

Improving Teaching-Learning Process in Data Structures: Self Experience

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Abstract—In this paper we discuss improving the teaching-learning process in the subject data structures based on the previous teaching experience. The class has many students with plenty of individual skills. The teaching will be the same for every student. But the students learning will differ based on their perception. The teaching should be creative as well as innovative; so that it will reach all the students. Then getting improvement in teaching-learning process is an easy process.

Keywords: Data Structures, teaching-learning process.

I. INTRODUCTION

Teaching is a broadcast process. In this sender (teacher) passes the message, which is received by the many receiver (student). Teaching needs innovation to make learning process to be successful. There is a need for an improvement in the engineering education and its standard. At the same time the technology also growing at a lightning speed with so many innovative inventions.

Data Structure is a core subject for Computer Science and Engineering students. It is vital for other branch students also. This subject serve as a fundamental for the various subjects like computer networks, Operating system, Database Management Systems, Information Retrieval, Graph theory and Applications, Theory of Computation and so on. So there is a need to get strong knowledge in data structures.

II. RELATED WORK

Ezhilarasu et.al [2016] discussed about the methods to improve the teaching and learning process in the subject Theory of Computation [1]. The previous experience used to find the possible solution. Theory of Computation is a mathematics oriented paper. The analysis shows that lateral entry students want more practice in this subject. Normally girls are clearing the papers in their first attempt. Hence they don't need any coaching class. The other students (regular boys) need some practice in this subject.

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III. ANALYSIS

The following aspects need to be analyzed for getting the solution to improving the teaching-learning process in data structures.

- Engineering Subjects
- The Hurdles
- Proposed Solutions

IV. ENGINEERING SUBJECT

The Engineering subject generally categorized as

- 1.Humanities and Science
- 2.Basic Science
- 3.Engineering Science
- 4.Professional core & Professional soft core
5. Professional Elective
6. Open Elective
7. Employment Enhancing Courses.

The subject Data structures generally comes under Professional core. It also comes under Engineering Science and Employment Enhancing Courses. All circuit branches generally prefer this data structures in their curriculum. Hence in this point of view this subject comes under Engineering Science. During the campus drive many IT companies ask the questions related to data structures. Hence in this point of view this subject comes under Employment Enhancing Course. Some of the electives are closely related with the data structures. Ex. Graph theory and Applications. As this subject comes under many categories there exist significant importance for this data structures.

In Anna University Curriculum in olden days this subject known as Data Structures and Algorithms. Generally placed in the third semester. But in the current regulation(Regulation 2013) this subject divided as 1.Programming and Data Structures – I (PDS I) 2. Programming and Data Structures – II (PDS II). PDS I placed in the second semester and PDS II placed in the third semester.

The Data Structures serve as a base for many subjects. In order to get more marks in that subject thorough knowledge in data structures is must. Then only student can gain more knowledge in the related subjects. The subject generally given as theory and the practical. If the subject studied by the student along with the practical then there is a bright chance of getting good marks in the university examinations. But some of the students are struggling in this paper. Hence there is a need for finding the solution to this problem.

V. THE HURDLES

The students are having the following hurdle to get good/pass mark in the subject Data Structures.

1. The attitude.
2. The lack of time management.
3. The practice.
4. The incorrect material.
5. The social media.
6. Improper attendance.
7. The curriculum design

VI. THE ATTITUDE

The Engineering College passed out students is excelling in many competitive examinations like Civil Service Examinations, Bank Examinations etc. The students should have positive attitude that they are studying Engineering Degree which will be useful for them; they will prosper when there are going to compete with other stream students. Many of the recent innovations are implemented by the Engineers.

VII. THE LACK OF TIME MANAGEMENT

Normally in every engineering college faculties are completing all the five units for their allotted subject before the scheduled last working day. Three internal tests will be conducted in every semester for each subject. The question paper for these internal tests normally covers all the important questions. But unfortunately some students are preparing for the university exam at the last minute.

VIII. THE PRACTICE

The problematic topic needs more practice. Hence the students should solve the homework problem also some more text book problems. In case any doubt they should clarify that immediately.

IX. THE INCORRECT MATERIAL

Some students unknowingly get the material from their seniors. If there is change in the regulation then there is a possibility of change in the syllabus. The students may get more materials from the internet. Some materials may be incorrect.

X. THE SOCIAL MEDIA

The students are spending their lot of time in social media even during exam time. The social media should be used properly without disturbing their studies.

