ANAND KUMAR

curriculum viate

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EDUCATION

Dual Degree (*B.Tech (Honors) & M.Tech*) with specialization in *Structural Engineering* *2013- May,2018*
Civil Engineering Department, Indian Institute of Technology, Kharagpur, India
GPA: 8.02/10

Higher Secondary Education, Central Board of Secondary Education (CBSE) *2011-2013*
Jawahar Navodaya Vidyalaya, Bengaluru, India
Aggregate: 91.8%

Secondary Education, Central Board of Secondary Education (CBSE) *2010-2011*
Jawahar Navodaya Vidyalaya, Koderma, India
GPA: 10/10

ACADEMIC DISTINCTIONS

· Recipient of Prime Minister Research fellowship

· Awarded Dakshana fellowship, among **1% of (25000)** JNV students, by Dakshana Foundation

· Awarded **certificate of merit** from CBSE for exceptional performance in math and science in Secondary School Examination

· Contributed to **publication**: *S. Majumdar; R. Ali; **A. Kumar**; A. Deb.*, "Optimum Rib Design in TMT Rebars to Enhance Fatigue Life While Retaining Bond Strength". Journal of Materials in Civil Engineering Vol. 30, Issue 3 (March 2018), ASCE. First Online: Dec. 29, 2017   https://doi.org/10.1061/(ASCE)MT.1943-5533.0002173

· Qualified IIT-JEE 2013 Advanced, achieved 95.5% percentile

· Awarded with Teaching Assistantship of INR 148,800 from IIT Kharagpur for academic year 2017-2018

RESEARCH BACKGROUND

Multiaxial Fatigue Life prediction using Finite Element Method *May'17 - April'18*
Civil Engineering Department, IIT Kharagpur
Advisor: Prof. Arghya Deb

> Objective of project was to extend highly stressed volume (HSV) based approach to multiaxial fatigue analysis. First, the approach was evaluated and validated for uniaxial fatigue. Approach combining HSV and FEM resulted in very accurate estimates for uniaxial fatigue. However, HSV approach didn't perform well for multiaxial fatigue case even with several parameter modifications

Behavior of stress concentration with rib geometry in nonaxisymmetric rebars *May'16 - July'17*
Civil Engineering Department, IIT Kharagpur
Advisor: Prof. Arghya Deb

> · Increase in stress concentration with increase in notch radius after an optimal notch-radius was observed for reinforcement bars with transverse ribs not symmetric to rebar axis. Objective was to validate and establish this hypothesis using FE simulation and explain the behaviour.
> · Analytical model for rebar were setup in MATLAB to study the effect of change in notch radius on all stress components at critical point under observation. It involved implementing numerical integration, concepts of solid mechanics in MATLAB. Shear stress due to change in cross section area and bending shear due to change in shear centre of cross-section were found to impact maximum principal stress.

Damage Detection using Ant Colony Optimization *May'16 - July'16*
Civil Engineering Department, IIT Kharagpur
Advisor: Prof. D. Maity

> Code for structural analysis and eigenvalue analysis of response of 3D frame in was written in MATLAB. Damage was incorporated by diminishing elastic modulus of element. Using Frequency Response Function (FRF) as objective function. Model was allowed to converge to identify accurate damage in respective elements using ant – colony optimization algorithm

Analysis, Design and Research in STAAD and Abaqus *July'16 – Nov'16*
Lab Project · CAD Lab, Civil Engineering Department, IIT Kharagpur
Advisor: Prof. S.K. Bhattacharya

> Modeled a plate in Abaqus using 2D-deformable shell elements containing an elliptical hole at centre subjected to pressure, Validated stress concentration factor with theoretical result by Inglis; also performed experiments on buckling of steel column and dye cast simulation using Arbitrary Lagrangian-Eulerian (ALE) FEM

EXPERIENCE

Graduate Researcher   *Jan'19 – Present*
Indian Institute Of Technology, Bombay

- · Currently investigating control of neutral type time delay system arising from problem of controls in oil-well rig vibrations
- · Presented a term paper on dislocation mechanics fracture mechanics based on works of J. Weertman and A. Acharya.
- · I have taken graduate courses on Advanced fatigue and fracture mechanics, Partial differential equations, stochastic methods, optimization theory among others

Cross-category fashion apparel recommendation using Deep Neural Networks   *May'18 – Jan'19*
Decision Science Analyst, Quantiphi Inc, India

Objective was to recommend complete outfit for given one/set of query apparels. This involved using Deep convolution based auto-encoder neural networks to learn inherent style space from outfit images while unlearning the image specific pose details, use of approximate nearest neighborhood algorithms, Similarity measure in higher dimensional space and creating co-occurrence based space for recommendation to complete the outfit

Explicit to implicit model conversion for Large Abaqus model using python   *May'16 – July'16*
Intern, Air-frame, AIRBUS, India
Mentor: Reuben Dinakar

Objective was to review difference in implicit and explicit procedure in Abaqus, to develop a script to automate conversion of models from explicit to implicit and vice-versa. This involved critical analysis of Abaqus modeling procedure and object oriented programming for converting models for a given analysis procedure to other (eg. implicit to explicit)

SKILLS

Software	Abaqus, SolidWorks, AutoCAD, Staad.Pro, ANSYS, Microsoft Office
Programming	Python, MATLAB, FORTRAN, R, Ruby, LATEX, SQL, Linux

OTHER INFORMATION

Teaching Experience, Indian Institute of Technology Kharagpur

2018	· **Teaching Assistant, Mechanics (undergraduate course)** Mentored 90 freshmen, conducted weekly tutorial sessions on problems in stress, strain and bending, conducted tests
2017	· **Teaching Assistant, Computer Aided Design & Engineering Drawing (LAB)** Mentored a batch of 84 students in manual drawing & CAD using Autocad, Solidworks, evaluated weekly assignments and provided with feedbacks

Social/Leadership Experience

2016	· **Vice President, Dakshana Alumni Network** Led 6 cross-functional team overseeing alumni co-ordinations across major cities and Universities in India · Co-ordinated national level Dakshana fellowship exam
2015	· **Organizing Committee member, Megalith** Organized with team of 20, a civil engineering technical fest to encourage creative problem identification and solving among civil engineering students
2014	· **Volunteered (*under National Service Scheme*) for cause of rural upliftment to neighboring villages every weekend for two year**

Languages	HINDI - Mothertongue	ENGLISH - Intermediate (conversationally fluent)	BENGALI - Basic
Interests	Photography · Painting · Programming · Cooking ·