SIMON WELLS | S.WELLS@NAPIER.AC.UK | ARG.NAPIER.AC.UK | OPENARGUMENTATION.ORG

PLATFORMS FOR SUPPORTING ARGUMENTATION RESEARCH

Presented to the 2024 Scottish Argumentation Day hosted by the University of Edinburgh and the CHAI Research Lab | 17th May 2024

THE OPEN ARGUMENTATION PLATFORM

Edinburgh Napier UNIVERSITY

- A set of permissively licensed (GPL3) free software tools, libraries, APIs and interfaces [Wells (2020b)]
- Core components comprise:
  - SADFace | ArgDB | MonkeyPuzzle | ALIAS | DGDL/ADAMANT | Canary
- Covering:
  - Argument description, storage, manual analysis, computation, dialogue, and mining
- All components aim to have:
  - A simple and consistent but extensible underlying data model.
  - Clear extension points for domain specific analysis & representation tasks.
  - Tooling to support import from, and export to, other relevant formats, e.g. AML, AIF, &c.
  - An open source canonical implementation.
  - Supporting Documentation.
  - Free Software (GPL3) licensing.
  - A completely open development model including public GIT repository & public issue/bug tracking.

GOALS

Edinburgh Napier UNIVERSITY

- Support the general adoption, use, and integration of argument-oriented software tools
- Provide flexible and configurable toolchains:
  - Pipe structured argument and dialogue information to where it is needed
  - Pick & choose tools to match your problem: Install only what you need, as you need it
- Simple set-up and exploitation of argumentative tools:
  - Consistent use of underlying tools and languages
  - Run within private infrastructure (laptop, server) as well as public services
- To move argumentation technology up the TRL stack by making it easier to adopt

SADFACE

Edinburgh Napier UNIVERSITY

- The Simple Argument Description Format
- A JSON language for describing arguments:
  - metadata, nodes, edges, resources
- A software library for working with SADFace
  - pip install sadface
  - Construct, explore, manipulate, and verify arguments from CLI, TUI, or code (Python Lib)
- Easily describe and re-use arguments
- Well defined extension points: solve your own research problems and store your own name-spaced metadata
- Document oriented
- AIF compatible
- Some datasets of SADFace documents available [Dolan (2024) 59.6K arguments]

- Upcoming/Technology Preview:
  - Hyper-edges: efficient circumscription and labelling of whole arguments
  - Dialogue description support