XI. IMPROPER ATTENDANCE

The students' attendance should be proper for every subject. If the student are having negative thought towards the subject or the faculty then some of the students are having improper attendance in that particular subject.

XII. THE CURRICULUM DESIGN

The lateral entry students are studying the PDS II subject directly. They don't have the knowledge of PDS I. So it will affect their performance in the university examinations.

XIII. PROPOSED SOLUTIONS

The Faculty must identify the slow learners. The crash course for PDS I should be conducted to the lateral entry students. The Faculty must prepare the smart material. That material should have 2 to 3 important questions with answers in PART B for every five units. Then 5 to 10 important questions with answers in PART A for every five units. The total number of questions is to be decided by the faculty based on the analysis of the class. The prepared smart material must be delivered to all slow learners in the form of both soft copy as well as hard copy.

XIV. CONCLUSION

Data structure is an easy subject. The learning of this subject will create more innovative thoughts for the learners as well as for the teachers. If the three listed aspects 1. Engineering subject 2. hurdles 3. Proposed solutions followed properly then there is a chance of getting more marks by the slow learners. The teaching of this subject helped us to write more papers [2-51] in various domain.

REFERENCE

- [1] Ezhilarasu P, Prakash J, Satheesh Kumar D. Improving Teaching-Learning Process in Theory of Computation: Self Experience. International Journal on Applications in Information and Communication Engineering. 2016;2(1):5-8.
- [2] Ezhilarasu P, Prakash, J, Krishnaraj N, Satheesh Kumar D, Sudhakar K, Parthasarathy C. A Novel Approach to Classify Nondeterministic Finite Automata Based on More than Two Loops and its Position. SSRG International Journal of Computer Science and Engineering. 2014;1(10):46-49.
- [3] Ezhilarasu P, Prakash, J, Krishnaraj N, Satheesh Kumar D, Sudhakar K, Parthasarathy C. A Novel Approach to Classify Nondeterministic Finite Automata Based on Dual Loop and its Position. International Journal of Engineering Trends and Technology. 2014;18(3):147-150.
- [4] Ezhilarasu P, Prakash J, Krishnaraj N, Satheesh Kumar D, Sudhakar K, Dhiyanesh B. A Novel Approach to Classify Nondeterministic Finite Automata Based on Single Loop and its Position. International Journal of Advanced Research Trends in Engineering and Technology. 2014;1(4):7-10.
- [5] Bal RG, Ezhilarasu P. An efficient safe and secured video steganography using Shadow Derivation. International Journal of innovative Research in computer and communication Engineering. 2014;2(3):3251-3258.
- [6] Ezhilarasu P, Thirunavukkarasu E, Karuppusami G, Krishnaraj N. Single substring based classification for nondeterministic finite automata. International Journal on Applications in Information and Communication Engineering. 2015;1(10):29-31.
- [7] Ezhilarasu P, Krishnaraj N. Double Substring Based Classification for Nondeterministic Finite Automata. Indian Journal of Science and Technology. 2015;8(26):doi:10.17485/ijst/2015/v8i26/87161.
- [8] Ezhilarasu P, Krishnaraj N. Triple Substring Based Classification for Nondeterministic Finite Automata. International Journal of Applied Engineering Research. 2015;10(59):177-82.

