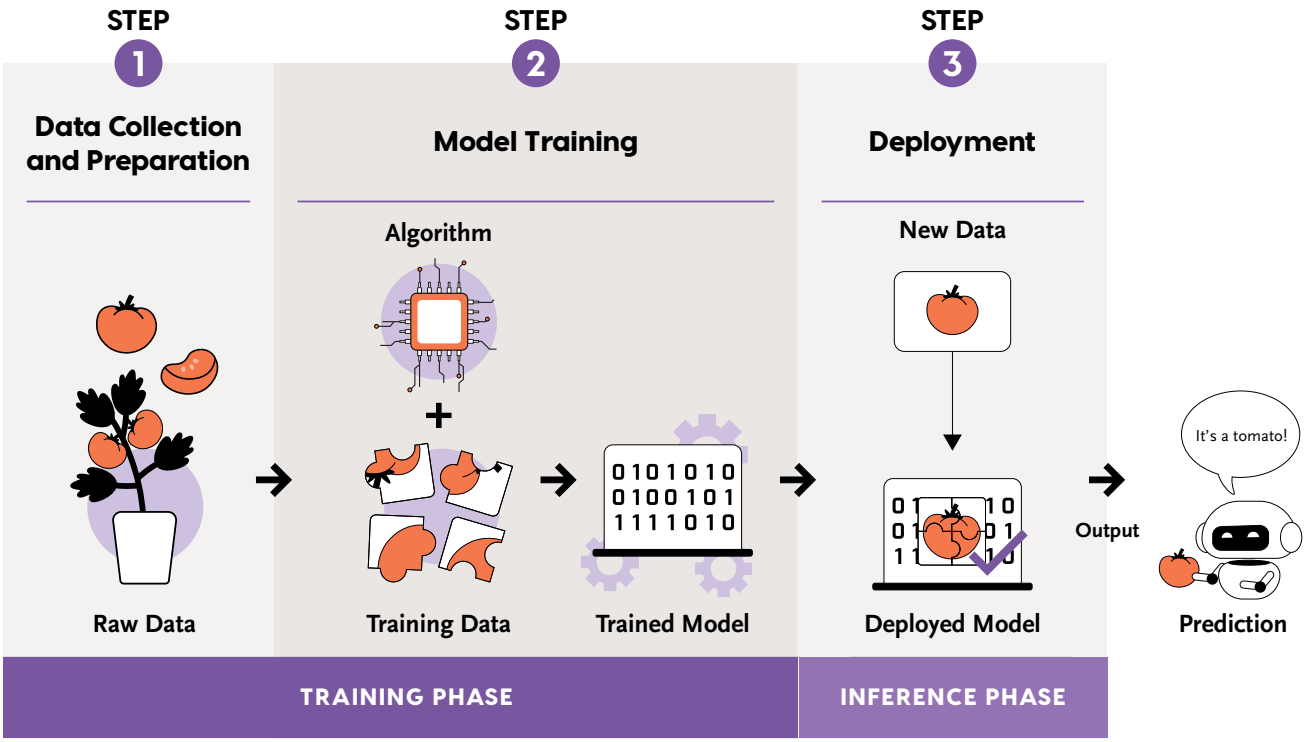
What is it:

Deep Learning is a common machine learning technique that uses the three methods above but is often supervised learning. Inspired by the human brain, it can be described as interconnected layers of "neurons" that learn progressively complex data features at each layer. It is used dominantly for unstructured data (e.g. images), sequences (e.g. audio recordings or text), or time-series data.

How it works:

The first layer of "neurons" receives and processes the data. Subsequent layers further process and interpret. The network is trained by weighting the inputs. For example, If the network classifies an image correctly, weights contributing to the correct answer are increased, while other weights are decreased.

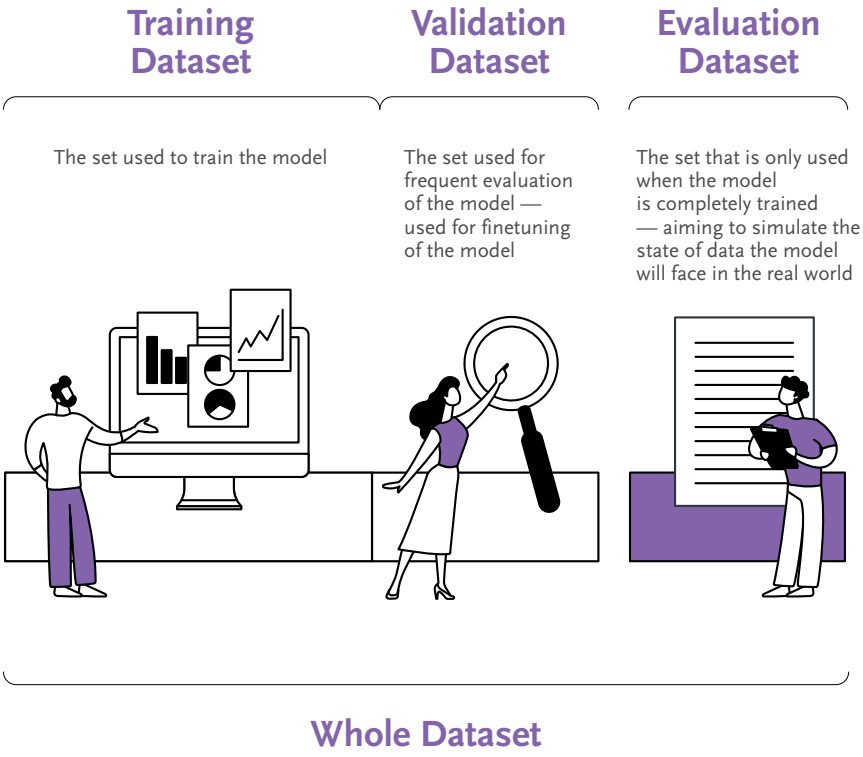
How AI systems are Developed and Deployed



Training Phase

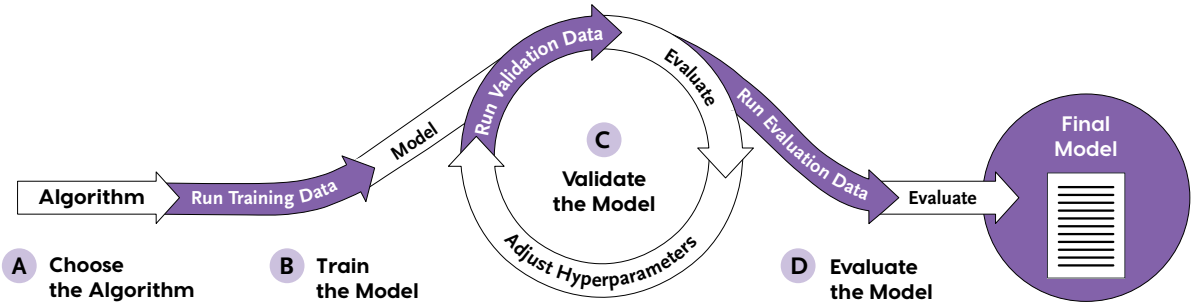
STEP 1 Data Collection and Preparation

The training data is collected and undergoes any necessary processing (e.g. removing duplicates, formatting). In addition, for many projects, the **training data needs to be labelled**, requiring significant effort. After processing the data, it is split into three different sets for use in an AI project.



Training Phase

STEP 2 Model Training



Once the data is ready, the next step is then to build and train the AI model, which follows a process of:

A Choosing the Algorithm

Engineers have to choose the algorithm best suited for the task.

B Training the Model

The algorithm runs the training data to perform a given task (e.g. making a prediction), resulting in a trained model.

C Validating the Model

Next, the model needs to be validated against the Validation dataset, which must be different from the Training dataset. With each run, the hyperparameters of the AI model are adjusted. After repeating the process multiple times, the performance of the model improves.

D Evaluating the Model

Finally, once the model has also performed well at the validation process, it is tested against the Test dataset. Depending on the result, the model either has to go back to training with more datasets or is ready for use!

Definitions:

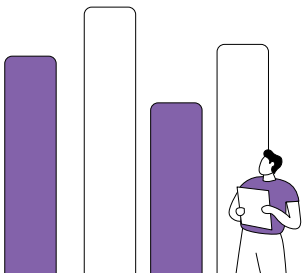
Algorithm
A series of instructions executed automatically by a computer

Model
The algorithm which has been trained on data for a specific problem

Inference Phase

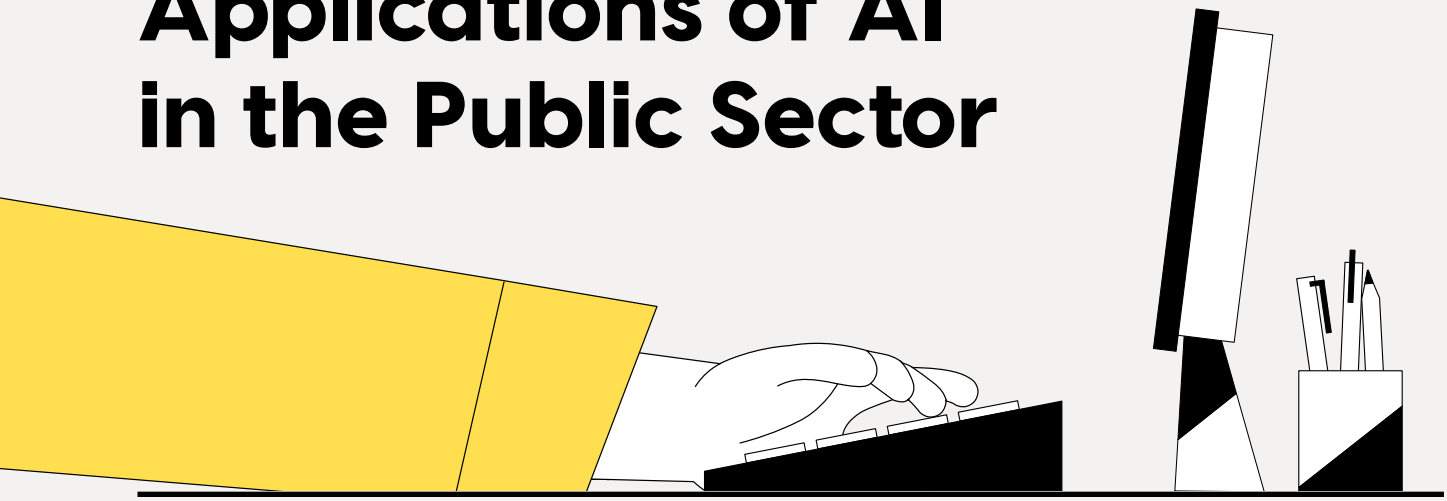
STEP 3 Deployment

When the model has been trained, it is ready to be deployed and predict new input data based on what it has "learned". The model is deployed for use in an agency's work processes, and its performance is continually monitored. When performance falls, for example, due to changes in incoming data distribution, the model will need to be retrained.