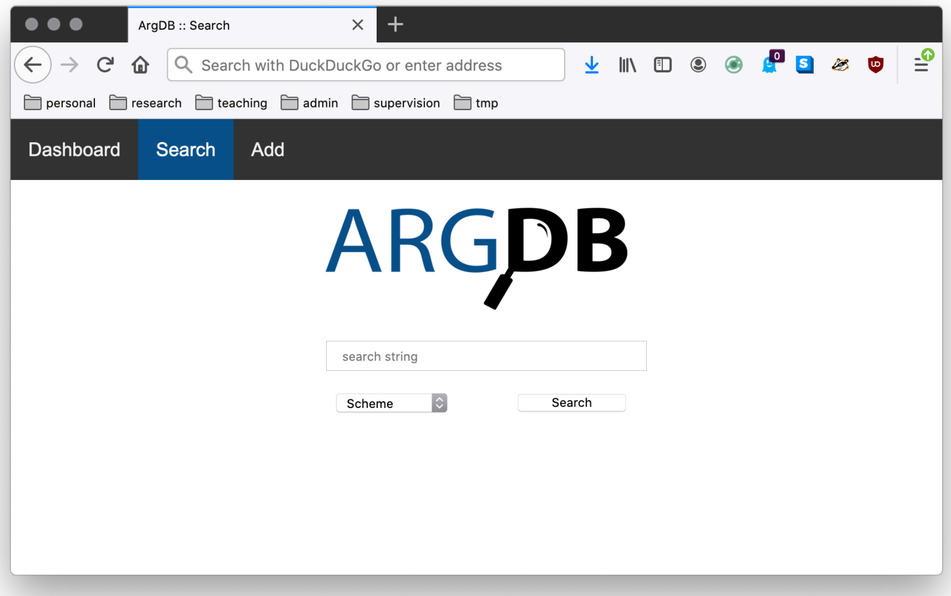

```
{"edges": [
        {
            "id": "3df54ae1-fa41-4ac7-85d5-4badee39215b",
            "source_id": "70447169-9264-41dc-b8e9-50523f8368c1",
            "target_id": "ae3f0c7f-9f69-4cab-9db3-3b9c46f56e09"
        },
        ...
    ],
    "metadata": {
        "core": {
            "analyst_email": "siwells@gmail.com",
            "analyst_name": "Simon Wells",
            "created": "2019-04-22T23:52:30",
            "description": "An example SADFace document showing an argument
                analysis of the Hangback cycle safety campaign from the
                STCD corpora.",
            "edited": "2019-04-22T23:52:30",
            "id": "42e56df7-4074-40d8-8ea1-4fca5321dd31",
            "notes": "This is incomplete because the analysis in Pangbourne
            \& Wells (2018) has much more argumenative content.",
            "title": "Hangback Example",
            "version": "0.2"
        }
    },
    "nodes": [
        {
            "id": "ae3f0c7f-9f69-4cab-9db3-3b9c46f56e09",
            "metadata": {},
            "sources": [],
            "text": "The 'Hang Back' campaign video should not have been
                published, and should be withdrawn.",
            "type": "atom"
        },
        ...
    ],
    "resources": []}
```

ARGDB

Edinburgh Napier UNIVERSITY

- A simple tool to store, search, and retrieve your argument data [Wells (2020a)]
- Core functionality:
  - Indexes SADFace documents utilising a hybrid JSON and relational model
  - Enables retrieval through full text and keyword search

- <u>Upcoming/Technology Preview:</u>
  - Vector based search: Find not only keyword matches but also “related arguments” from the vector space of your argument dataset
  - Dataset management: Manage, extract, and share public and private datasets. Subscribe to public dataset feeds to add “arguments of interest” to your collection
  - Rich Interfaces: CLI, API, Web