- [9] Karnan M, Thangavel K, Ezhilarasu P. Ant Colony Optimization and a New Particle Swarm Optimization algorithm for Classification of Microcalcifications in Mammograms. Sixteenth International Conference on Advanced Computing and Communication, ADCOM2008.
- [10] Ezhilarasu P, Krishnaraj N, Dhiyanesh B. Arithmetic Coding for Lossless Data Compression–A Review. International Journal of Computer Science Trends and Technology. 2015;3(3):89-94.
- [11] Muthu Ayyanar V, Satheesh Kumar D, Ezhilarasu P. Energy Effective Data Collection In Problematic Disseminated Sensor Network. International Journal on Applications in Information and Communication Engineering. 2016; 2(1), 3-4.
- [12] Ezhilarasu P, Prakash J, Krishnaraj N, Satheesh Kumar D, Suresh Babu V, Parthasarathy C. A Novel Approach to Design the Finite Automata to Accept the Palindrome with the Three Input Characters. Indian Journal Of Science And Technology. 2015;8(28):doi:10.17485/ijst/2015/v8i28/78189.
- [13] Satheesh Kumar D, Ezhilarasu P, Prakash J, Ashok Kumar KB. Assimilated Strong Fuzzy C-means in MR Images for Glioblastoma Multiforme. Indian Journal Of Science And Technology. 2015; 8(31): doi:10.17485/ijst/2015/v8i1/79281.
- [14] Satheesh Kumar D, Ezhilarasu P. Hemangioma Neoplasm in Spinal Cord Dissection on RAG Spurious Purgation. International Journal on Applications in Basic and Applied Sciences. 2015;1(5):1-6.
- [15] Manoj Prabhakar J, Ezhilarasu P, Satheesh Kumar D, Sowmya R. A Survey To Detect Undesirable Messages In Online Social Network. International Journal on Applications in Information and Communication Engineering. 2015;1(12):22-23.
- [16] Ezhilarasu P. Construction of a Basic Calculator Through the Turing Machine – A Review. International Journal of Engineering Trends and Applications. 2015;2(6):1-6.
- [17] Ezhilarasu P, Karthik Kumar P. LZW Lossless Text Data Compression Algorithm – A Review. International Journal of Computer Science & Engineering Technology. 2015;6(11):617-630.
- [18] Ezhilarasu P, Krishnaraj N. Loop and Substring Based Hybrid Classification for Nondeterministic Finite Automata. International Journal on Applications in Information and Communication Engineering. 2015;1(12):9-18.
- [19] Ezhilarasu P, Satheesh Kumar D, Prakash, J. Classification and Variants of Automata–A Review. International Journal on Applications in Engineering and Technology. 2015;1(4):1-3.
- [20] Ezhilarasu P, Sowmya R. Construction of a Turing Machine to Check the Equivalence of an Input String for the Three Input Characters – A Review. International Journal on Applications in Electrical and Electronics Engineering. 2015;1(8):11-13.
- [21] Nisha Nandhini A, Karthik, Prakash J, Ezhilarasu P. A Study On Systematic and Constructive Approaches for Insufficient Pattern Recognition with Evidence Theory Concept. International Journal on Applications in Information and Communication Engineering 2015;1(11): 24-28.
- [22] Ezhilarasu P, Prakash J, Krishnaraj N, Satheesh Kumar D, Suresh Babu V, Parthasarathy C. Construction of Minimized Deterministic Finite Automata for Finding the Equal Number of Input Characters. International Journal on Applications in Information and Communication Engineering. 2015;1(11):17-20.
- [23] Thirunavukkarasu E, Karuppusami G, Ezhilarasu P, Krishnaraj N. Shannon-Fano Coding for Lossless Data Compression – A Review. International Journal of Applied Engineering Research. 2015;10(15):36030-36036.
- [24] Thirunavukkarasu E, Karuppusami G, Ezhilarasu P, Krishnaraj N. Performance Comparison of Huffman Coding and Tunstall Coding. International Journal of Applied Engineering Research. 2015;10(15):36023-36029.
- [25] Sowmya R, Ezhilarasu P, Satheesh Kumar D, Manoj Prabhakar J. A Survey on Data Security Using Identity Based Encryption in Cloud Computing. International Journal on Applications in Information and Communication Engineering. 2015;1(11):3-4.
- [26] Ashok Kumar KB, Satheesh Kumar D, Ezhilarasu P, Priyamka NK. A Survey on Emotional Detection using Personalised appearance through Face Classification. International Journal on Applications in Information and Communication Engineering. 2015;1(10):38-40.
- [27] Priyamka NK, Satheesh Kumar D, Ezhilarasu P, Ashok Kumar KB. A Survey on Brain Tumor Image Registration to Assist in Performing the Surgery. International Journal on Applications in Information and Communication Engineering. 2015;1(10):34-35.
- [28] ManojPrabhakar J, Ezhilarasu P, SatheeshKumar D, Sowmya R. A Survey on Face Detection using an Image through Fingerprint Matching in Live. International Journal on Applications in Information and Communication Engineering. 2015;1(10):32-22.
- [29] Thirunavukkarasu E, Karuppusami G, Ezhilarasu P. Implementation of Run-Length Encoding in Examination for Lossless Data Compression. International Journal of Engineering Trends and Applications. 2015;2(4):35-40.
- [30] rakash J, Ezhilarasu P, Nandhini N, Thirunavukkarasu E. Nature of Nondeterministic Finite Automata Based on Single Loop Position and it's Time Complexity. international Journal of Technology in Computer Science & Engineering. 2015;2(3):181-188
- [31] Krishnaraj N, Ezhilarasu P, Karthick S, ManojPrabhakar J. Enhancing Security in Mobile Devices Through Multimodal Biometrics. Middle-East Journal of Scientific Research. 2016;24(4):1355-1361.
- [32] Ezhilarasu P, Krishnaraj N, Suresh Babu V. Huffman Coding for Lossless Data Compression–A Review. Middle-East Journal of Scientific Research. 2015;23(8):1598-1603.
- [33] Krishnaraj N, Ezhilarasu P, Dharun VS. Smart phone application for automatic public transportation through providing intelligent bus status information to the users. International Journal of Applied Engineering Research. 2015;10(59):163-167.
- [34] Ezhilarasu P. Fibonacci Coding for Lossless Data Compression–A Review. International Journal of Engineering Trends and Applications. 2015;2(3):44-51.
- [35] Ezhilarasu P, Krishnaraj N. Applications of Finite Automata in Lexical Analysis and as a Ticket Vending Machine – A Review. International Journal of Computer Science & Engineering Technology. 2015;6(5):267-270.
- [36] Ezhilarasu P, Krishnaraj N, SureshBabu V. Applications of Finite Automata in Text Search – A Review. International Journal of Computer Science Engineering and Technology. 2015;5(5):116-119.
- [37] Saranya S, Ezhilarasu P. Cloud Based Carbon Emission Management. International Journal of Applied Engineering Research (IJAER). 2015;10(16): 12376-12378.
- [38] Ranjith R, Saranya S, Ezhilarasu P. A Survey on Embryonic Graph-Based Unfailing Routing Method for VANETs. International Journal of Computer Science Engineering. 2015; 4(1):32-34.
- [39] Ezhilarasu P, Saranya S, Satheesh Kumar D, Ganesan M. A Survey on Carbon Emission Management and Intelligent System using Cloud. International Journal of Technology in Computer Science & Engineering. 2015;2(1):122-127.
- [40] Ezhilarasu P, Suganthi J. Genetic Algorithm optimized SVM for Tumor Prediction in Mammogram. Life Science Journal. 2013;10(7s):460-465.
- [41] Karnan M, Thangavel K, Ezhilarasu P. Diagnose Breast Cancer through Mammograms using Image Processing alongwith Optimization Techniques. Second International Conference on Information Processing. 2008;2(1):488-501.
- [42] Satheesh Kumar D, Yadav KP. An Efficient Semi-Automated Method for Prostate Cancer Localization. International Journal of Computer & Organization Trends. 2013;3(1):20-27.
- [43] Satheesh Kumar D, Yadav KP. Medullablastoma Neoplasm in MR Images Dissection on FCM Method. International Journal of Engineering Trends and Technology. 2013;4(1):84-92.
- [44] Venkateshwaran.N, Satheesh kumar D. Apply the RSS method to increase life time of cluster based wireless sensor networks. International Journal of Engineering Research. 2015;3(3):333-336.
- [45] Venkateshwaran N, Satheesh kumar D. Clustering based effective and ensures data dissemination in wireless sensor network.