CHAPTER 3

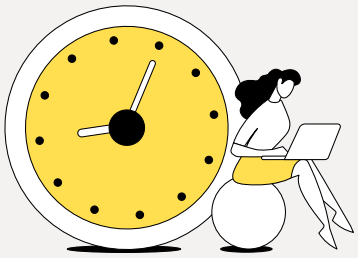
Applications of AI in the Public Sector



How to identify opportunities to adopt AI in your agency?

Broadly, there are two ways AI can support you with at work:

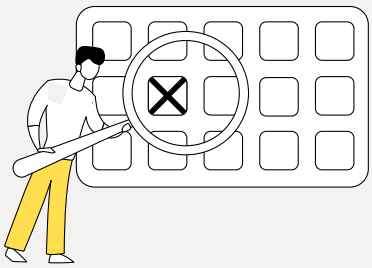
Automate repetitive tasks



Are there repetitive tasks at work that you wish could be automated? Tasks that AI can automate tend to be consistent and repetitive. There are two archetypes of AI applications that automate repetitive tasks:

- **Recognition**
- **Conversation Systems**

Augment human capabilities



Do you wish you had more insights from data to back up your decisions? AI can support by providing predictions and detecting patterns not perceivable by humans. There are three archetypes of AI applications that augment human capabilities:

- **Personalisation**
- **Pattern and Anomaly Detection**
- **Forecasting and Decision Support**

We have identified nine common AI applications that fall under five archetypes of AI applications:

	Common AI Application	Use Case
Automate Repetitive Tasks	**Recognition**	
	Video analytics	Video analytics for Kerbside Loading Bay Pilot (URA)
	Information extraction and summarisation	Extraction of unstructured financial data (DOS)
	Conversation systems	
	Chatbot	Municipal Services Chatbot (MSO)
	Speech and language tools	Transcription of parliamentary sitting (Parliament)
Augment Human Capabilities	**Personalisation**	
	Personalised services	Customisation of job recommendations (WSG)
	Pattern and Anomaly Detection	
	Sentiment analytics	Understanding SME issues (ESG)
	Feedback analytics	Enabling holistic urban planning (URA)
	Fraud analytics	Detection of Fraudulent Claims (SSG)
	Forecasting and Decision Support	
	Predictive modelling	Identification of riskier workplaces (MOM)

Recognition

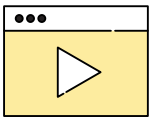
In your role, do you regularly look through text, audio or video to recognise key information to be extracted or an object of interest to be identified or counted?

Such tasks are extremely tedious and prone to human error. Recognition AI models identify and determine objects within text, audio, video, image or other primarily **unstructured data.**

Structured vs Unstructured Data

Structured data is stored and represented in a manner that can be easily interpreted. For example, tabular data that stores names, height and blood-type. Unstructured data is stored in a format that cannot be directly interpreted. For example, an image of a cat or a MP3 file. These data have semantic meaning that require interpretation beyond the raw data stored digitally.

Video Analytics



What is this?

An AI application that can identify objects and monitor their behavior within video footages.

Use case example:

Analysing Usage of Kerbside Loading Bays using Video Footage

Urban Redevelopment Authority (URA)

To efficiently monitor utilisation of the pilot Kerbside Loading Bays, URA deployed a video analytics model to measure vehicle dwell times from video footages.

Find out more here

Information Extraction and Summarisation

What is this?

An AI application that shortens long pieces into a coherent summary with main points in a document or extracts essential details from text documents.

Use case example:

Extracting Unstructured Data for Business Statistics

Department of Statistics (DOS)

To tap on the vast amount of information that can be derived from unstructured data (e.g. detailing of fixed assets under notes), DOS is developing an AI solution to automatically identify, extract and validate the required information from financial statements.

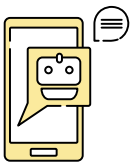
Find out more here

Conversation Systems

In your role, do you engage citizens and businesses or record conversations?

It takes an intensive amount of manpower to engage every stakeholder individually and to transcribe meetings. AI conversation systems enable machines to comprehend and mimic how humans interact across mediums such as text and speech.

Chatbot



What is this?

An AI application that can simulate a conversation through messaging applications, websites, mobile apps or over the phone.

Use case example:

Streamlining the feedback process for municipal issues

Municipal Services Office (MSO)

To bring the feedback reporting process to residents, guide them along the reporting process and route the case to the correct agency, MSO tapped on the Virtual Intelligent Chat Assistant (VICA) platform to develop an AI-powered chatbot available on widely used messaging platforms like WhatsApp and Telegram.

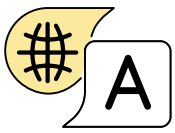
Find out more here

Give it a try here

Whatsapp

Telegram

Speech and Language Tools



What is this?

An AI application that converts audio on different formats to text or translates text of one language to another.

Use case example:

Improving efficiency and accuracy in the transcription of parliamentary sittings

Parliament

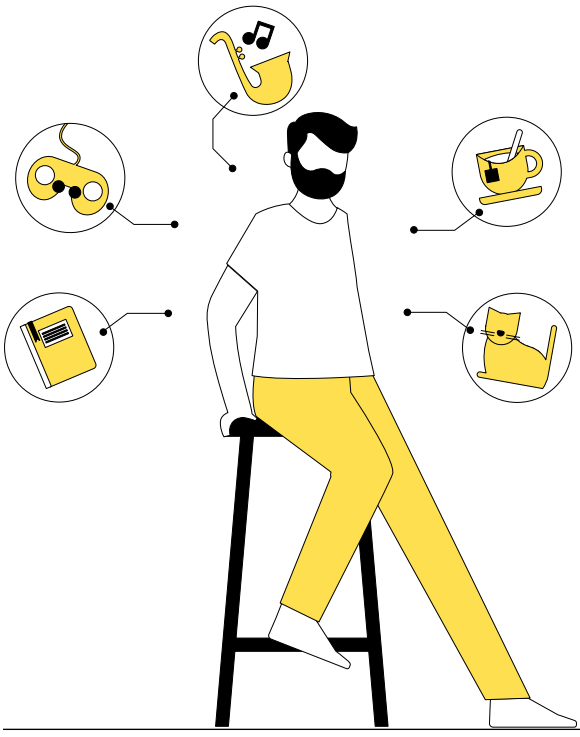
Parliament deployed an AI product, Transcribe, to reduce manpower and time required as well as increase the accuracy of parliamentary sitting transcriptions.

Find out more here

Personalisation

In your role, do you provide digital services to citizens or businesses?

It is not possible to manually customise services for every individual. Personalisation engines can develop profiles of each individual that can adapt over time to the individual's unique preferences.



Personalised Services

What is this?

An AI application that can curate recommendations and customise a user's experience on the platform according to their individual needs and preferences.

Use case example:

Customising job recommendations for individual jobseekers

Workforce Singapore

To reduce time and effort spent on finding suitable jobs, WSG developed an AI model which made personalised job recommendations based on a jobseeker's profile (e.g. skills), preferences and past activity on MyCareersFuture.

Find out more here

Pattern and Anomaly Detection

In your role, do you need to regularly scan documents to find trends, highlight common topics or spot atypical claims?

On top of being laborious, there is a limit to a human's ability to detect and identify patterns and anomalies when the data is vast. AI algorithms are able to learn patterns in the data and find higher-order connections between data points to see if it fits existing patterns or if it is an outlier.

Sentiment Analytics

What is this?

An AI application that can detect the sentiments and understand the issues of concern reflected in text documents.

Use case example:

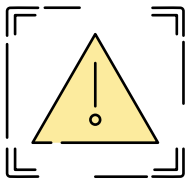
Understanding issues facing SMEs

Enterprise Singapore (ESG)

To gain deeper insights on the types of issues faced by SMEs when COVID-19 hit in 2020, ESG developed a model for detecting emerging issues based on the engagement reports of ESG's SME centres.

Find out more here

Feedback Analytics:



What is this?

AI applications that can analyse feedback and identify trends for planners and policymakers.

Use case example:

Translating varied public feedback into insights for planning

Urban Redevelopment Authority (URA)

To gain a holistic understanding of public sentiment on planning and infrastructure issues, URA is leveraging on AI which can geo-tag email feedback and in the future, create a feedback dashboard to analyse feedback trends across time and space, allowing for quicker intervention.

Find out more here

Fraud Analytics

What is this?

An AI application that can identify transactions or claims which might potentially be fraudulent for further investigations.

Use case example:

Optimising the detection of fraudulent grant claims

SkillsFuture Singapore (SSG)

To efficiently filter for fraudulent grant claims, SSG built two anomaly detection AI models which output a dashboard to show training providers which have displayed high-risk claims, providing a starting point for investigations.

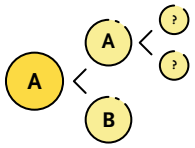
Find out more here

Forecasting and Decision Support

In your role, do you need to identify probabilities or predict outcomes based on a given set of conditions?

Whether it is because of a lack of time or analytics support, decision-making at times might not be backed up with insights learned from data. AI enables predictive analytics to help officers make decisions about future outcomes based on existing or past behaviour patterns.

