



**INSIGHT VIA  
ARTIFICIAL INTELLIGENCE**

## COMPANY OVERVIEW

Insight Via Artificial Intelligence (IVAI) is an innovative Adelaide based SME with extensive experience in the research, development and deployment of artificial intelligence, machine learning, virtual/augmented reality and data analytics technologies.

Our focus is on advancing the state-of-the-art in trusted artificial intelligence and on developing AI that augments human capability.

We value collaboration and have proven capability to translate research into real world solutions for our clients. IVAI has a broad customer base, applying our capability across Defence, Government, Health and Industry sectors.

## CONTACT

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## CAPABILITY

### Research & Development

- Proven expertise in explainable Artificial Intelligence, Machine Learning, Computer Vision, Natural Language Processing, Virtual and Augmented Reality and related technologies.
- Human/Machine interface optimisation

### AI Solution Development & Implementation

- Helping organisations to unlock the value in their data.
- Delivering optimal AI/Data Science solutions quickly and effectively using bespoke or industry standard platforms.

### Products & Services

- Plan, build, deploy & manage AI systems profitably, ethically and responsibly using our innovative platform.
- AI augmented VR and AR product development.
- Advanced analytics for cybersecurity applications.

### Education & Training

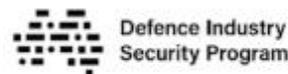
- Managing AI: Tailored training courses for C-Suite, Boards and Project Managers.
- Effective AI enhanced VR/AR training solutions.

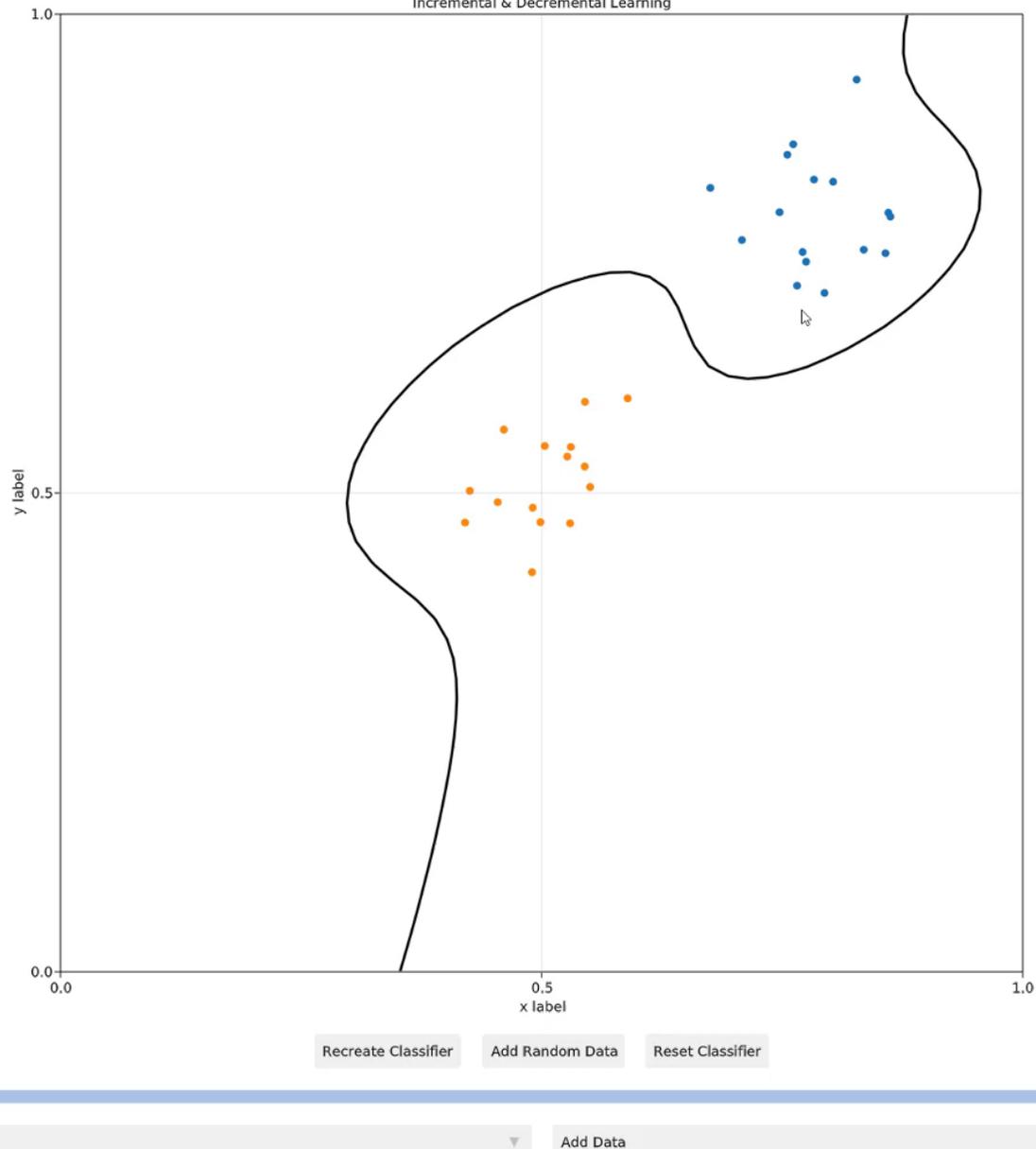
## Advancing human-machine teaming with trusted AI

