

(For JSPS Fellow)

Form B-5

Date (日付) 21/07/2014

(Date/Month/Year: 日/月/年)

Activity Report -Science Dialogue Program-
(サイエンス・ダイアログ事業 実施報告書)

- Fellow's name (講師氏名): ATUPELAGE CHAMIDU JANAKA (ID No. P13348)

- Participating school (学校名): Kofu minami high school

- Date (実施日時): 18/07/2014 (Date/Month/Year: 日/月/年)

- Lecture title (講演題目): (in English) Knowledge into computer for medical imaging based
diagnosings

(in Japanese) 医療用画像で自動診断をするために
コンピュータを賢くしよう

- Lecture summary (講演概要): Please summary your lecture 200-500 words.
Following I am outlining the main sections of my lecture.

- **Sri Lanka**

Basic information of the Sri Lanka and reasons for the close relationships in between Sri Lanka and Japan is illustrated.

- **My self**

Brief information of my carrier and my intention to be a research are explained to the students.

- **Researching and Engineering**

Research is about knowledge and engineering about invention. Researcher focuses on the "unknown" while the engineer focuses on the "known". Researchers are always thinking different than ordinary people.

- **Background of cancer diagnosing and CAD systems**

Cancer is the uncontrolled growth of abnormal cells in the body and one of the dangerous diseases in worldwide. Doctors diagnose the cancers by looking at the abnormality of the tissue structures. However, tiny structural variations cannot be observable through human eye. At present, CAD (Computer Aided Diagnostic) systems are used in cancer detection. Most of these CAD systems use morphological (structural) information of the tissue component. Ex. The size and shape of the nuclei.

With the development of current imaging modalities, we can obtain very-high resolution images of body tissue samples. These images contain a number of information and most of them cannot be perceived by human eye.

Using a lot of information (present in the image) will help to increase the reliability and accuracy of cancer diagnostic. Furthermore, identifying very low-grade tumor is very difficult because their structural patterns are not much varied with the normal tissue structures. To observe these tiny structural changes, it require get the assistance of the computer.

In the middle of the discussion Mr. Yokoyama briefly presented his research 2D CT and 3D CT images.

- **Image processing**

Image processing methods utilized the very basic mathematical matters studied in Japanese high schools such as matrix, derivatives. I showed few example; the things they learn that researches are using.

- **Machine learning**

Machine learning is the process of modeling the human brain into a computer. I showed very simple and interactive examples how we learn gradually from the childhoods and how this process executed in the computer.

- **Pathology imaging research project**

In my research, I focus how to extract the every possible information presents in the medical images and utilize them into mathematical mode. This model can describe the cancer or whatever the abnormal patterns in the medical images very higher accuracy.

In my lecture, I provided a strong background about medical imaging technologies. After that I turned the lecture to theoretical matters (very understandable ways) that are important in medical image processing. In this lecture, I mainly emphasis the student how image processing and machine learning methods utilized in medical image processing.

- Language used (使用言語): English & Japanese

- Lecture format (講演形式):

◆Lecture time (講演時間) 100 min (分), Q&A time (質疑応答時間) 25 min (分)

◆Lecture style(ex.: used projector, conducted experiments)

(講演方法 (例: プロジェクター使用による講演、実験・実習の有無など))

PPT Presentation

◆Interpretation(ex.: assistance by accompanied person, provided Japanese explanation by yourself) (通訳 (例: 同行者によるサポート、講師本人による日本語説明))

Assistance by accompanied person to translater difficult terms

◆Name and title of accompanied person (同行者 職・氏名)

Mr. Yokoyama Ryo, Mater student

◆Other note worthy information (その他特筆すべき事項):

- Impressions and opinions from accompanied person (同行者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。):