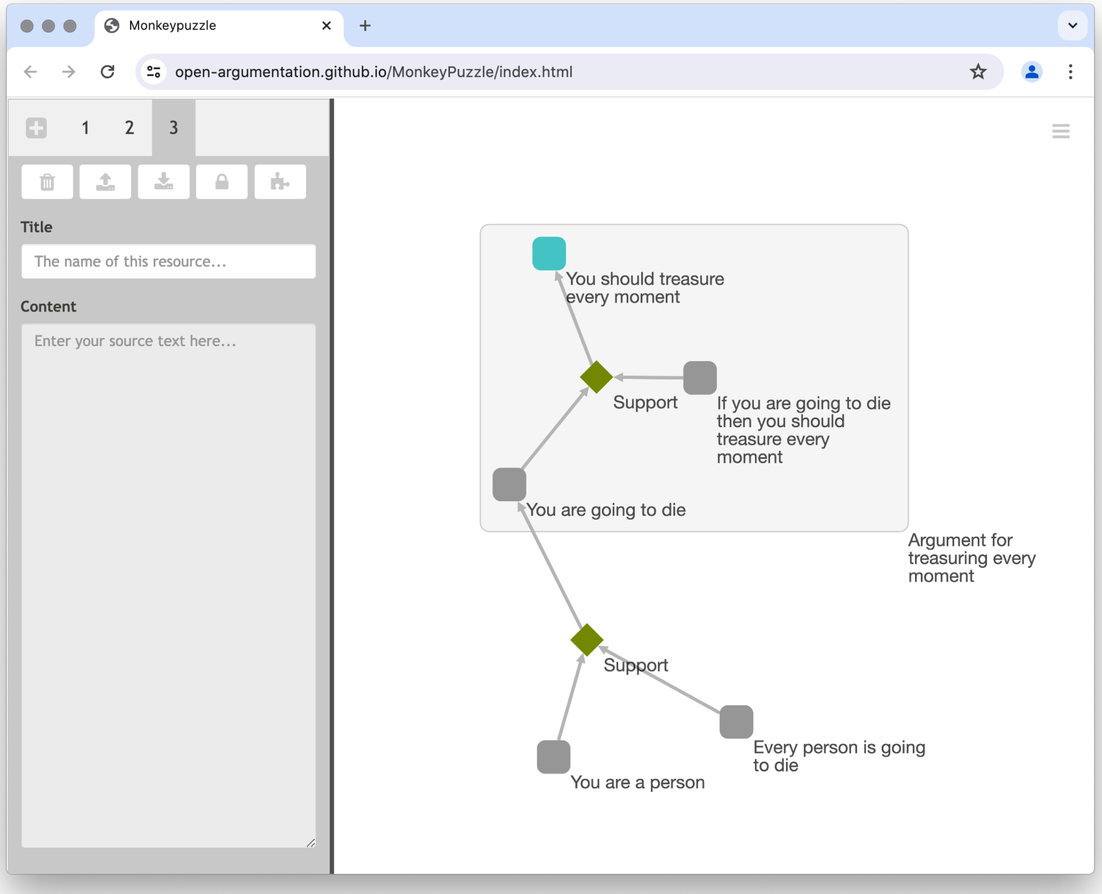


MONKEYPUZZLE

Edinburgh Napier UNIVERSITY

- Browser-based user interface for manual argument analysis of multiple resources across a problem domain [Wells & Douglas (2017)]
- Construct a single analysis that captures the arguments from a range of resources
- Runs hosted or standalone
- Output: A single SADFace JSON document
- Bonus: Contains a hidden SADFace JS implementation
- Aims for scalability: build and manage large analyses of complex real-world domains [Khartabil (2017), Khartabil *et al* (2021)]