Predictive Modelling



What is this?

An AI application which predicts the probability of an outcome using a set of variables.

Use case example:

Increasing inspections to riskier workplaces across sectors

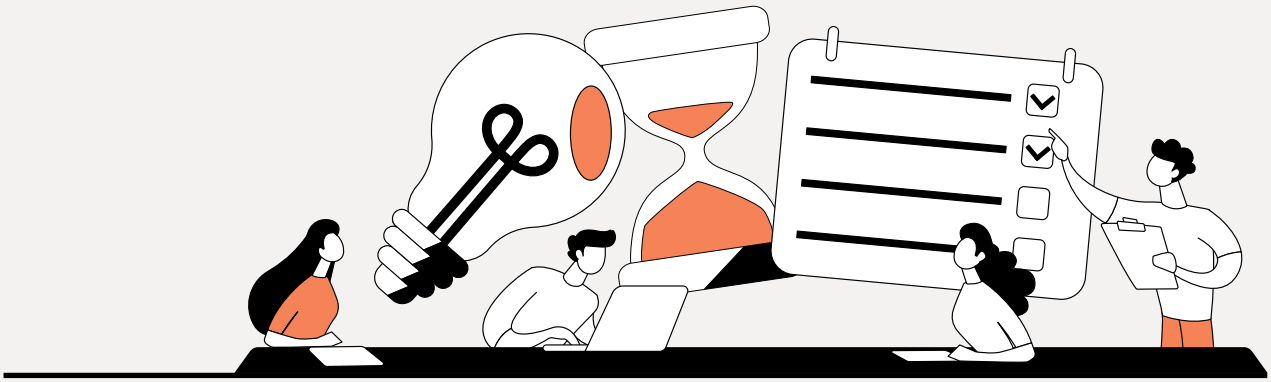
Ministry of Manpower (MOM)

MOM developed a predictive AI model that identifies riskier workplaces by providing a risk ranking of companies based on their likelihood of safety contraventions, helping them target and plan enforcement better.

Find out more here

CHAPTER 4

How do I Start an AI Project?



This chapter provides a guide to help you in starting an AI project when:

1. Defining the Problem
2. Collecting and Assessing Data
3. Choosing a Solution Provider
4. Deployment, Operations and Maintenance of the Model

STEP

1 — 2 — 3 — 4

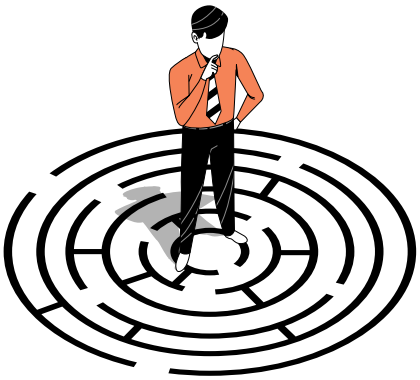
Defining the Problem

The first step to any AI project is the problem definition. AI projects without a proper problem definition process might end up wasting critical time, resources and effort.

Defining the Problem: Identify opportunities for AI

There are two ways to find opportunities to adopt AI:

1



Identify the pain points in your work processes which AI can solve

2

Examine if existing processes can be improved using the Common AI Applications (Chapter 3)

Articulate the Problem Statement

Rather than a starting point of "My boss asked me to use AI to improve our work", articulate the real pain point in your work processes. The issue at hand usually belongs to one of or a combination of these three categories:

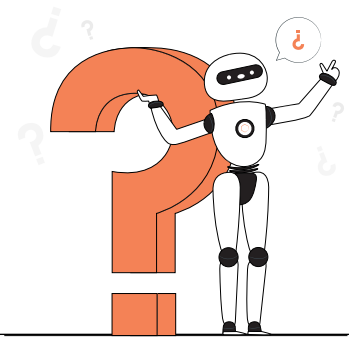
- **Cutting down time and effort**
- **Saving cost**
- **Enhancing performance**

Pose a question

Having thought through these three aspects, try sharpening the problem statement into a question.

✓ **E.g.: "Monitoring the video feeds is burdening for the team"**

✗ **"How can we reduce the number of hours and manpower needed to monitor the video feeds?"**



Defining the Problem: Identify how AI can solve the problem

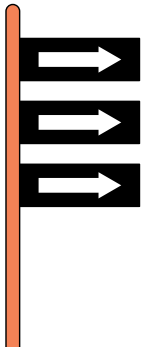
Early in the process, ensure that AI is the right approach to the problem. Below are factors to assess if AI is the right tool to solve your problem statement:

1

Data based

There is data that could represent your decision-making process.

2



Repetitive

Decision-making is repeated on a large scale.

3

Non-deterministic

It is difficult to articulate logical rules on the decision-making process.

Defining the Problem:
Define success for the project

Identify metrics

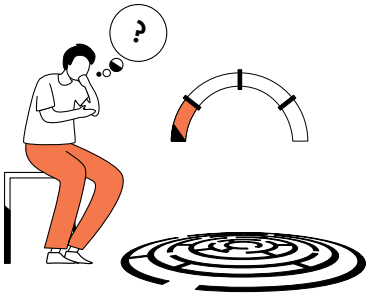
Articulate the measure by which the AI solution is going to improve your work process.

E.g., Hours spent, manpower, risk identification accuracy

Measure baseline

A current benchmark helps the problem to be clearly defined, and you know what exactly you are trying to solve or improve. This also helps evaluate the expected and eventual outcome/impact of the solution later.

E.g., 50 hours/month being spent performing a task



Set a target

Set and quantify the expected outcomes and improvements from the project. This is to:

- Set the right expectations
- Measure success and outcomes after implementation

E.g., Cut hours spent each month by 30%

TIP

Try to think of outcomes and improvement using the frame of

- Cutting down time and effort
- Enhancing performance
- Saving cost

To help you better understand this process, let's look at how ESG did it!

ESG, in partnership with five Trade Associations and Chambers, has a network of SME centres that provide SMEs with basic business advisory and capability upgrading workshops. The SME centres also facilitate projects to meet the needs of SMEs.

Articulate the Problem Statement

Identify the issue at hand

A better grasp of SMEs' concerns allows ESG to collaborate with their partners to better re-orientate the services at the SME Centres to meet their needs. Such concerns are typically reflected in the engagement reports that the SME Centres' Business Advisors log when SMEs come forward to seek business advice. However, sieving and categorising the 3,000 monthly reports is laborious and time consuming.

Problem Statement:

Manual categorisation of engagement reports is time consuming and labour intensive. How can ESG increase this process's efficiency to gain a better grasp of SMEs' concerns and meet their needs?

Identify how AI can solve the problem

Data based

There is data that could represent your decision-making process.

Yes, the task is entirely based on the engagement reports logged by SME Centres

Non-deterministic

It is difficult to articulate logical rules on the decision-making process.

Yes, different engagement reports might use different vocabulary to describe the same problem

Repetitive

Decision-making is repeated on a large scale.

Yes, there are 2,000–3,000 engagement reports to be classified each month

Define success for the project

- **Identify metrics**

  The time and manpower needed to review and classify the engagement reports.

- **Measure baseline**

  Previously, to understand sentiments, the team had to review 2,000–3,000 engagement reports manually every month.

- **Identify how things would improve after the solution is implemented**

  Cutting down time and effort

  Rather than the existing process of manually tagging each report into key areas of concern for business sensing each month, an automated classifier could perform the classification. Officers need to only review 5% of the reports every other month and view a dashboard to review trends and emerging issues.

Support

Getting more support for the first steps of your AI project

DSAID

The Data Science and Artificial Intelligence Division (DSAID) was established as a capability centre to enable GovTech and the whole-of-government (WOG) to formulate effective policies and deliver citizen-centric services through data-driven insights and decision-making. This will allow evidence-based policy-making, enhanced productivity in public service provision and better-targeted services to meet citizens' needs.

Click here to contact DSAID regarding the Design Thinking Workshop

Design Thinking Workshop

DSAID conducts workshops to help agencies identify AI implementation opportunities and upskill organisational understanding of AI. With customised and proven frameworks, these workshops are essential as a first step for agencies. Users are brought through the journey of challenging assumptions, redefining problems and collectively discovering solutions that fit their problem statements. The systematic approach guides users to their end goal, starting small from proof-of-concepts to scaling up for impact by leveraging private or public sector solutions and platforms.

AISG

AISG is a national AI programme launched by the National Research Foundation. It brings together Singapore-based research institutions to grow local AI research capabilities and develop new AI tools and solutions to meet national and industry needs. AISG offers two programmes targeted at organisations that are taking the first steps in adopting AI solutions.

AI Clinic

The AI Clinic is a theme-based 2.5-hour workshop that aims to help participants understand practical AI use cases specific to your agency's sector and explore potential AI solutions and possible ways to implement them.

AI Discovery

The AI Discovery programme is based on AISG's experience in providing advisory services to businesses to identify, scope and develop AI solutions. It consists of two 2.5-hour phases.

Ideation Phase:
Helps an agency identify areas of opportunity for their organisations to explore

Prioritisation Phase:
Helps an agency prioritise use cases based on feasibility and potential business value

While the AI Clinic is a workshop for participants from different organisations within one sector, the AI Discovery workshop is a one-to-one engagement with AISG for close consultation on AI use case ideation and prioritisation.

Click here to contact AISG regarding the two programmes

STEP 1 — 2 — 3 — 4

Collecting and Assessing Data

Poor training data results in poor AI performance. An AI application is dependent on the training data and the quality of labels used to develop the model. As such, the output can only be as good as the input – or as the phrase goes, "Garbage in, garbage out!".

If the data is not ready for analysis, is insufficient, or non-existent, the problem is not ready to be tackled. Therefore, it is important to first know the data needs of the project.

Data Collection

Consider what datasets are needed for this project and how to obtain these datasets.

Data Labelling

Annotate data (e.g. images, text files, videos etc.) with labels for training the algorithm (for supervised learning). This is a critical step, but also often highly manual and time consuming.

TIP

How much data is needed to train a decent model? It depends.

