Democratisation of Deep Learning: Neural Architecture Search at Low Cost

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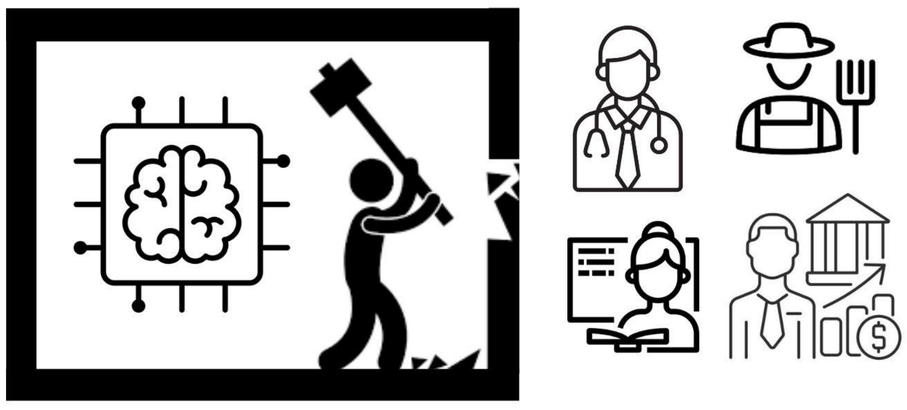
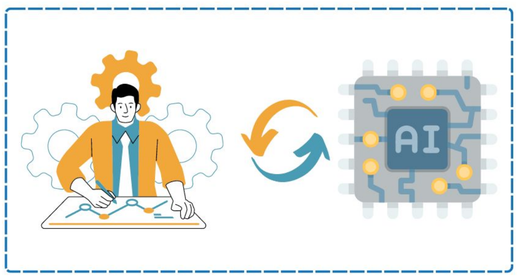
INTRODUCTION

Manual design of deep learning-based neural networks (DNNs) **limits their usage to AI experts** and **hinders the exploitation of their true potential** more broadly



AIMS

Aim 1: Replace the tedious trial and error process of manually designing DNN architectures



Developing novel neural architecture search (NAS) methods to generate better DNNs than the existing manually designed DNNs at much lower cost

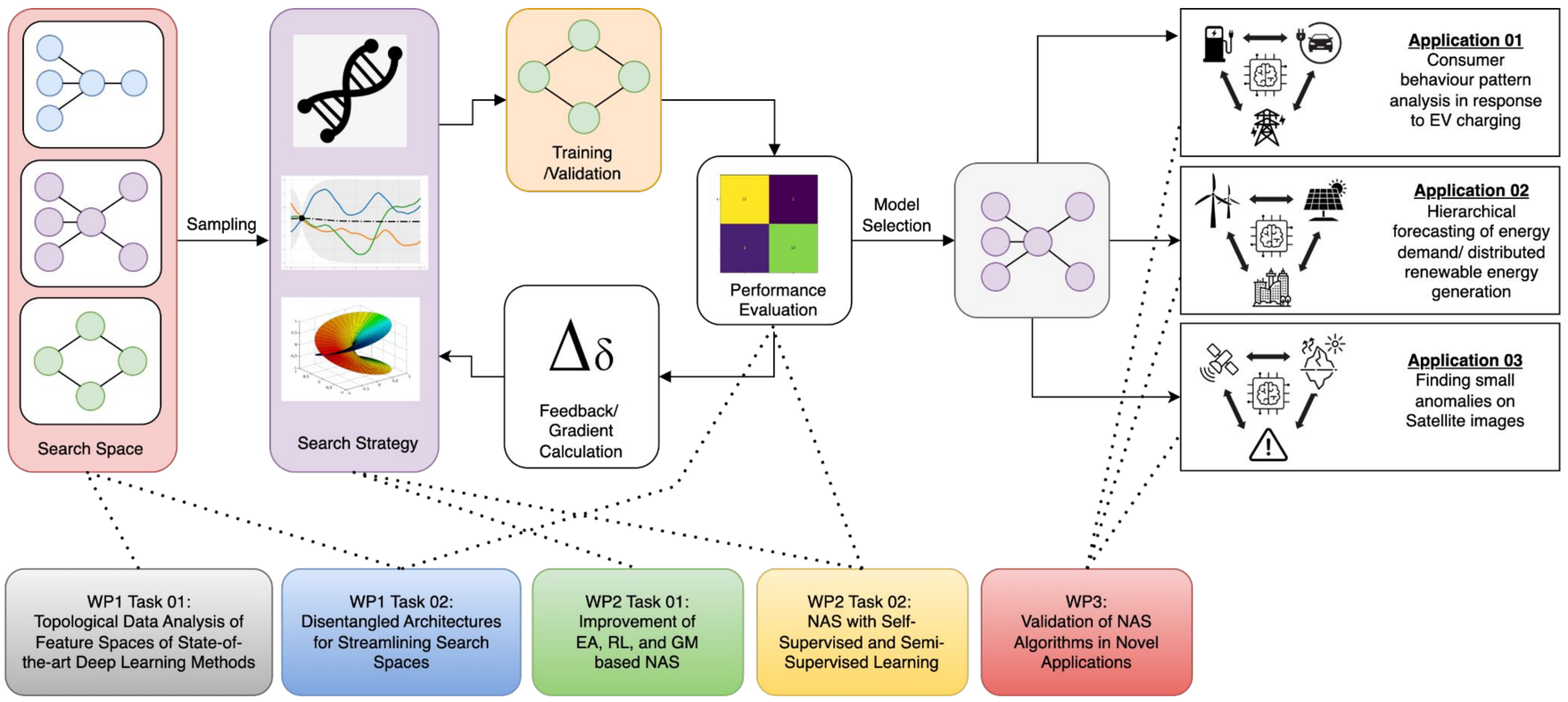
Aim 2: Expand NAS applications in different domains including energy and climate change

