(For JSPS Fellow)

Form B-5

Date （日付） （11/02/2017：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）：　Diego Gabriel Francis Thomas　（ID No.　P15723　）

- Participating school （学校名）：　Fukui Prefectural Wakasa High School (Wakasa-city, Fukui)

- Date 　（実施日時）:　（25/01/2017:日/月/年）

- Lecture title （講演題目）：　（in English）Deep down into Computer Vision: 3D modeling with an RGB-D camera

　　　（in Japanese）

- Lecture summary （講演概要）: Please summary your lecture 200-500 words.
Among all our five senses, vision plays the most important role in our daily life. Our visual perception helps us understanding, interacting and moving into our environment. The objective of Computer Vision is to simulate the human visual perception (i.e., make the computer "see"). Though it is a natural and easy task for a human to recognize a friend, to grasp an object or to avoid a wall, it is difficult for a computer, or a robot. To understand our environment, it is essential to know its 3D geometry. Constructing 3D models of an observed scene is thus of outmost importance for computer vision. 3D modeling of a real scene stands for constructing a virtual representation of the scene, generally simplified that can be used or modified at our will. Constructing such a 3D model by hand is a laborious and time consuming task, and automating the whole process has attracted growing interest in the computer vision field. Consumer grade RGB-D cameras such as the Kinect camera or the Asus Xtion pro camera have become the commodity tool to build dense 3D models of indoor scenes. Though recent advances have shown compelling results in both static and dynamic 3D scene reconstruction, several limitations still remain. In particular, how to build large-scale scenes, how to build easy-to-manipulate 3D models or how to capture fast motions are still open challenges that need to be addressed. First, we present a method to build large scale indoor scenes by fitting planar patches with deviation images to the input data. While the set of planar patches provides a structured representation of the scene useful for loop closure processes, the deviation images encode the fine 3D details of each object in the scene. We demonstrate high-fidelity real-time 3D modeling of indoor scenes. Second, we present a method to build in real-time animated 3D head models using a consumer-grade RGB-D camera.The facial motion is captured using a blendshape animation model while the geometric details are captured with a deviation image mapped over the template mesh. We report robust and high-fidelity simultaneous facial motion capture and 3D head modeling results on a wide range of subjects with various head poses and facial expressions.
　　　During my lecture, I fist briefly introduced myself and gave my motives for becoming a researcher in the academy. Then I introduced my research field: Computer vision. I explained the main goal of Computer Vision (making the computer see), why it is challenging and the many applications. I continued with introducing my own research: 3D reconstruction, and the main stages involved. I showed a demo of my main research achievements by doing some live reconstruction of the class room. I finished my presentation with discussing potential future directions in the field. Thanks to the english teacher we took many breaks during the presentation to explain more in details some parts of the presentation.

- Language used （使用言語）：English_____

- Lecture format （講演形式）：
  ◆Lecture time （講演時間）　75　min （分）, Q&A time （質疑応答時間）　30　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））
          Used projector, conducted experiments on 3D reconstruction using a depth camera
  ◆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））
          Provided Japanese explanation by myself
  ◆Name and title of accompanied person （同行者 職・氏名）
          There was no accompanied person_____
  ◆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。）：