1. **Using pre-trained models.** Many use cases can utilise pre-trained models, such as detecting people in images, and translating text. In this scenario, you will not need to collect data for training, but collect some data to estimate the model performance.

2. **Transfer learning.** Many of use cases can be trained from pre-trained model by utilising transfer learning. For example, if you want to train a model to detect unicorns in images, you can utilise model weights learnt from large-scale general object detection datasets, which will require less data. In this scenario, you can expect to collect thousands of examples to train the model.

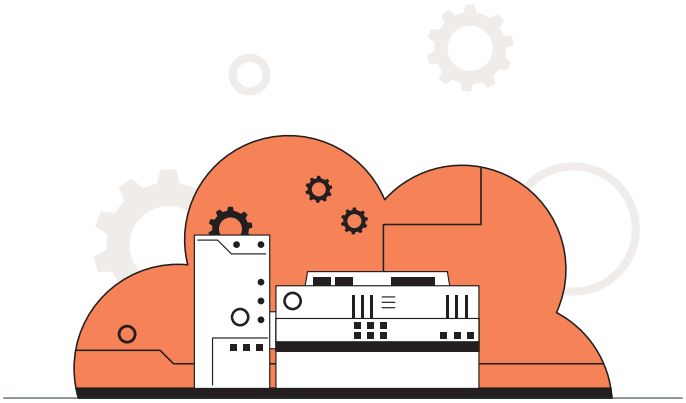
3. **Training from scratch.** You may need to collect between thousands and tens of thousands of examples if you are training your AI model from scratch. That said, recent advances in machine learning have achieved significant breakthroughs in allowing image and language problems to achieve reasonable performance with few than 50 examples.

STEP

1 — 2 — 3 — 4

Assessing the state of data

Assess the quality and quantity of the data.



TIP

Refer to the Data Strategy Playbook

A section of the Data Strategy Playbook is dedicated to identifying data needs for use cases. It provides systematic guidance for sourcing and using data for data projects.

You can also use this framework for further discussion with the Chief Data Officer/IT team to ensure the data needs of your project are addressed.

TIP

This article on DSAID's Medium blog focuses on the steps for data collection and preparation in building a computer vision model. While your project might not be a computer vision model, this could help you get a better sense of how to go about data collection and assessment.

3 Principles of Data Quality:

1

Completeness

Do you have all the required data, both in terms of the variables and the quantity of data?

2

Accuracy

How well do the values in the dataset match the true characteristics of the entities described by the dataset?

3

Veracity

How credible is the data? Did the data originate from a reliable source?

To better understand where to start, let's briefly introduce the Government Data Architecture.

Government Data Architecture

The Government Data Architecture (GDA) facilitates efficient and secure data sharing of clean, authoritative datasets across public agencies. It does so by designating and building:

- **Single Sources of Truth (SSOTs) that acquire, clean and maintain high quality core data**
- **Trusted Centres (TCs) that fuse and distribute core datasets**

  There are 4 Trusted Centres for different types of data:

  - **Individual**
    Department of Statistics
  - **Business**
    Department of Statistics
  - **Geospatial**
    Singapore Land Authority
  - **Sensor**
    Smart National Digital Government Group

- **Central platforms for data users to request, download and analyse datasets**

- **Vault**

For Individual and Business datasets, Vault is the one-stop platform in the GDA which enables officers to search, request and obtain datasets. To see what datasets are available for the project, you are free to browse and preview datasets available on Vault without a request.

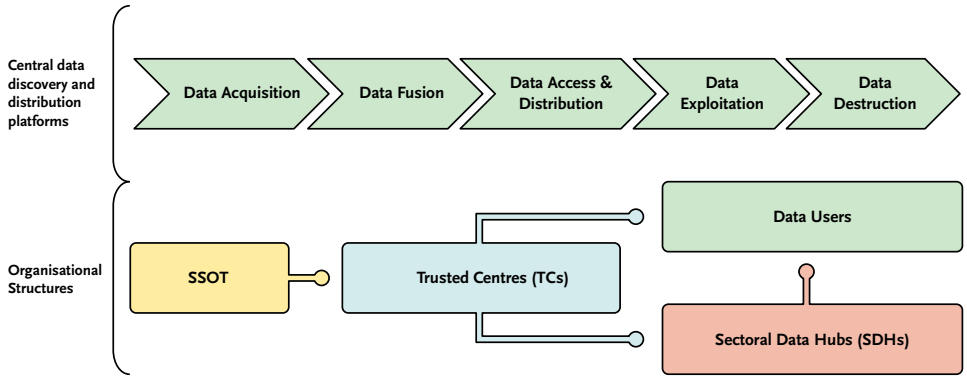
Access Vault at https://vault.gov.sg/.

- **GeoSpace**

Geospatial data can be accessed from https://geospace.gov.sg

- **Sensor**

Sensor data can be accessed from https://tcs.gov.sg



Read more about the GDA here

STEP 1 — 2 — 3 — 4

Choosing a Solution Provider

There are three options to develop an AI solution for your agency depending on your project requirements:

A. Government
- Data Science and AI Division (DSAID) Support
- Central AI Products

B. Industry

C. Research

A

Government

DSAID Support

DSAID works with government agencies using data science and artificial intelligence to improve policy outcomes, service delivery and operational efficiency. DSAID supports partner agencies in building in-house expertise, formulating data and AI strategies and setting up the necessary infrastructure. The following paragraphs detail the support offered by DSAID to agencies.

Project Partnerships

DSAID provides support for developing AI solutions through project partnerships with agencies. With a focus on shared ownership of success, post-project handover and sustainability, project partnerships involve agency staff throughout the project to allow for stronger buy-in, more effective agile delivery and capability development.

Project Consultancy

DSAID also provides technical expertise and solution architecting services to agencies. By providing technical consultancy on software and hardware systems design and deployment, DSAID supports agencies in enhancing their systems' design, capabilities and performance.

Forward Deployed Teams (FDTs)

FDTs are teams of data scientists and engineers from GovTech. They are embedded to agencies on a permanent basis as their core data science team, enabling success by cultivating relationships with agency IT teams and business owners. Their roles include:

- **Executing High-Impact Use Cases**
- **Developing Workforce Capabilities**
- **Improving Accessibility and Quality of Data and Tools in the Agency**

Read more about FDTs in this article on DSAID's Medium blog.

Click here to contact DSAID about a project consultancy or FDTs.

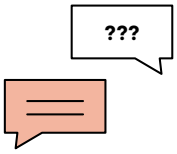
Central AI Products

Some problem statements might be able to be solved using existing Central AI Products. There are currently eight Central AI Products that support the development and deployment of AI in the government. These are products that agencies should consider before other options.

Service Delivery

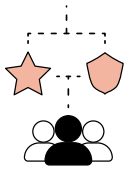
Virtual Intelligent Chat Assistant (VICA)

Provides a human-like conversational experience.



Percy

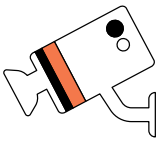
An AI-powered personalisation software platform that can also maintain the data security of citizens.



Internal Operations

Video Analytics System

A scalable and modular system which empowers agencies to use Video Analytics as a service.



Transcribe

An AI platform converting speech in audio or video into text.

SG Translate

A customised Government translation engine using AI to produce translations.

Fraud Detection

A platform that provides insights for evaluating and investigating grant fraud.

Policymaking and Planning

GovText

A text analytics platform that streamlines multiple text analytics processes.

Analytics.gov

A platform that provides centralised access to commonly used analytics products for data exploitation.

If you wish to find out more about any of these Central AI Products, contact the Product Manager here

Virtual Intelligent Chat Assistant (VICA)

VICA provides a human-like conversational AI experience for government interaction, leveraging modern Natural Language Processing Engines with higher accuracy and more advanced conversational capabilities than the previous AskJamie chatbots.

VICA can:

- **Provide answers to basic queries**
- **Perform agency transactions for the user**
- **Direct users to the correct agency chatbot to attend to them**
- **Guide citizens in the process of giving their input**
- **Escalate conversations to human support agents within the same chat session**
- **Support chat interactions on multiple channels including web, Whatsapp, and Telegram**

This will enable end-users to get their questions and requests handled quickly and easily.

MSO's Chatbot taps on VICA as a Central AI product. Find out more about this use case in the Annex.

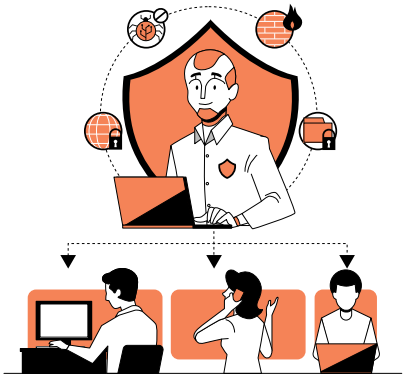
Percy

Percy is an AI-powered personalisation software platform that allows agencies to easily configure personalised experiences on their email and web channels, improving the interaction between the Government and citizens.

Percy can:

- **Enable personalisation of citizen engagement on email and web without the need for technical know-how**
- **Maintain data security of citizens as compared to many other commercial tools**

HDB's MyNiceHome taps on Percy to recommend relevant HDB web articles to users based on their browsing history. It further tracks the performance of the recommendations using click-through rate. The MyNiceHome team achieved web personalisation simply by integrating with Whole-of-Government Application Analytics (WOGAA) and annotating additional information on their website. Percy then automatically built a custom personalisation model to serve relevant content.



