Individual Project (CS3IP16)

Department of Computer Science
University of Reading

Project Initiation Document

PID Sign-Off

Student No.	**27020363**
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Degree programme (BSc CS/BSc CSwIY)	**BSc CS**
Supervisor Name *(Consultation with supervisor is mandatory)*	**Huizhi Liang**
	Supervisor to sign PID form on Bb (grade centre)
Date	**6 Oct 2020**

SECTION 1 – General Information

Project Identification

1.1	**Project Title**
	An AI-assisted decision making system for thyroid nodule classification
1.2	**Please describe the project with key-phrases (max 5)**
	FNA(Fine Needle Aspiration) is the standard way of detecting malignant thyroid modules. This technique is extremely accurate but also very expensive, due to the special hardware equipment that needs. Given that our end goal is to detect as many malignant modules as possible, in a given set of patients, my ai-assisted web-based, IT system will be designed to work as a complementary of FNA's procedure. By using a Deep Learning Algorithm, my project aims to detect the patients in a given set with a higher probability of having malignant modules and prioritize them in taking the FNA tests, this will increase FNA's effectiveness by saving precious days or weeks from starting the necessary treatment.
1.3	**E-logbook maintenance agreed with supervisor** *Use Google doc, OneDrive, or any mobile App whereby you will be able to generate a PDF copy*
	Latex document in the project documentation directory
1.4	**GitLab link for maintain source code and research data** *Any change in GitLab link and Source code repository MUST be explicitly mention in final report*
	https://github.com/stefanos-stefanou/Final-Year-Project

SECTION 2 – Project Description

2.1	**Summarise the project's background in terms of research field /application domain (max 100 words).**
	The project from the application domain view is purely a Scientific Application space. In the research field, it mainly lies in 2 active research fields, statistics, and artificial intelligence, especially in the Deep Learning branch.
2.2	**Summarise the project aims, objectives and outputs (max 250 words).** These aims, objectives, and outputs should appear as the tasks, milestones and deliverables in your project plan (fill out Section 3).
	My ai-assisted web-based system will be composed of two distinct subsystems The Deep Learning subsystem, capable of scanning a number of ultrasonic scans and give a probability of that scan been malignant or not, and the web-based, IT subsystem, that it will make the access to the Deep Learning solution easy for approved hospital personnel, this subsystem will be able to categorize the scans, give charts and inside statistics for the scans provided, and give the lists of patients that need to prioritize into the personnel for further use.
2.3	**Initial project specification – roughly indicate key features and functions of your finished program/application. Indicate possible method, data source, technology etc. (max 400 words)** (Sensible and relevant Charts, Table, and Figures can be used)

	The final web-based application will accept a number of ultrasonic scans with the relevant patient ID from the approved hospital personnel. It will use the Deep Learning subsystem to assign a specific probability in every patient, and it will prioritize the high-risk patients for taking the FNA test. The interface will also offer some features to the doctors and personnel, such as an indication of the high-risk area in each scan, various charts regarding the distribution of patients, and probability/risk assessments in the patients that don't have priority in every scan set. The number of features will enable doctors to judge by themselves for each case separately if they want, and utilize the FNA's hardware efficiently. This web-based application will have a simplistic database for storing patients and scans, providing insights in case that a patient has scanned again in the past, and give various insights about the probability increase or decrease of being malignant or not. My system will come with all the necessary security mechanisms that scientific/hospital software is mandatory to come with, following internationally recognized standards such as ISO 13485 and more.
2.4	**Describe the social, legal and ethical issues that apply to your project. Does your project require ethical approval? (If your project requires a questionnaire/interview for conducting research and/or collecting data, you will need to apply for an ethical approval)**
	As my project will use publicly available data, specifically the DDTI dataset (http://cimalab.intec.co/?lang=en&mod=project&id=31) ,this section is not applicable
2.5	**Identify the items you may need to purchase for your project. A cost upto £200 can be applied (include VAT and shipping if known). You need to have consent of your supervisor. Your request will be assessed by the department.**
	Not applicable
2.6	**State whether you need access to specific resources within the department or the University e.g. special devices and workshop**
	Computational time provided by university infrastructure(GPU Server)

SECTION 3 – Project Timeline

below is an analytic timeline for this project

Phase 1	Oct	
		Statistics
		Antificial Inteligence
Phase 2	Nov	
		Frontend technologies
		Backend Technologies
Phase 3	Dec,Jan	
		Backend Design
		Backend Develepoment
		Backend Testing
Phase 4	Feb	
		Frontend Design
		Frontend Develepoment
		Frontend Testing
		Integration Testing
Phase 5	Mar	
		Analytic Report
		Presentation
		Delivery of the product
Phase 6	April | May	
		Safety Net