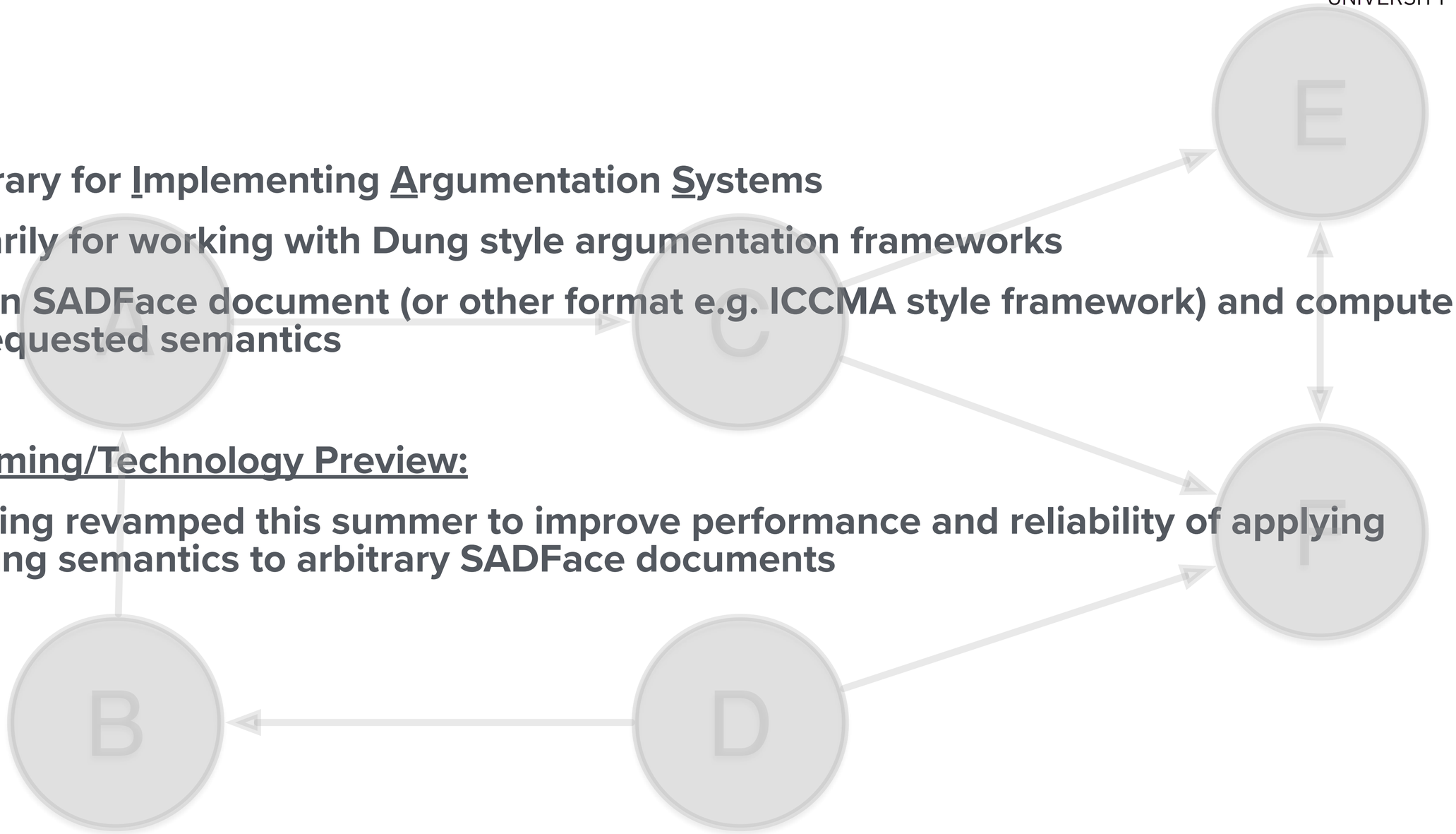
- <u>Upcoming/Technology Preview:</u>
  - Desktop version:
    - Support for multiple media types; prototypes built and tested. Integration ongoing before release
    - Integration with ArgDB
    - Automated co-analyst: prototype in development



ALIAS

- A Library for Implementing Argumentation Systems
- Primarily for working with Dung style argumentation frameworks
- Pipe in SADFace document (or other format e.g. ICCMA style framework) and compute the requested semantics

- Upcoming/Technology Preview:
  - Being revamped this summer to improve performance and reliability of applying Dung semantics to arbitrary SADFace documents



DGDL/ADAMANT

Edinburgh Napier UNIVERSITY

- The Dialogue Game Description Language: A language for describing the rules of dialogue games [Wells & Reed (2012)]
- A DiaAlogue MANagement Tool: A dialogue game runtime, management, and execution tool
  - Use both technologies together to specify, run, and manage dialogues

- Upcoming/Technology Preview:
  - DGDL 2:
    - Refined, consistent, flexible, and extensible language, e.g. simplified requirements and effect blocks, more scaffolding to guide utterance generation, support for (dis-)assembling utterance content for increased granularity of responses within micro-dialogues, move to JSON representation to simplify onwards use of DGDL
    - Based on feedback and findings from more than a decade of use of DGDL
  - PrEFACE Lib: Prompt engineering and RAG library for interfacing between ADAMANT managed DGDL games and LLMs (*under review COMMA'24 also [Wells & Snaith (2023)]*)

CANARY

Edinburgh Napier UNIVERSITY

- Aims to be a testbed for implementing, experimenting, and exploiting Argument Mining techniques
- Currently "*very alpha*"
- Some support for argument segmentation, detection of arguments/components and linked-arguments, and stance prediction

- <u>Upcoming/Technology Preview:</u>
  - Use canary to provide "assistance" and limited automation of the otherwise manual argument analysis process

CAVEATS

Edinburgh Napier UNIVERSITY

- Adopted a "*release early, get feedback, improve development*" cycle so things do change, but:
  - Even minimal functionality can save you development effort
  - Complete development history of all components is available so you can freeze and archive components that you rely on if there are subsequent breaking changes