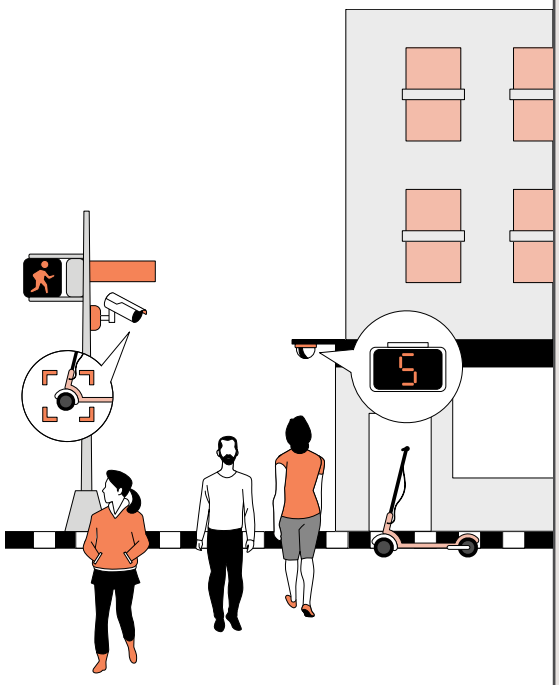
Video Analytics System

The Video Analytics System (VAS) is a scalable and modular system that empowers agencies to use Video Analytics as a Service, train video analytics models and exchange videos and data generated from video analytics across whole-of-government.

AI models using the VAS can:

- **Identify and count objects of interest from government-deployed video cameras**
- **Access on-demand videos that belong to your agency or other agencies for operation or research work**

URA used the VAS to analyse usage of Kerbside Loading Bays via video footages. Refer to the Annex to read more on this use case.



Transcribe

Transcribe is an AI platform that enables auto transcription technologies, converting speech either in audio or video into text. The platform is accessible from both the internet and intranet at https://www.transcribe.gov.sg via Google Chrome or Microsoft Edge.

With Transcribe, users can:

- **Upload an audio or video file for transcription**
- **Speak into the Transcribe web application for instantaneous voice transcription**

Parliament used Transcribe to automate the transcription of parliamentary sittings. Read more about this use case in the Annex.

SG Translate

SG Translate is a customised Government translation engine that uses AI to produce decent first-cut translations with localised terms in all four official languages.

SG Translate can:

- **Serve as a translation resource for public officers that produces consistent output, especially for the translation of distinctly Singapore content**

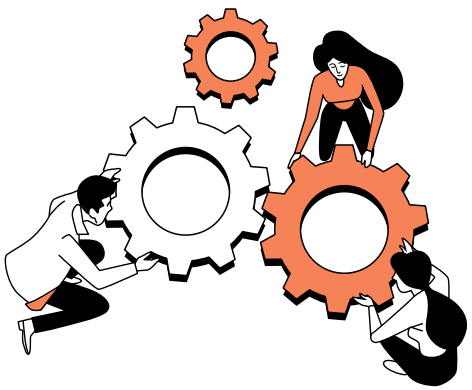
Over a short span of two years, public officers have used SG Translate to generate about 200,000 first-cut translations. During the national COVID-19 response, SG Translate facilitated Government communications with the public, reducing the time taken to translate each Gov.sg WhatsApp message by 25-50% as translation requests soared.

Fraud Detection

Fraud Detection is a platform that provides insights for evaluating and investigating grant fraud across WOG. This will reduce the time needed by public officers to consolidate data and insights for investigations and audits and provide a common framework for describing an entity's nature of breach, which can be used for grant application processing.

Fraud Detection can:

- **Automate checks against government data sources such as CPF and MOM and flag discrepancies in employment size**
- **Alert if the applicant/vendor or their directors/shareholders are blacklisted or have incarceration records**
- **Draw data from agencies to create a network of people and companies and the relationships between them. It will flag any conflicts of interest in the applications for grants requiring that applicants and vendors not be related**

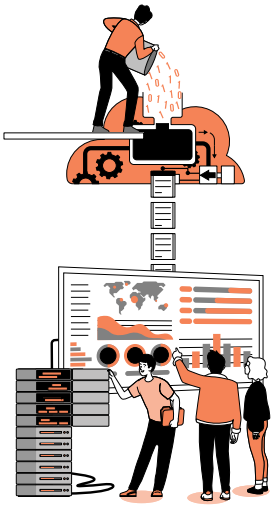


GovText

GovText is a text analytics platform that streamlines multiple text analytics processes such as topic modelling, enabling public officers to analyse and sieve out insights from texts. When there is a need to sieve through a high volume of text data, many hours are required. This product potentially reduces the time and manpower needed to extract information from texts.

From a collection of documents (e.g. feedback, survey, discussion notes), GovText can be used to:

- **Discover key topics in a collection of documents**
- **Extract the insights**
- **Reveal any unknown trends from the text data**

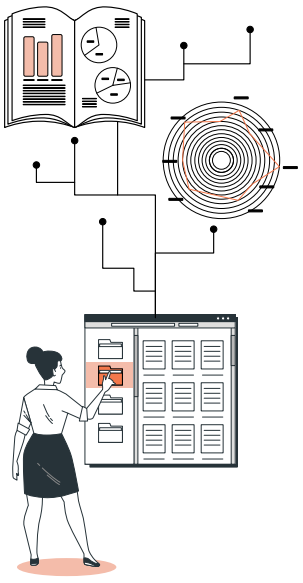


Analytics.gov

Analytics.gov is a platform that provides centralised access to commonly used analytics products for data exploitation. This will reduce ground challenges public officers face in the procurement, deployment and maintenance of data analytics tools, such as an AI model.

On Analytics.gov, officers can:

- **Create data science notebooks**
- **Use data visualisation collaboration platforms**
- **Access curated Open Source package repositories (Python and R)**
- **Leverage on integration with Vault**

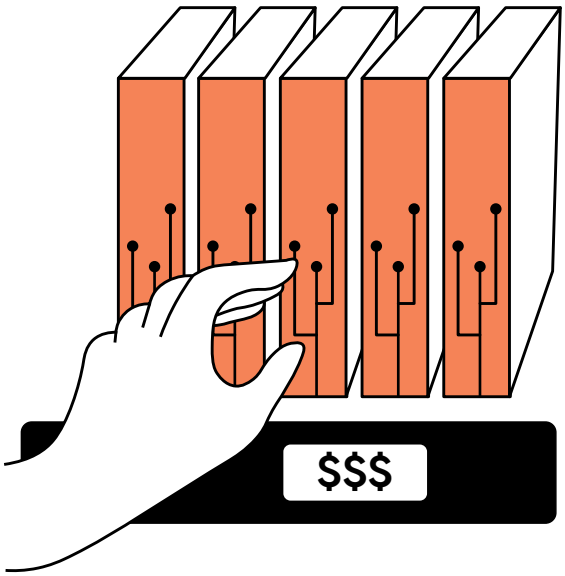


B Procure from the Industry

If DSAID support and the Central AI products are not suitable, your agency can procure an AI solution commercially via the "Green Lane Approach":

Green Lane Approach

The Green Lane is for government agencies to procure technology products and services from firms that have qualified under the various programmes endorsed by GovTech, such as the Accreditation@IMDA.



This approach aims to:

- **Improve process efficiency during the tender and quotation evaluation**
- **Support growth and scaling of Singapore-based tech product companies and start-ups**

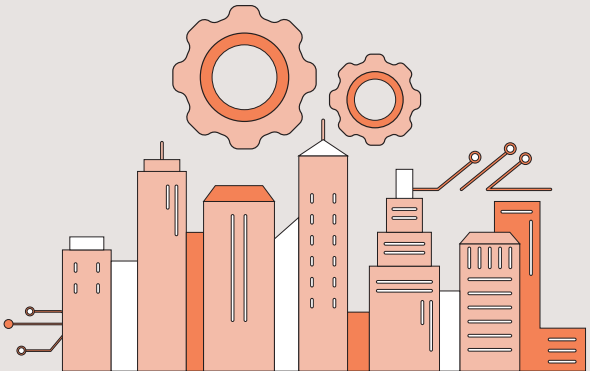
Any procurement of technology products and services, if not covered under an international agreement, will need to follow the Green Lane Procurement approach. The flowchart on the next page guides you through the process.

AC Panel

Agencies are obliged to consider the Panel of Accredited Companies (AC Panel) first before any other frameworks or companies. AC Panel consists of Singapore-based frontier tech product companies and promising start-ups that have been evaluated under the IMDA SG:D Accreditation and SG:D Spark programmes.

To expedite the procurement decision cycle, agencies can discuss specific project requirements with any AC Panel supplier to assess whether the AI solution meets your needs.

Find the list of AI solution providers in the AC Panel here.



DSAI Bulk Tender

GovTech established GVT(T)20005 Data Science & Artificial Intelligence (DSAI) software and services block and bulk tender that will reduce lead time and effort required from Agencies when procuring DSAI products/services.

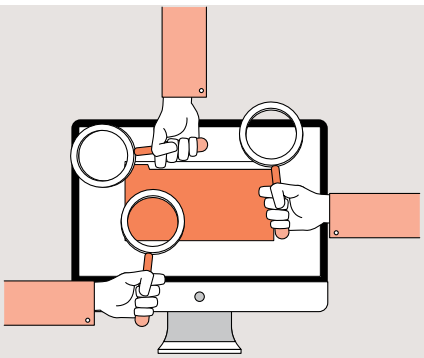
This bulk tender is valid for a period of three years, from 3 May 2021 to 2 May 2024, for the supply of three categories:

- **Cat A: Software and Professional/ Support Services**
- **Cat B System Integration and Maintenance Services**
- **Cat C: Project and Consultancy Services**

For more information, click here.

Other Sourcing Methods

If neither the AC Panel nor the Bulk Tender offering are suitable, then agencies are no longer obliged under the Green Lane Procurement approach and can consider other sourcing methods.



C Research Collaborations

If commercially available solutions are unable or unfeasible to solve your problem statement (especially if it is more complex and difficult), the third option for developing an AI solution for your agency is via collaboration with Singapore's ecosystem of researchers. There are a few possibilities:

AI Singapore (AISG)

Your agency can collaborate with AISG on your AI project via its flagship programme, the 100 Experiments (100E).

In this programme, AISG supports projects where a minimum viable model can be developed and deployed within 9 to 18 months. AISG will provide matching funds of up to $250,000 per 100E project for researchers from Singapore's autonomous universities, A*STAR research institutes, other Singapore-based publicly-funded research institutions or the AISG engineering team to develop an AI minimum viable model to work for your agency's problem statement. Your agency will be required to match this funding in kind and cash.

