

Preface

Field is defined here as “a spatiotemporal area that is difficult to grasp via any analytical and/or engineering approach due to the coexistence of various individuals and entities, which results in the unexpected occurrence of seemingly accidental events thus necessitating our continuing commitment and care” (Osamu Katai). *Field informatics* aims to provide solutions to various problems arising in the field from the standpoint of informatics.

The components of field informatics are *description*, *prediction*, *design*, and *transfer*, and the methods for these components range widely. Because field informatics is a new research area, it lacks a founding method. We consider that various methods of various origins will be applied to realize description, prediction, design, and transfer in the field. For example, let us consider the social goal of revitalizing hilly and mountainous areas amid increasing depopulation. Though all agree that creating a new business model in these areas is important, it is not easy to find an effective way of attracting people to hilly and mountainous areas. By using field informatics, however, situations can be *described* with remote sensing (Chap. 1), biologging (Chap. 2), human sensing (Chap. 3), and ethnography (Chap. 4); the effects of various options can be *predicted* with system dynamics (Chap. 5) and multiagent simulations (Chap. 6), and solutions can be *designed* using methods such as inclusive design (Chap. 7) and participatory design (Chap. 8). In addition, the experience gained can be *transferred* by case writing (Chap. 9) and outreach communication (Chap. 10).

Field informatics can be applied to *nature observation*, *social participation*, and *innovation*.

Field informatics for natural observation is an extension of fieldwork, and uses both theories and methodologies to analyze information from fields scientifically. Field informatics can generate key technologies such as remote sensing and biologging to solve global problems such as food shortages and environmental degradation. The role played by informatics in natural observation involves collecting and accumulating data, and verifying and utilizing them in accordance with the intended purpose.

Although many species are in danger of extinction, no effective countermeasures are being taken for economic reasons. Faced with such problems, field informatics tries to help endangered species and humans coexist, observing the biosphere with various technologies. The field, as a place of natural observation, is also a venue for the productive and social activities of people. Mutual learning in concert with the people living there enables us to interpret phenomena. Here, the field is a real society, in which a range of factors intertwine in complex fashion. For example, agriculture, forestry, fishing, and livestock industries are affected by the environment, and also social systems such as politics and economy. Their problems and improvements can only be understood by viewing the field as a system consisting of natural and social activities.

Field informatics for social participation is a place where there is inherent value and people who protect that value. The new science required here involves modeling the complex and diverse phenomena arising in the field and transferring the resulting model to practitioners. Therefore, field informatics transcribes the words and deeds resulting from the actions of people and involves analysis and generalization. The obtained model must be shared by practitioners in the field in an understandable form.

However, only a subset of information in the field can be detected, managed, and controlled. Therefore, if simply used by someone unaware of this limit, a misunderstanding may arise in that the world becomes expressed only in terms of the obtained information. Qualitative studies based on social sciences are to be applied in parallel with information technology. Furthermore, people in the field are forced to actively participate in dealing with accidental events that are hard to control. Therefore, information should be seen as dynamic and active rather than static and passive.

Field informatics for innovation involves designing and realizing an information system that contributes to the human community through its application in different fields. In other words, it creates innovation via the mutual learning of the designers and users of information technology. From this perspective, the field is a site where new narratives are generated with the support of technical feasibility in the near future rather than those for mere observation. Field informatics for innovation incorporates technological progress during the development period, and creates a scenario that can be realized in the near future.

Resistance to new technology is often observed in the field. Also, the limits of explanations, which are due to the complexity of information systems, make it difficult to establish communication between researchers and people in the field. For example, pursuing the cause of software failure sometimes reveals a trivial manmade mistake. It is not always the case that the field is an easy place for computer scientists to get involved. However, in the future, since a large portion of innovations will be born in the field, more attention must be paid to it.

This book targets graduate students seeking tools and approaches for natural observation, field workers engaging in activities on social participation, and researchers and engineers pursuing innovation. Field informatics can be of benefit to not only students or researchers but also to those in other positions. For example,

individuals in charge of government can utilize the methods of field informatics to form consensus and develop activities. Nonprofit organizations can use field informatics to conduct social programs more effectively. Those with sites such as agriculture, forestry and fisheries, hospitals, and so on can use field informatics to understand and solve various problems.

The members of the field informatics research group in Kyoto University who contributed to the work represented in this book are as follows: Nobuaki Arai, Hiromitsu Hattori, Toru Ishida, Shigeo Matsubara, Kazuyuki Moriya, Yuu Nakajima, Junichi Okuyama, Tetsuro Sakai, and Takaaki Tsuji of the Department of Social Informatics; Osamu Katai of the Department of Systems Science; Yutaka Yamauchi of the Graduate School of Management; Hajime Kita and Yuichi Nakamura of the Academic Center for Computing and Media Studies; and Takayuki Shiose of the University Museum. Reiko Hishiyama of the Department of Industrial and Management Systems Engineering, Waseda University, also joined the research group. The specialties of the members range from informatics, engineering, agriculture, and sociology to pedagogy. The fields targeted by each member also differ, ranging from environment conservation to social education for international cooperation. Specifically, the research activities of the biosphere in Southeast Asia—large-scale traffic simulations, participatory “mono-zukuri (the spirit to produce excellent products)” workshops, inclusive design workshops, distance learning, and intercultural collaboration—are included. Our research group, with such practical research activities as its background, is consolidating the various methods described herein as field informatics and providing lectures open to the public.

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