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- International Journal of Modern Communication Technologies & Research.2015;3(1):7-9.
- [46] Sudhakar K, Satheesh Kumar D, Rajesh Kumar B. Automatic Renal Neoplasm Volumetry on Prior Shape Level Set Segmentation Method. *International Journal of Applied Engineering Research*.2015;10(6): 13789-13802.
- [47] Sreedevi M, Satheesh Kumar D. Discovering Behavioral Characteristics of Anomalous Subpopulations. *International Journal of Innovations in Scientific and Engineering Research*.2014;1(4):1-7.
- [48] SelvaVinayagam G, Ezhilarasu P, Prakash J. Applications of Turing Machine as a String Reverser for the Three Input Characters – A Review. ISCO 2016.
- [49] Ezhilarasu P, Jayaraj R, Prakash J, Ananthi J. A Study on Pushdown Automata for Solving Simple Problems. *International Journal on Applications in Information and Communication Engineering*. 2016;2(6):21-26.
- [50] Ezhilarasu P, Krishnaraj N, Basim A. Segmentation and Texture Analysis for Efficient Classification of Breast Tumors from Sonograms. *Current Signal Transduction Therapy*. 2016;11(2):84-90.
- [51] Krishnaraj N, Ezhilarasu P, Gao Xiao-Zhi. Hybrid Soft Computing Approach for Prediction of Cancer in Colon Using Microarray Gene Data *Current Signal Transduction Therapy*. 2016;11(2):71-75.