The fine-tuned AI minimum viable model will be handed to your agency to proceed with the integration, deployment and maintenance of the end solution undertaken by GovTech or in partnership with a commercial solution provider. Your agency can also consider recruiting the AI apprentices from AISG who have been working on the project to build up internal capability in integrating, deploying and maintaining the fine-tuned model.

IRAS' AI-enabled Evaluation of Live Chat Service Quality

The Inland Revenue Authority of Singapore (IRAS) handles an increasing volume of live chats by taxpayers every year – about 235k live chat requests were received in FY2020. Frontline supervisors monitor the quality of service rendered by inspecting live chats regularly through sampling. The service quality monitoring process needs to ensure consistency and quality in the delivery of services and can be tedious and resource-intensive.

Through the 100E collaboration, AI models were deployed to automate the scoring of chat dialogues based on specific service quality metrics. This enabled IRAS to efficiently and effectively evaluate the performance of each agent by aggregating the predicted scores. IRAS has also benefited from the collaboration with AISG by hiring an AI apprentice (who had developed IRAS' AI models) to continue their efforts in improving, maintaining and scaling up the AI models.

Contact AISG here for more information on the 100E

TRANS Grant

The Public Sector Translational R&D Grant (TRANS Grant) supports translation of R&D into applications and taps on the local research community to solve public sector challenges, demonstrate the feasibility of new ideas and encourage agencies to experiment and deploy innovative solutions using digital technology.

The desired outcome is for the public sector to deploy the solutions upon successfully completing the proof-of-concept and good results demonstrated during testing. Your agency may approach the following TRANS Labs to discuss possible collaborations:

- **Smart Nation Applied R&D Lab (SNAL) from A*STAR**
- **Smart Platform Infrastructure Research on Integrative Technology (SPIRIT) from NTU**

Intelligent Case Retrieval System for Singapore Judiciary

The Judiciary needed an intelligent case retrieval system for supporting effective retrieval of key legal documents in decided cases. Commercially available research tools only enabled searches based on the hard text of published judgements without any intelligent capabilities. Legal commercial AI vendors were also not willing to explore R&D in AI solutions that fit the requirements of the Judiciary without a hefty price tag.

Therefore, the Supreme Court and State Courts worked with NTU SPIRIT Lab to develop the Intelligent Case Retrieval System (ICRS), an AI solution that can understand case details, identify points of law, relevant precedents and possible outcomes, to guide the judge. From a Proof-of-Concept, the ICRS has been deployed as a full-fledged AI decision and research support system internally for judges and judicial officers across the Judiciary to replace the hardcopy of the legal bluebook.

Contact GovTech here for more information on the TRANS Grant

STEP

1 — 2 — 3 — 4

Deployment, Operation and Maintenance of the Model

Deployment and Operation

Successfully implementing an AI model to solve your problem statement goes beyond developing an AI model. Crucially, there are important considerations, which can be categorized in the classic framework of People, Process and Technology.

Technology

Depending on the needs of your project, there are some important technical considerations which you will have to discuss with the engineers.

- **Data Pipelines**

While the AI model could be trained by batch data that has been collected, data pipelines are needed to input data into the AI system. It is also important to specify the destination of the AI model's output. Will the output be directly used by a human to make decisions? Or will the output be used as input for another application?

- **Regularity of output**

Is the model required to output upon request, or only at specified timings? How quickly does your agency require the model predictions? This will affect the model's **latency requirement.**

- **Deployment environment**

Should you deploy your AI model on-premise or on the Government Commercial Cloud? This would depend on the control needed of the data, and the compute resources your model requires.

Latency Requirement

Latency requirement describes the speed at which an application or user requires an AI model's output.

People

If intended users do not know or want to use the AI solution, the benefits reaped will be limited no matter the quality of the technology.

Some ways to encourage adoption of the model amongst users in the agency include:

- A clear communication plan on the capabilities and limitations of the AI system
- Addressing user resistance and demands
- Training users users to benefit from the AI system

Process

It is important that the AI solution is integrated into the existing work processes. The right processes should be in place to support the adoption of the new AI solution.

Maintenance

An AI model's performance might deteriorate over time as data evolve and models built become outdated. It is important to track a model's performance and maintain it. To ensure a systemised maintenance, you should think about:

Tracking performance

How will you track the model's performance? Use historical data to backtest, examine data distributions and test assumptions.

Retraining the model

How often should you retrain the model? If you receive new data periodically, retraining the model can be scheduled accordingly. Will you retrain the entire model on new data? This might not be necessary, depending on the model.

Infrastructure for retraining

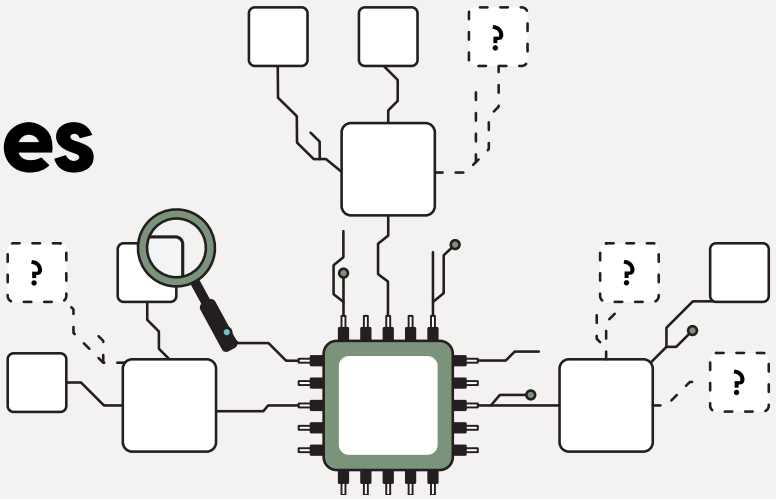
Does the project have the infrastructure for retraining? This could be in "containers" – isolated applications offline, or online, allowing the model to learn continuously.

TIP

If you need more help on deploying, operating and maintaining the model, you can reach out to DSAID for their Project Consultancy services mentioned earlier in this Chapter.

CHAPTER 5

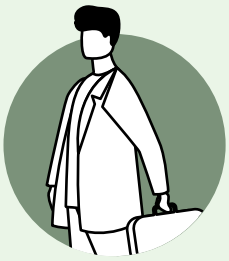
Developing AI Capabilities



With AI increasingly used across the Government and its functioning markedly different from technology most are familiar with, there is a need to proliferate AI capabilities across an agency's workforce and further develop ops-tech capabilities to harness AI effectively.

Crucially, most officers need to be literate with AI technology while more need to be able to identify opportunities where AI can be employed and even customise AI products to suit the needs of their agency.

The next page provides an overview of the different archetypes of officers with regard to AI competency. Linked to each archetype is a directory of relevant courses which officers can attend to achieve various competencies. Kindly refer to the course websites for the latest details.

	Literacy	Business User	Power User
Archetype			
Objective	Knowledge and understanding of AI fundamentals and applications	Ops-tech capabilities to identify AI use cases	Capabilities to customise AI systems and products for use
Competencies	• Demonstrate intuition (not technical comprehension) on the workings of some common machine learning algorithms.	• Relate some use cases where machine learning (e.g. clustering, regression, classification) has been used to solve specific problems.	• Perform basic data modelling for a set of data to identify and recognise patterns and predict future trends using techniques in classification, regression, clustering, forecasting. • Utilise proven off-the-shelf products, auto-ML tools, open-source tools and libraries for analysis. • Develop appropriate evaluation criteria to determine the performance of the models and recommend further improvements.

Type of Courses	Competencies
 **Literacy**	• Data Science and AI Literacy ePrimer (LEARN App) • AI for Everyone (Coursera/Andrew Ng) • AI for Everyone Workshop (AISG) • Artificial Intelligence for Everyone - A Practical Experience (Republic Polytechnic)
 **Business Users**	**Introduction to AI** • An Introduction to Code-Free Machine Learning (Republic Polytechnic) • Introduction to AI and Machine Learning (Singapore Polytechnic) • Getting Started with Artificial Intelligence (IBM) • Introduction to Machine Learning Techniques (code-free) (CSC) **Specific Applications** **Predictive Analytics** • Predictive Analytics for Business Users (Temasek Polytechnic) **Text Analytics** • Text Mining – Making Sense of Unstructured Data (Republic Polytechnic) • Text Analytics for Business Users (Temasek Polytechnic) **Conversation Systems** • Developing Your First Chatbot (Republic Polytechnic) • Creating Your Digital Voice Assistant (Republic Polytechnic)
 **Power Users**	**Introduction to AI** • Artificial Intelligence for Techies – A Hands-On Approach (Republic Polytechnic) • Data Science and Machine Learning Bootcamp with R (udemy on CSC LEARN) • AI for Industry (AISG) • Certificate in Artificial Intelligence (SMU) **Specific Applications** **Predictive Analytics** • Predictive Analytics with Programming (Temasek Polytechnic) **Text Analytics** • A Primer in Text Analytics – Unstructured Text and Sentiment Analysis (CSC) • Text Analytics with Programming (Temasek Polytechnic) **Video Analytics** • Face Recognition in Action (Nanyang Polytechnic)

For an updated and comprehensive list of courses you can take, check out the Data Science and AI Training Road Map

Featured Course:

An Introduction to Code-Free Machine Learning (Republic Polytechnic)

The National AI Office and DSAID have worked with Republic Polytechnic to adapt this course for public sector officers, with hands-on exercises on the Government's Central AI Products

- **Overview of Machine Learning**
- **Machine Learning workflow**
- **Five Hands-on exercises using GovTech and private sector platforms**
  - Solve a regression problem on a cloud provider's platform
  - Train an object detector on GovTech's Video Analytics System
  - Perform topic modelling on GovTech's GovText platform
  - Perform sentiment analysis on a cloud provider's platform
  - Use speech-to-text technologies using GovTech's Transcribe platform
- **Instil awareness of major AI applications from use cases in the Government**
- **Develop capability for identifying opportunities to apply AI at work and for scoping out an AI project**

