[EE] Evening Poster | B (Biogeosciences) | B-AO Astrobiology & the Origin of Life

[B-AO01]Astrobiology

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Twenty years have passed since when the field of Astrobiology, which aims to unveil the origins, evolution, and habitability of life by integrating multidisciplinary fields, was established. Origins of Life are currently being re-conceptualized via expansion of prebiotic chemistry to systems chemistry and chemical space. Besides their relationship to life's building blocks, it is expected to demonstrate the significant roles of organic molecules in the history of planetary formation. The linkages among the variations in chemical compositions of deep-sea hydrothermal environments, geological settings, and ecological systems were systematically investigated. Cassini, which accomplished in the long-term explorations of the planets bearing liquid, had "Grand Finale" this year. Discoveries of extrasolar planets have been dramatically increased to date.

Originally, Astrobiology does not need a specific science category. We therefore aim to make this session so that Earth and Planetary scientists from all the categories join for discussing 'where we came from and where we are going' and for making novel integrated researches.

For the next stage of Astrobiology, presentations on the instrument development in space explorations, comparative studies of solar system and exoplanets, etc, will be very much welcome.

[BAO01-P15]Screening candidates of unicellular organisms in microscopic images using machine learning

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Keywords:microscopic images, cell, machine learning

Characteristic classification of cells in microscopic images is an important technique in the fields of biotechnology, medical, space etc. In the above technique, it is important to extract only the focused cells from the microscopic image. Examples are the space missions Tanpopo [1] and STARDUST [2]. A large number of images are continuously captured in the depth direction by mechanically setting a constant reference. Manual searching by humans for a target object from a large amount of image group requires much labor. In this study, screening a single microscopic image. Automatic screening of a target object from a group of microscope images is very important in reducing labor.

This study uses the microscopic images of Life Detection Microscope (LDM) [3] as experimental data. The microscopic images of LDM are subjected to fluorescent dyeing treatment. The microscopic image is *E.coli* with reference to the density of microbes in Atacama Desert [4]. There are sparsely populated cells in the image, thus it is suitable to recognize each cell. Since cells are subjected to fluorescent staining treatment, it is easy to distinguish cells from others.

As a screening approach, machine learning using Convolutional Neural Network (CNN) [5], which is generally considered effective for image recognition, is used.

The CNN in this study is made in order to classify the cell in LDM’s microscopic image. The

development language is Python [6], since Python has abundant machine learning frameworks. This study uses TensorFlow [7] as a framework. TensorFlow is a license-free machine learning library provided by Google.
Consequently, CNN was a valid approach in identification of the cell, but it cannot classify the focused cell or not.

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