## DISCRIMINATORS

- Undertaking research at the frontiers of AI.
- Adopting innovative approaches to challenging problems.
- Creating force multipliers through interactive AI.
- Explainable and transparent AI compliant with Defence and Government ethics frameworks.
- An innovative platform to manage the entire AI project lifecycle.
- VR/AR scenario development and validation supported by latest psychological and human-factors research.
- PhD qualified research and development team.
- Australian owned and operated.
- Defence Industry Security Program (DISP) members.

## PARTNERS & CLIENTS





# Realtime adaptive AI systems for limited bandwidth applications

We can take a deep neural network of size 159mb and compress it down to < 1.3mb without accuracy loss.

We have efficient techniques for incrementally updating and transmitting AI models.

## Example Application

- Explainable anomaly detection for network security
- Human integrated sensor systems

## Input

### What kind of data does the system learn from?

- What is the source of the data?
- How were the labels/ground truth produced?
- What is the sample size?
- What data is the system not using?
- What are the limitations/biases of the data?
- How much data [like this] is the system trained on?

## Output

### What kind of output does the system give?

- What does the system output mean?
- How can I best utilise the output of the system?
- What is the scope of the systems capabilities?
- How is the output used for other system components?

## Performance

### How accurate/precise/reliable are the predictions?

- How often does the system make mistakes?
- In what situation is the system likely to be correct/incorrect?
- What are the limitations of the system?
- What kind of mistakes is the system likely to make?
- Is the system performance good enough for...

## How (global)

### How does the system make predictions?

- What features does the system consider?
- What is the systems overall logic?
  - How does it weigh different features?
  - What rule does it use?
  - How does [feature X] impact its predictions?
  - What are the top rules/features it uses?
- What kind of algorithm is used?
  - How are the parameters set?

## Why

### Why/how is this instance given this prediction?

- What feature(s) of this instance lead to the system's prediction?
- Why are [instances A and B] given the same prediction?

## Why not

### Why/how is this instance NOT predicted...?

- Why is this instance predicted P instead of Q?
- Why are [instances A and B] given different predictions?

Most AI vendors offer AI capabilities with only basic explanations.

# ← Basic Explanations

## How to be that

### How should this instance change to get a different prediction?

- How should this feature change for this instance to get a different prediction?
- What kind of instance gets a different prediction?

## How to still be this

### What is the scope of change permitted to still get the same prediction?

- What is the [highest/lowest/...] feature(s) one can give to still get the same prediction?
- What are the necessary features present or absent to guarantee this prediction?
- What kind of instance gets this prediction?

Input

What kind of data does the system learn from?

- What is the source of the data?
- How were the labels/ground truth produced?
- What is the sample size?
- What data is the system not using?
- What are the limitations/biases of the data?
- How much data [like this] is the system trained on?

What kind of output does the system give?

- What does the system output mean?
- How can I best utilise the output of the system?
- What is the scope of the systems capabilities?
- How is the output used for other system components?

How accurate/reliable are the system's predictions?

- In what situation is the system likely to be correct/incorrect?
- What are the limitations of the system?
- What kind of mistakes is the system likely to make?
- Is the system performance good enough for...

How does the system make predictions?

- What features does the system consider?
- What is the systems overall logic?
  - How does it weigh different features?
  - What rule does it use?
  - How does [feature X] impact its predictions?
  - What are the top rules/features it uses?
- What kind of algorithm is used?
  - How are the parameters set?

Performance

How (global)

We build interactive AI systems capable of advanced explanations.

Advanced Explanations →

Why

**Why/how is this instance given this prediction?**

- What feature(s) of this instance lead to the system's prediction?
- Why are [instances A and B] given the same prediction?

Why not

**Why/how is this instance NOT predicted...?**

- Why is this instance predicted P instead of Q?
- Why are [instances A and B] given different predictions?

What if

**What would the system predict if the instance changes to?**

- What would the system predict if this feature of the instance changes to...?
- What would the system predict for [a different instance]?

How to be that

**How should this instance change to get a different prediction?**

- How should this feature change for this instance to get a different prediction?
- What kind of instance gets a different prediction?

How to still be this

**What is the scope of change permitted to still get the same prediction?**

- What is the [highest/lowest/...] feature(s) one can give to still get the same prediction?
- What are the necessary features present or absent to guarantee this prediction?
- What kind of instance gets this prediction?

Q. V. Liao, D. Gruen and S. Miller. Questioning the AI: informing design practices for explainable AI user experiences. In: *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. ACM



# We develop technology with a human-centered paradigm

- ✓ Human actors, and human actions, form an integral component of system operations and goals.
- ✓ Everyone is a someone, and not a something.
- ✓ Employees seek autonomy, mastery and development (we want to thrive as people).
- ✓ The workplace and work itself serve as one of the most important social channels through which humans can flourish, and human dignity can manifest.
- ✓ When one introduces an AI tool into the workplace, it implicitly or explicitly occupies a position on the social structure.