Expanding the idea of NAS currently applied to labelled data to areas of unlabelled data or partially labelled data

PROPOSED NEW WORK

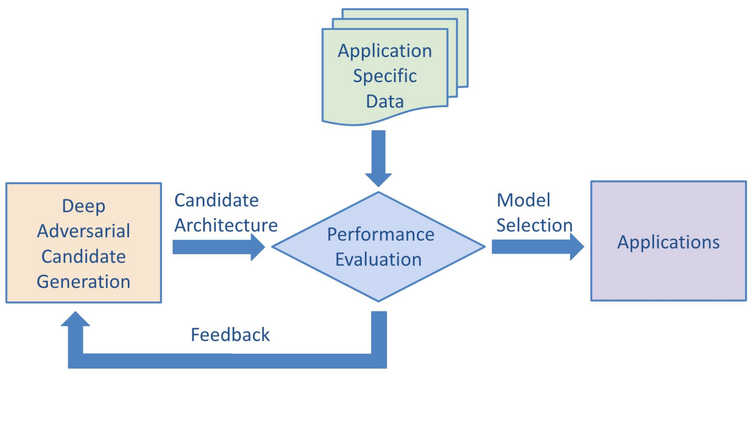
Proposed work packages (WPs):

- **WP1:** Improving Search Spaces in NAS using Heuristics for Augmenting and Streamlining
- **WP2:** Improving performance of Search Strategies and the effect of Labels on NAS
- **WP3:** Validation of NAS algorithms in novel applications



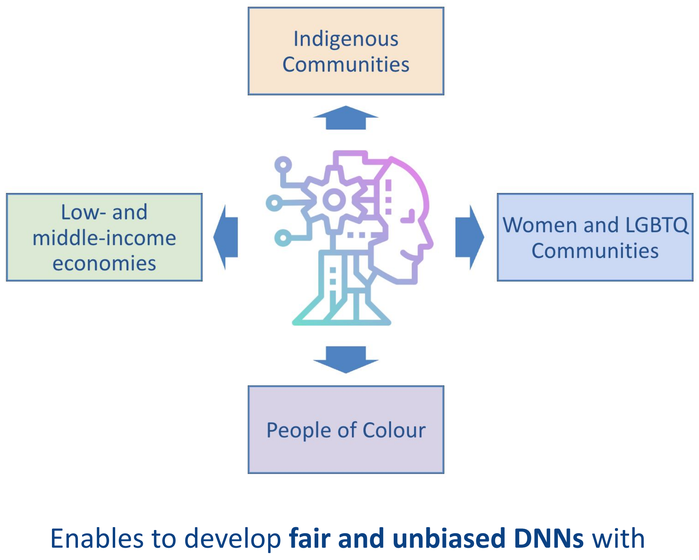
CURRENT WORK

Developing a **novel search algorithm for NAS** using **deep adversarial candidate generation methods**



Enables **exploitation of DNNs beyond human knowledge** and makes **DNNs accessible for non AI experts**

Understanding how AI can **exacerbate social inequality**



Enables to develop **fair and unbiased DNNs** with NAS methods

Understanding the applicability of AI to **distribute energy in rural/developing countries**

This map was created based on 2021 World Bank energy access data - Sub Saharan Africa: Access to electricity 2020 (% of population). (n.d.). Retrieved January 25, 2023, from https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS

Enables to make **energy accessible across all economies**

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