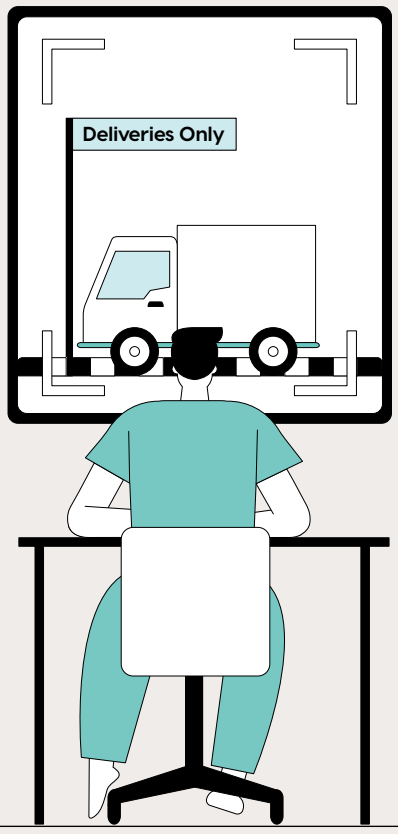
ANNEX

Video Analytics

Analysing Usage of Kerbside Loading Bays (KLBs) Using Video Footage (URA)

Problem Statement:

Despite a high volume of deliveries, delivery drivers faced challenges in commercial areas that lacked designated loading/unloading facilities. They were parking illegally, resulting in traffic disamenities for other road users and risking summons. The pilot involved the conversion of selected kerbside parking lots into paid Kerbside Loading Bays (KLBs). There was a need to monitor the usage of these bays to evaluate the pilot for its effectiveness and collate learning points for scaling up and future deployment.



What the team did:

Through collaboration with GovTech, a Video Analytics model named "Platesnap" was developed to extract vehicle and dwell time data from video footages captured from KLBs. Using Platesnap, which is currently available on GovTech's Video Analytics System (VAS), the team efficiently monitored and analysed dwell times within the KLBs. For example, by analysing the footage, it could be shown that median dwell time was less than 8 minutes, and 84% of goods vehicles dwelled less than 20 minutes. Additionally, analysis also found that four of the five KLBs had utilisation rates that exceeded 50% of the utilisation rates of regular parking lots along the same street, between the hours 9am–530pm, indicating that the KLBs were well-utilised by delivery drivers.

Outcome/Impact:

Platesnap extracted meaningful information from video data automatically and quickly, allowing analysis to be done efficiently without manually looking through hours of video footage. This is cost-efficient significantly reducing the man-hours, therefore allowing for a long-term, large-scale evaluation of KLBs.

Information extraction and summarisation

Extracting Unstructured Data for Business Statistics (DOS)

Problem Statement:

While DOS has been relying on structured data from financial accounts, there is also a rich source of information and new insights that can be derived from the unstructured data (e.g. details of fixed assets under the notes). However, considerable manual effort is currently required to extract and process relevant information from the unstructured part of the financial statements. This limits the number of financial statements that can be processed for data compilation.

What the team did:

The team worked with a commercial AI solution provider to develop an AI solution, using advanced semantic and reasoning algorithms to automatically identify, extract, cleanse and validate the required information from financial statements. As a Proof-of-Concept (PoC), the team identified about 30 data items such as details of fixed assets, overseas subsidiaries and ultimate investors from the financial statements for the model to extract. The solution was assessed to successfully extract the required data from the unstructured information in the financial statements with reasonable accuracy. The experience and knowledge gained in the PoC helped the team to plan and scale up the actual implementation of the AI solution.

Outcome/Impact:

The AI solution enables DOS to improve operational processes and data quality and facilitate the development of more timely business indicators.

Chatbot

Streamlining the feedback process for municipal issues (MSO)

Problem Statement:

Residents who encountered municipal issues have been consistently deterred from reporting them because they do not know which government agency to approach or do not have the time. This results in municipal issues not being surfaced in time for proper resolution. Consequently, this impacts the residents' standard of living and erodes their confidence in the Government.

For those who do report them, crucial information is often left out, resulting in additional time spent on agencies seeking clarification before they can adequately act on the case.

Outcome/Impact:

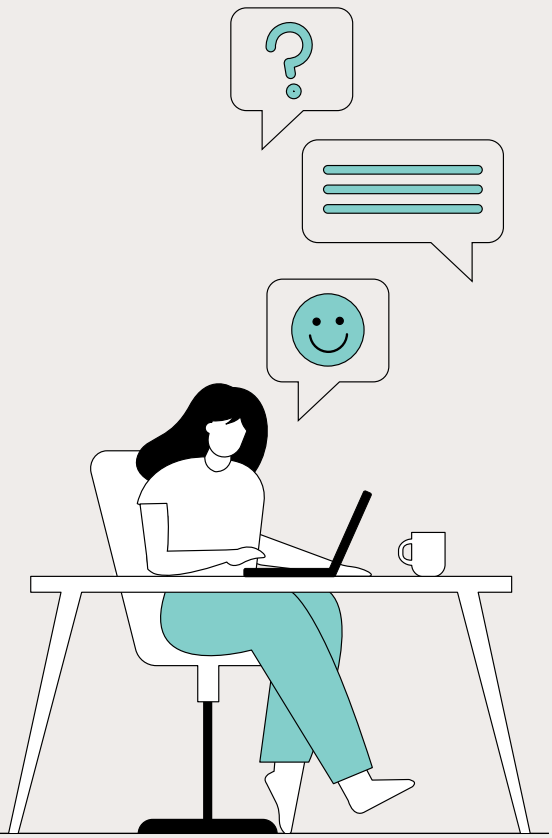
With the AI Chatbot, residents can report municipal issues on existing messaging platforms they are familiar with, not worry about which agency to contact and whether or not all required information has been provided. Not only will this improve residents' feedback reporting experience, but it also speed up resolution.

Whatsapp

Telegram

What the team did:

MSO has developed an AI-powered chatbot hosted on the VICA platform, which simplifies the feedback provision process for residents. It is available on widely-used messaging platforms (i.e. WhatsApp and Telegram), and utilises AI predictive capabilities to guide users along the feedback reporting process, prompt residents for mandatory case details in real-time, and predict and route the case to the correct agency.



Speech and Language Tools

Improving efficiency and accuracy in transcription of parliamentary sittings (Parliament)

Problem Statement:

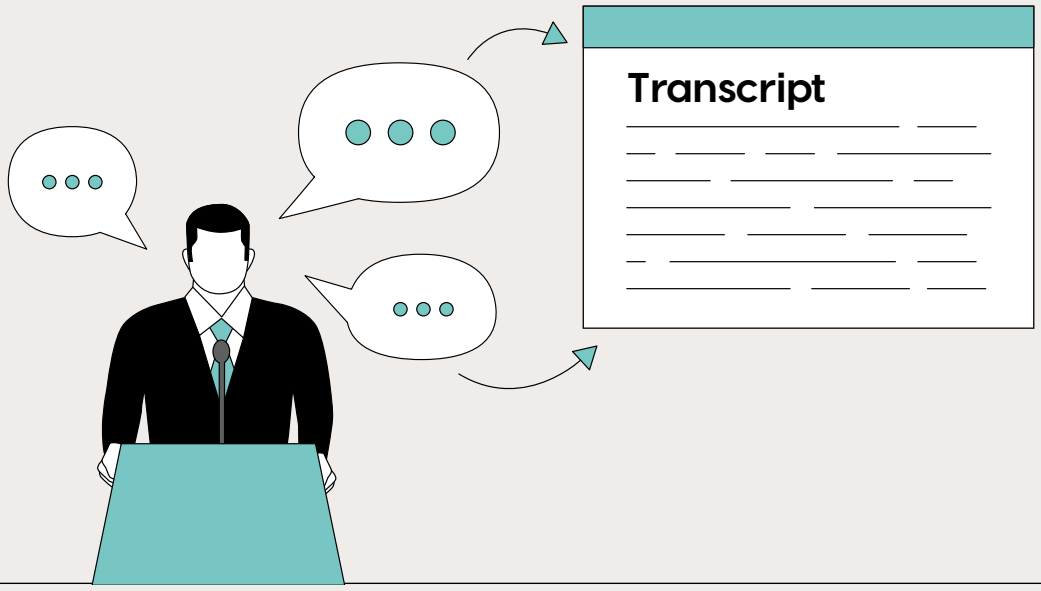
Transcribing hours of Parliamentary sittings to compile a full verbatim transcript quickly took hours of work and engagement of additional manpower on sitting day to help type out raw transcripts. Parliament wanted to explore how technology or AI could be adopted to reduce reliance on human effort and improve turnaround time for the raw transcripts.

Outcome/Impact:

Parliament was able to reduce manpower every sitting day and turn around more accurate, 15-minute-long transcript within 1.5 hrs, down from 2.5 hrs previously.

What the team did:

Parliament worked with GovTech to customise the transcription Central AI Product, Transcribe, to integrate the solution into the workflow process. The customised solution functioned within the Government intranet environment to ensure compliance with cybersecurity IMs, contextualised to Parliament's lingo, and included an optional spell check feature to increase the spelling accuracy in the raw transcripts. In April 2021, the customised solution was further enhanced with a live transcription feature that could machine-transcribe spoken text instantaneously, following feedback from users.



