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Subject: Motivation Statement – DARA Open PhD Fellowship Application

To the Selection Committee
DARA Open PhD Fellowship Programme
Danish Academy of Advanced Research (DARA)
Denmark

Dear Members of the Selection Committee,

I am writing to express my sincere motivation to apply for the DARA Open PhD Fellowship. My academic background, interdisciplinary research experience, and strong interest in responsible AI place me in an excellent position to contribute to DARA's mission of supporting transformative, curiosity-driven science. I am particularly applying within the field of **Data and Computer Sciences**, especially in the areas of **artificial intelligence, data analytics, and machine learning**, where I aim to advance trustworthy multimodal systems addressing global societal challenges.

Currently, I am completing a research internship at the IFI Research Center – Vietnam National University in Hanoi, where I am developing a novel multimodal fact-checking framework. This work leverages fusion models such as CLIP and ViLT combined with explainable AI techniques like SHAP and Grad-CAM to verify the truthfulness of social media content. This project not only deepened my expertise in language–vision modeling and XAI but also strengthened my resolve to pursue impactful research at the intersection of AI and society. My Master's thesis, which I expect to defend by **July 31, 2025**, is based on this work.

Throughout my academic journey, I have completed several projects that reflect my commitment to using AI for public good. I designed and deployed a real-time object detection, segmentation, and tracking system using YOLOv8 across complex datasets (COCO, BDD100K, PPE-Detection, PotholeImage), worked on health-related applications such as pneumonia detection from chest X-rays using CNNs and MobileNet, and contributed to behavioral recognition research using LSTM–YOLOv4 to prevent cheating during exams.

In addition, I have worked on the detection and prediction of bonded assembly degradations by combining YOLOv5, ResNet18, and MLP architectures, integrating visual and physical features to improve durability predictions. This experience enhanced my understanding of predictive maintenance and multi-modal fusion techniques for industrial applications.

These projects have equipped me with a strong foundation in deep learning, multimodal data analysis, signal/image processing, and practical AI deployment. Beyond technical skills, they reflect my ability to define and execute research with societal relevance values at the heart of the DARA programme.

I am particularly inspired by DARA's emphasis on visionary and interdisciplinary projects. My proposed PhD would focus on building transparent and reliable multimodal AI systems capable of verifying public information, contributing to democratic resilience and digital trust. I am equally open to aligning my work with applications in digital health or environmental monitoring, leveraging AI for broader sustainable development goals.

Joining the DARA Fellowship would provide me with a unique opportunity to collaborate across disciplines, benefit from world-class research infrastructure, and grow as a scientist within a vibrant doctoral community. I am confident that the training, mentorship, and intellectual freedom offered by DARA would allow me to carry out impactful research and contribute meaningfully to both science and society.

Thank you very much for considering my application.

Sincerely,

Alidor MBAYANDJAMBE MASHEKE