（様式４）

二国間交流事業 共同研究報告書

令和 5 年 3 月 31 日

独立行政法人日本学術振興会理事長　殿

［日本側代表者所属機関・部局］
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1. 事　業　名　相手国: フランス　(振興会対応機関: MEAE-MESRI　)との共同研究

2. 研究課題名

（和文） ビッグデータ時代のディープアンサンブル学習：モデルからアプリケーションまで

（英文） Deep ensemble learning in Big Data Era: from models to applications

3. 共同研究実施期間　2020 年　4 月 1 日 ～　2023 年 3 月 31 日 (　3 年　ヶ月)

【延長前】　2020 年 4 月 1 日　～　2022 年 3 月 31 日 (　2 年　ヶ月)

4. 相手国側代表者(所属機関名・職名・氏名【全て英文】)

Bordeaux Sciences Agro・Associate Professor・Bombrun Lionel

5. 委託費総額(返還額を除く)

本事業により執行した委託費総額		1,824,000　円
内訳	1年度目執行経費	950,000　円
	2年度目執行経費	874,000　円
	3年度目執行経費	－　円

6. 共同研究実施期間を通じた参加者数(代表者を含む)

日本側参加者等	5 名
相手国側参加者等	3 名

＊ 参加者リスト(様式 B1(1))に表示される合計数を転記してください(途中で不参加となった方も含め、全ての期間で参加した通算の参加者数となります)。

7. 派遣・受入実績

	派遣		受入
	相手国	第三国	
1 年度目	0	0	0(　)
2 年度目	0	0	0(　)
3 年度目	0	0	0(　)

＊ 派遣・受入実績(様式 B1(3))に表示される合計数を転記してください。

派遣：委託費を使用した日本側参加者等の相手国及び相手国以外への渡航実績(延べ人数)。

受入：相手国側参加者等の来日実績(延べ人数)。カッコ内は委託費で滞在費等を負担した内数。

8. 研究交流の概要・成果等

(1)研究交流概要(全期間を通じた研究交流の目的・実施状況)

The objectives of the exchange project are two folds: 1) develop new deep ensemble learning from both fundamental and applications (disaster damage assessment and disease detection), 2) help the young researchers to exchange the new ideas and extend the good relationship with French side for their further promotion. Throughout the period of the research exchange project, the implementation status involved various activities such as: 1) exchange of knowledge and expertise between researchers from the Japanese and French sides, including sharing of datasets, research findings, and methods, 2) collaborative research activities, including joint research projects and publications, 3) development of new methods and techniques for deep ensemble learning, with a focus on disaster damage assessment and disease detection.

(2)学術的価値(本研究交流により得られた新たな知見や概念の展開等、学術的成果)

Within the project, we developed three kinds of deep ensemble learning approaches: 1) ensemble learning approaches based on covariance pooling of CNN features for high resolution remote sensing scene classification; 2) building damage mapping with self-positive unlabeled learning; 3) differ-modality learning for building semantic segmentation. Also, we constructed the datasets with optical and SAR. The results are published in the top journals (IEEE Transactions on Geoscience and Remote Sensing, Remote Sensing, and IEEE JSTARS) and top conference (NeurIPS workshop).

(3)相手国との交流(両国の研究者が協力して学術交流することによって得られた成果)

In the context of the research exchange project between Japan and France, cooperation between researchers from both countries can lead to the development of new approaches in deep ensemble learning applied to disaster damage assessment and disease detection. Through the exchange of ideas and expertise, researchers can gain new insights and perspectives, leading to potential breakthroughs in understanding and addressing complex challenges in these fields. The project can also foster new collaborations and partnerships between researchers from both countries, leading to long-lasting and productive relationships that can lead to further advancements and breakthroughs in the future.

(4)社会的貢献(社会の基盤となる文化の継承と発展、社会生活の質の改善、現代的諸問題の克服と解決に資する等の社会的貢献はどのようにあったか)

The research exchange project has the potential to create a significant positive impact on society by improving disaster damage assessment and disease detection, which are critical issues affecting people worldwide. Through the development of new deep ensemble learning approaches, the accuracy and efficiency of these assessments can be improved, leading to better decision-making and management of these events. This project can thus contribute to enhancing the overall quality of life for individuals and communities affected by disasters and diseases. Moreover, the collaboration and partnership between researchers from Japan and France can promote cultural exchange and understanding, leading to a more interconnected and diverse society, which is an important aspect of social development.

(5)若手研究者養成への貢献(若手研究者養成への取組、成果)

Within the project, four young researchers in Japan and one young researcher in France are involved in the project. During the project or after the project, PI (Dr. Junshi Xia) was promoted to Senior Research Scientist. Dr. Naoto Yokoya was promoted to Associate Professor in the University of Tokyo and Team Leader in RIKEN. Dr. Bruno Adriano was promoted to Associate Professor in Tohoku University. Dr. Wei He was promoted to Professor in Wuhan University, China. Dr. Sara Akodad finished her Ph.D. degree and now is the postdoctoral researcher in CNES.

(6)将来発展可能性(本事業を実施したことにより、今後どの様な発展の可能性が認められるか)

The project has the potential to improve disaster damage assessment and disease detection through the development of new deep ensemble learning approaches. This can lead to better decision-making and management of these events, ultimately improving the quality of life for affected individuals and communities. The collaboration between Japan and France can also promote cultural exchange and understanding. The project has potential for further advancements in the field and can lead to future partnerships and collaborations, such as international collaboration research project.

(7)その他(上記(2)～(6)以外に得られた成果があれば記載してください)

例:大学間協定の締結、他事業への展開、受賞など

N/A