



Pakistan Institute of Engineering and Applied Sciences

Nilore, Islamabad, 45650 Pakistan

THESIS PROJECT PROPOSAL PROFORMA

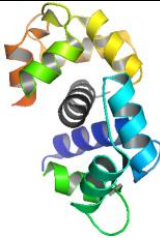
Project Title	Learning Calmodulin Interactions
Nature	Computational
Prerequisites	<p>Knowledge of the following will be helpful:</p> <ul style="list-style-type: none"> Machine Learning / Computational Intelligence / Pattern Classification / Data mining Python Programming Bioinformatics <p>Interested students will be required to take Machine Learning and Bioinformatics (or equivalent) courses if they have not already done so.</p>
Field	Scientific Computing and Computational Intelligence
Expected Cost (if any)	
Work Place*	PIEAS

*define %age of work to be done in PIEAS or at some other place

Supervisor Information

Name of supervisor and designation	Dr. Fayyaz ul Amir Afsar Minhas, Senior Scientist
Department\Division and Organization	Department of Computer Science, PIEAS
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Project Details

Synopsis	<p>Motivation: Calmodulin is a protein found in all animals and plants because of its important role in a number of biological functions such as control of heart rate, muscle movements, neuronal activity, etc. It performs these functions by interacting with a number of other proteins. An example interaction of calmodulin with another protein is shown in the figure on the right.</p>  <p>Objectives: The objective of this project is to develop a machine learning predictive model for predicting whether a given protein will bind calmodulin or not. The model will be given a protein sequence as input. The model's output is a score reflecting the tendency of the proteins to bind calmodulin. Such a model can be used in understanding the biology of calmodulin as well as in designing new proteins that can bind calmodulin.</p> <p>For more details visit: http://faculty.pieas.edu.pk/fayyaz/bioinfo.html</p> <p>Skills Resulting from the project: Big data analysis, machine learning, Bioinformatics, Python Programming, Text analysis and Interactomics, Multidisciplinary Research methodologies and publishing.</p>
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Goals of the Project

4th Semester (3 credit hour per week are available)	I. Development of understanding of proteins and their interactions II. Learning to handle protein data on the computer III. Understanding the underlying basis of Calmodulin interactions IV. Study of properties of proteins useful in prediction of Calmodulin interactions V. Hands-on understanding of machine learning techniques VI. Developing a baseline predictor
5th Semester (12 credit hour per week are available)	I. Analysis of features and classification schemes II. Benchmarking the predictor III. Development of a webserver for the prediction

Instructions

- All the columns of project proposal forms are mandatory to be filled.
- The minimum qualification for a supervisor is eighteen years of education plus two years service.
- The minimum requirement for a co-supervisor is eighteen years of education.
- In case of external supervisor (outside DCIS), a co-supervisor will be mandatory from faculty.
- Wherever the project work is carried out (including classified establishments), the defense (only examiners and supervisor) and final presentation (open to all) will be held at PIEAS. The presence of supervisor is necessary for all presentations of fourth and fifth semesters.
- DCIS has right to reject or accept any project.



Signature of Supervisor

Signature Head of the Department
(With name and designation)