Personalisation Services

Customising job recommendations for individual jobseekers (WSG)

Problem Statement:

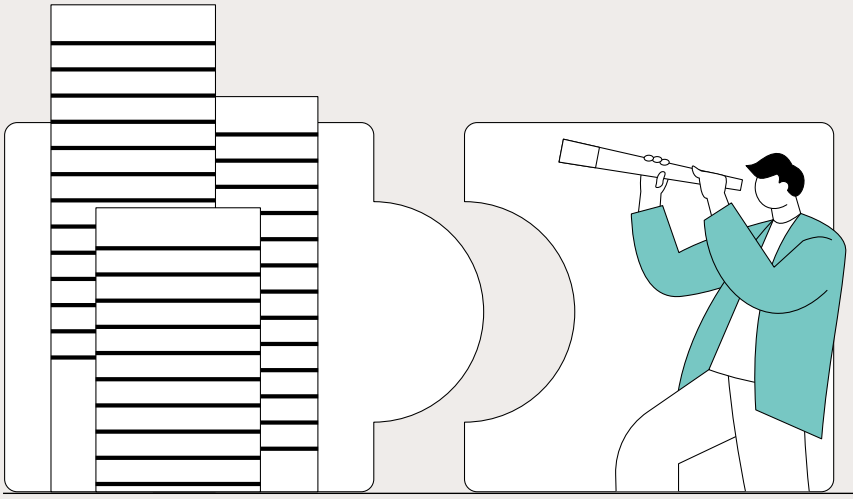
While people no longer have to flip through the newspapers to find job ads, today's online job portals still have their drawbacks. Jobseekers are often overwhelmed with the number of options out there, and it takes significant time and effort to sort through the listings to find relevant jobs. Not only might jobseekers accidentally miss out on potentially suitable jobs, this time and effort might also be better used to help prepare their applications. With over 50,000 job listings, MyCareersFuture (MCF) needed a recommendation system to help jobseekers find suitable job matches. Being able to deliver personalised and timely job recommendations would help to improve both the process and outcomes of job matching.

What the team did:

JumpStart is a data science platform that focuses on providing AI services for labour market use cases, such as job or course recommendations. GovTech developed a platform, JumpStart, that tapped on various data sources like skills, CVs, user clickstreams, applications and job descriptions to build models that made personalised job recommendations based on a jobseeker's skills and preferences on MCF.

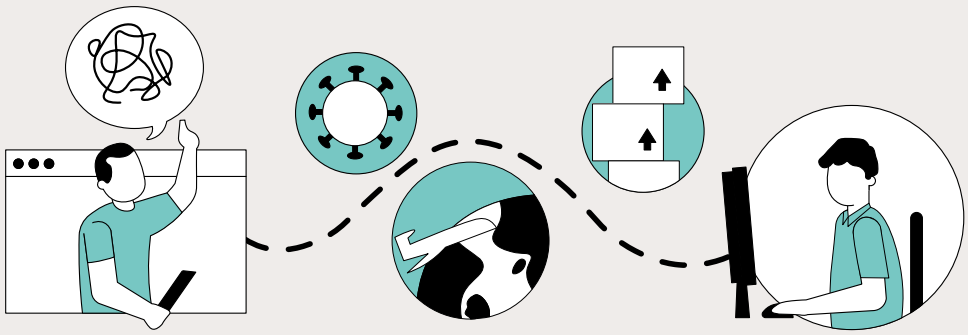
Outcome/Impact:

After implementing these new models on MCF, job applications on the platform increased by 9.1% and successful job placements using MCF increased by 21.5%.



Sentiment Analytics

Understanding issues facing SMEs (ESG)



Problem Statement:

ESG has a network of SME centres that provides SMEs with basic business advisory, capability upgrading workshops and facilitation of projects to meet the needs of SMEs. When COVID-19 hit in 2020, there was a need for deeper insights on the types of issues faced by SMEs and to better understand if new issues were also surfacing for micro and small enterprises.

What the team did:

The SME Centres' Business Advisors typically log engagement reports with SMEs who come forward to seek business advice. The team overseeing the SME Centres collaborated with DSAID's forward-deployed team in ESG and developed a deep learning classifier to mine this data and produce regular insights.

Furthermore, the team developed a model for detecting emerging SME issues. When tested against historical data, the model proved it could quickly pick up some COVID-19 related concerns from SMEs, such as concerns over employees having to transition from on-site to working from home. The model also showed that overseas expansion was still a relevant issue among SMEs who consulted SME centres, even during the Circuit Breaker period.

Outcome/ Impact:

Previously, to understand sentiments, the team reviewed around 3,000 engagement reports and categorised the issues manually. The ESG division now only reviews under 5% of the data every other month with the model, saving the ESG division about 30 hours each month.

Feedback Analytics

Translating varied public feedback into insights for planning (URA)

Problem Statement:

Citizen feedback on planning and infrastructure issues are sent to varied agencies – e.g. LTA for road congestion, NParks for the lack of parks within an area, or PUB for ponding and drainage issues. However, feedback from various sources need to be looked at holistically to gain a complete understanding of public sentiment, especially for cross-cutting issues. This enables better public engagement preparation, and a coherent set of measures for each agency's respective policies and planning.

Outcome/Impact:

Where feedback was previously manually geo-tagged and thus at times inaccurate or absent, the model now automatically geotags, improving the work process. Separately, once developed, planners, architects and policymakers in various agencies will have a feedback dashboard that can analyse trends across time and space. This will enable them to identify emerging topics, enabling them to intervene quickly and be less reactive. Furthermore, this tightens the feedback loop between ground sentiment and policy/plan formulation.

What the team did:

URA had previously collaborated with Institute for Infocomm Research, A*STAR to develop an AI model which geo-tags email feedback to various locations. URA next plans to use machine learning and visual analytics to translate the varied types of public feedback across agencies in the sector into insights of topics of concern, across different scales, from islandwide down to a neighbourhood level.

Fraud Analytics

Optimizing the detection of fraudulent grant claims (SSG)

Problem Statement:

SkillsFuture Singapore receives more than 600,000 grant claims per year. The agency needs an efficient way to filter for fraudulent grant claims, such as claims for training that did not occur.

What the team did:

SSG worked with GovTech to build two anomaly detection unsupervised machine learning algorithm to better detect novel types of fraudulent behaviour. Business users proposed and validated the features which the algorithm was trained to recognise. The product was an AI model that outputs a dashboard showing the training providers with the highest anomaly scores. The key features that contributed to the score are highlighted, providing a starting point for investigations.

Outcome/Impact:

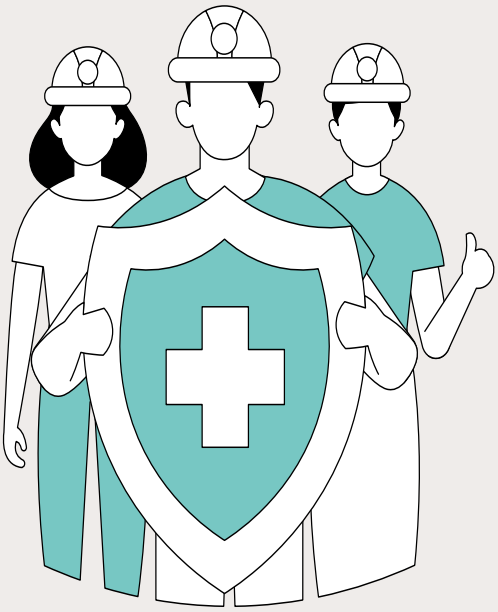
Backtesting the model on historical data, the algorithm would have enabled early detection of a known case five months earlier, when less than 1% of the claims have been disbursed.

Predictive Modelling

Increasing inspections to riskier workplaces across sectors (MOM)

Problem Statement:

The Occupational Safety and Health Division in MOM carries out enforcements and inspections to ensure that workplaces maintain acceptable safety and health standards. Previously, these inspections were planned primarily on the general risks of each sector. For instance, a majority of construction worksites are inspected at least once a year. However, more frequent inspections should be planned for riskier workplaces regardless of sector to achieve accident prevention outcomes and optimise resources. There was a need to identify riskier workplaces to target and plan enforcement better.

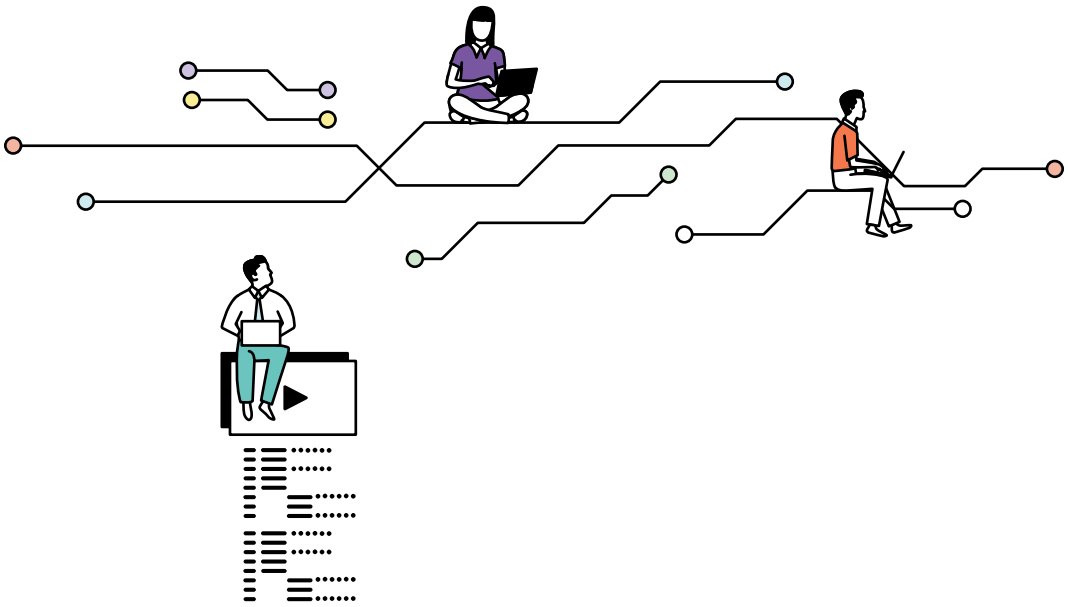


What the team did:

The team first hypothesised potential company or workplace parameters that correlated to the infringement or accidents and analysed their relevancy. Thereafter, the relevant data was used to develop predictive AI models for various sectors, providing a risk ranking of companies based on their likelihood of safety contraventions.

Outcome/Impact:

With the same inspection resources, the team was better able to focus on workplaces with severe contraventions and allowed for differentiated interventions based on the risk score of the companies, such as more targeted inspections on companies with higher risks. In particular, for the manufacturing sector, the model significantly improved the hit rate of the workplaces inspected, thus targeting where it matters and saving resources.



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