Inventing Curriculum using Julia and Pointer-Generator Network

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Introduction

What is Curriculum?

- A course of study that will enable the learner to acquire specific knowledge and skills
- A curriculum is the combination of instructional practices, learning
- experiences, and students' performance assessment that are designed to bring out and evaluate the target learning outcomes of a particular course
- Curriculum is what the school is attempting to teach, which might include social behaviors as well as content and thinking skills
- A selection of information, segregated into disciplines and courses, typically designed to achieve a specific educational objective
- The curriculum is the program of instruction. It should be based on both standards and best practice research. It should be the framework that teachers use to plan instruction for their students
- Curriculum can be both written and unwritten

Standard Curriculum structure – AICTE India

C. Structure of Undergraduate Engineering program :

S. No.		Credit Breakup for CSE students
1	Humanities and Social Sciences including Management courses	12
2	Basic Science courses	24
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	29
4	Professional core courses	49
5	Professional Elective courses relevant to chosen specialization/branch	18
6	Open subjects – Electives from other technical and /or emerging subjects	12
7	Project work, seminar and internship in industry or elsewhere	15
8	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)
	Total	159*

Minor variation is allowed as per need of the respective disciplines.

Sample Syllabus – Web Programming

Course Code	:	COPC210
Course Title	:	Web Technologies
Number of Credits	:	2 (L: 2, T: 0, P: 0)
Prerequisites	:	-
Course Category	:	PC

Course Learning Objectives:

To provide basic skills on tools, languages and technologies related to website development. Learnings from this course may be used in the Mini Project and summer internship.

Course Content:

UNIT 1: Introduction to www

Protocols and programs, secure connections, application and development tools, the web browser,

What is server, setting up UNIX and LINUX web servers, Logging users, dynamic IP Web Design: Web site design principles, planning the site and navigation

UNIT 2: Web Systems Architecture

Architecture of Web based systems- client/server (2-tier) architecture, 3-Tier architecture, Building blocks of fast and scalable data access Concepts - Caches-Proxies- Indexes-Load Balancers- Queues, Web Application architecture (WAA)

UNIT 3: Javascript

Client side scripting, What is Javascript, simple Javascript, variables, functions,conditions, loops and repetition

UNIT 4: Advance scripting

Javascript and objects, Javascript own objects, DOM and web browser environments, forms and validations

DHTML: Combining HTML, CSS and Javascript, eventsand buttons, controlling your browser,

Ajax: Introduction advantages & disadvantages,ajax based web application, alternatives of ajax

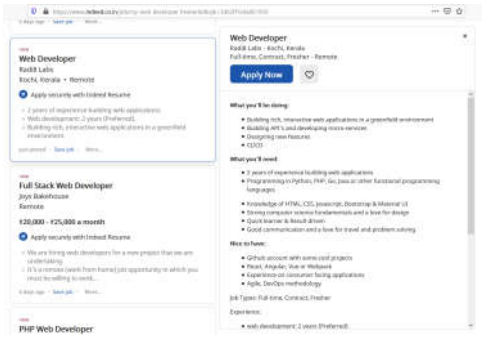
XML, XSL and XSLT: Introduction to XML, uses of XML, simple XML,XML keycomponents, DTD and Schemas, XML with application, XSL and XSLT.

Introduction to Web Services

UNIT 5: PHP

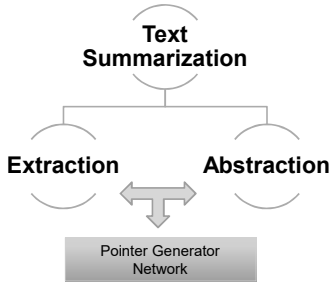
server side scripting, Arrays, function andforms,advance PHP Databases :Basic command with PHP examples, Connection to server,creating database, selecting a database, listing database, listing table-names creating a table, inserting data,altering tables, queries, deletingdatabase, deleting data and tables, PHP myadmin and database bugs.

Example Job Profile



Text Summarization

Shortening long pieces of text by applying computational methods



Algorithm

1. Create a dataset of job postings
2. Remove unwanted stop words, numbers, punctuation marks, unrelated words
3. Tokenize words and sentences.
4. Compute word frequency [n-gram analysis] and sentence score.
5. Select sentences with high scores and concatenate them
6. Sort the words in descending order of frequency (highest first)
7. Extract the top-n words/ word combinations from the previous step and compare them with the Syllabus of particular subject
8. Refine the syllabus of existing subject with new keywords.
   Propose a new subject

Code and Screenshots

Conclusion

- To achieve better results using natural language processing one of the important factor is preprocessing of document
- Using pointer generator network we can balance the advantages / disadvantages of extractive / abstractive summarization to get the better results
- Need to experiment with non professional courses and with other than English language such as indic languages

Additional Information

This is work in progress. Presented this work at JuliaCon 2020 (Youtube : https://www.youtube.com/watch?v=s9vOPTDpCzI).

For any comments/ suggestions/ queries contact: gcdeshpande@hotmail.com