**PROJECT VELOGRAPH**

**NEW TRIP**

- JOURNEY\_5-5-22\_23-2-43  
3.3KM 9 PASSES
- JOURNEY\_29-3-22\_7-29-21  
8.8KM 49 PASSES
- JOURNEY\_28-3-22\_21-50-37  
6.6KM 53 PASSES

Map Satellite

REAR SENSOR

FRONT SENSOR & CONTROL BOX

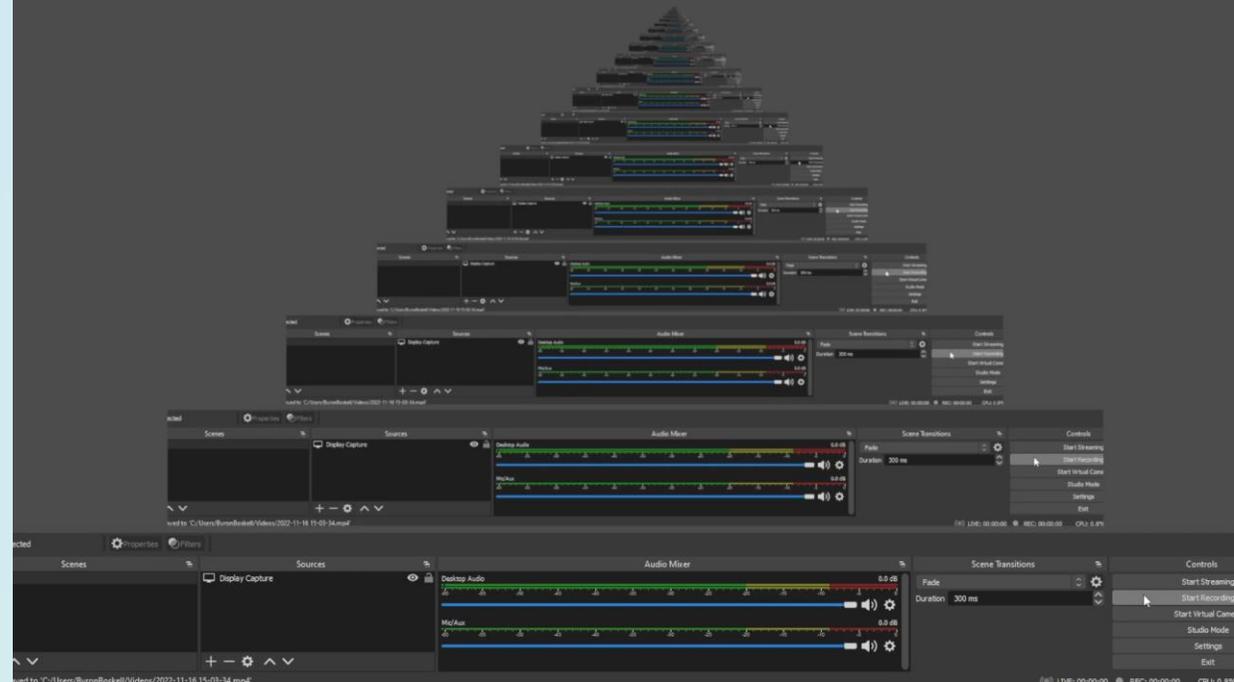
# Project Velograph – Working to make our roads safer

Custom non-intrusive hardware is attached to a bike, consisting of a GPS tracker and two short-range radars, which we use to pinpoint the locations where passing cars keep an unsafe distance.

[www.velograph.app](http://www.velograph.app)



Training aboriginal communities how to manage diabetes-related foot complications.



Training people living with intellectual disabilities basic life skills (e.g., how to prepare a meal).

# Virtual & Augmented Reality Training

We offer an all-in-one collaborative platform to assist organisations to plan, build, and manage artificial intelligence and related autonomous projects.

The platform provides a systematic, whole of organisation approach to planning, building and maintaining an AI system through its entire lifecycle.

We help you identify your best opportunity for AI.

Preview : UI



STAGE 1 | PLAN

- Problem Definition
- Impacts Assessment
- Data & Knowledge Acquisition
- Roles & Responsibilities

STAGE 2 | BUILD

- Requirements Specification
- Implementation Monitoring
- Requirements Evaluation
- Change Management

STAGE 3 | MANAGE

- Feedback, Enquiries, Complaints
- Supervision & Maintenance
- Resource Management
- Audit & Review

Powered by IVAI

Current Problem: **Predict the early onset of infection in warfighter from wearable device data**

Problems Filter Sort

1	Predict the early onset of infection in warfighter from wearable device data	6 Benefits	<b>Selected</b>
2	Predict the expenditure of spares, fuels and munitions	3 Benefits	<b>Select</b>

[+ Add Problem](#) or [+ Discover Problems](#)

Partner with us and let us work together to build  
Society 5.0

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[www.ivai.com.au](http://www.ivai.com.au)