- Feedback helps us make good decisions about what to include, what not to remove, and how to refine the experience, i.e.
  - Don't get rid of the ExternalConditions and ExternalEffects features as they're really useful for hooking in problem domain specific functionality that is otherwise out of scope for DGDL (Thanks U of Edinburgh/CHAI group for pointing this out)
  - So if you do use/adopt any of these tools, do let me know

SUMMARY

- Many of the tools have been in flux in recent years:
  - Developing and refining workflows
  - Selecting best approaches
  - Now starting to coalesce into stable forms

- Beginning to form a useful and reusable platform for investigating and answering research questions [e.g. Snaith & Wells (2021), Wells & Snaith (2022)] without reinventing the wheel every time

REFERENCES

- D. Khartabil & S. Wells (2017) "Mapping Increasingly Large Networks of Argumentative Inferences" abstract presented at the 2nd European Conference on Argumentation: Argumentation and Inference (ECA17), Fribourg, Switzerland
- D. Khartabil, C. Collins, S. Wells, B. Back, J. Kennedy (2021) "Design and Evaluation of Visualization Techniques to Facilitate Argument Exploration" in Computer Graphics Forum, vol. 40, issue 6, pp. 447--465, Wiley.
- M. Snaith & S. Wells (2021) "Towards a Declarative Approach to Constructing Dialogue Games" in the 21st International Workshop on Computational Models of Natural Argument (CMNA'21)
- S. Wells and C. Reed, (2012), "A Domain Specific Language for Describing Diverse Systems of Dialogue", (2012), in Journal of Applied Logic, vol. 10 (4), pp. 309–329.
- S. Wells & J. Douglas (2017) "Monkeypuzzle: Towards Next Generation, Free & Open-Source, Argument Analysis Tools" in proceedings of the 17th International Workshop on Computational Models of Natural Argument(CMNA17), pp. 50-53, London, U.K.
- S. Wells (2020a) "Datastores for Argumentation Data" in proceedings of the 20th International Workshop on Computational Models of Natural Argument(CMNA20), Pages 31-40, Perugia, Italy.
- S. Wells (2020b) "The Open Argumentation PLatform (OAPL)" in proceedings of Computational Models of Argument (COMMA 2020), Frontiers in Artifical Intelligence, Volume 326: Computational Models of Argument, pages 475-476, Perugia, Italy.
- S. Wells & M. Snaith (2022) "Reconsidering RepStat Rules in Dialectical Games" in proceedings of the the 22nd International Workshop on Computational Models of Natural Argument (CMNA'22)
- S. Wells & M. Snaith (2023) "On The Role of Dialogue Models in the Age of Large Language Models" in proceedings of the the 23rd International Workshop on Computational Models of Natural Argument (CMNA'23)

RESOURCES

Edinburgh Napier UNIVERSITY

- Napier Argumentation Research Group: arg.napier.ac.uk
- The args.me SADFace dataset: https://www.kaggle.com/datasets/angusdolan/sadface-argsme
- Open Argumentation Webpage: http://openargumentation.org/
- SADFace repository: https://github.com/Open-Argumentation/SADFace
- ArgDB repository: https://github.com/Open-Argumentation/ArgDB
- MonkeyPuzzle repository: https://github.com/Open-Argumentation/MonkeyPuzzle
- MonkeyPuzzle deployment: https://open-argumentation.github.io/MonkeyPuzzle/index.html
- ALIAS repository: https://github.com/Open-Argumentation/ALIAS
- DGDL repository: https://github.com/Open-Argumentation/DGDL
- ADAMANT repository: https://github.com/Open-Argumentation/ADAMANT
- Canary repository: https://github.com/Open-Argumentation/Canary

Edinburgh Napier
UNIVERSITY

THANKYOU

FEEL FREE TO GET IN TOUCH, GET INVOLVED, &C.