

# Sawood Alam

Web Science and Web Archive Researcher

## Education

- Current** **Ph.D.** in Computer Science *Old Dominion University, Norfolk, VA - USA*  
*MementoMap: A Web Archive Profiling Framework for Efficient Memento Routing*  
 This dissertation describes a framework for discovering and disseminating holdings information of various web archives. Profiling a growing number of archives enables Memento Aggregators to efficiently route URI lookups to archives that will likely return good results.
- Aug 2013** **M.S.** in Computer Science *Old Dominion University, Norfolk, VA - USA*  
*HTTP Mailbox - Asynchronous Restful Communication*  
 This thesis describes the HTTP Mailbox, a mechanism to enable RESTful HTTP communication in an asynchronous mode with a full range of HTTP methods and multicast semantics otherwise unavailable to standard clients and servers.
- May 2008** **B.Tech.** in Computer Engineering *Jamia Millia Islamia, New Delhi - India*  
*WIDE: Web Integrated Development Environment*  
 This project report describes development of a platform independent Web-based IDE that supports syntax highlighting, auto suggestion, code folding, remote compilation, and other features in various programming languages.

## Contact



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## Appointments

- 2009–Now** **ODU Research Foundation** *Norfolk, VA - USA*  
*Research Assistant*  
 While pursuing M.S. and Ph.D. programs at ODU, I was funded by ODURF as a research assistant and worked on various HTTP, Web, Social Media, Machine Learning, and Archiving related research and development projects.
- 2013–Now** **Old Dominion University** *Norfolk, VA - USA*  
*Instructor and Teaching Assistant*  
 I taught a course on Web Server Design to develop HTTP servers from scratch. I served as a teaching assistant in System Programming, Web Programming, and Discrete Structures courses. Professors gave an over all "Exceeds Expectations" remark on my work.
- 2008–2009** **Belzabar Software Design** *New Delhi - India*  
*Computer Scientist*  
 After my B.Tech., I worked at Belzabar as a developer and computer scientist on client projects including Startpage/Ixquick, Best Practice Institute, Fantasy Football Sherpa, IHitItBig, and NYC Department of Education. The CEO of the company appreciated my initiatives of the ExtJS and Ruby on Rails practice groups in the company. My colleagues gave me the "JavaScript Guru" title.
- 2006–2008** **Center for Information Technology JMI** *New Delhi - India*  
*Project Trainee*  
 I worked on LAMP stack to create Jamia Online Admission Portal to automate the admission application process in the university.

## Google Scholar

Publications 30  
 Citations 112  
 h-index 6

## Research Interests

Web Science, Data Science, Web Archiving, Digital Preservation, Machine Learning, Deep Learning, Information Retrieval, Decentralized Web, Urdu, RTL Languages, Unicode, Linux, Docker Containers

## Programming

Ruby (on Rails), Python, Go, Shell Script, R, PHP, JavaScript, HTML, CSS

## Languages

Urdu, Hindi, English, Arabic, Persian, Sanskrit, and some Indian vernaculars

# Publications

## Refereed Journals

- [1] **Web Archive Profiling Through CDX Summarization** *IJDL '16*  
Sawood Alam, Michael L. Nelson, Herbert Van de Sompel, Lyudmila Balakireva, Harihar Shankar, David S. H. Rosenthal  
*International Journal on Digital Libraries*. IJDL '16 17.3 (Sept. 2016) pp. 223–238. 2016. DOI: 10.1007/s00799-016-0184-4

## Refereed Conferences

- [1] **MementoMap Framework for Flexible and Adaptive Web Archive Profiling** *JCDL '19*  
Sawood Alam, Michele C. Weigle, Michael L. Nelson, Fernando Melo, Daniel Bicho, Daniel Gomes  
*Proceedings of the 19th ACM/IEEE-CS Joint Conference on Digital Libraries*, Urbana-Champaign, Illinois, USA, 2019. DOI: 10.1109/JCDL.2019.00033 (Extended preprint: arXiv:1905.12607)
- [2] **Archive Assisted Archival Fixity Verification Framework** *JCDL '19*  
Mohamed Aturban, Sawood Alam, Michael L. Nelson, Michele C. Weigle  
*Proceedings of the 19th ACM/IEEE-CS Joint Conference on Digital Libraries*, Urbana-Champaign, Illinois, USA, 2019. DOI: 10.1109/JCDL.2019.00032 (Extended preprint: arXiv:1905.12565)
- [3] **Unobtrusive and Extensible Archival Replay Banners Using Custom Elements** *JCDL '18*  
Sawood Alam, Mat Kelly, Michele C. Weigle, Michael L. Nelson  
*Proceedings of the 18th ACM/IEEE-CS Joint Conference on Digital Libraries*, Fort Worth, Texas, USA, 2018. DOI: 10.1145/3197026.3203881
- [4] **ArchiveNow: Simplified, Extensible, Multi-Archive Preservation** *JCDL '18*  
Mohamed Aturban, Mat Kelly, Sawood Alam, John A. Berlin, Michael L. Nelson, Michele C. Weigle  
*Proceedings of the 18th ACM/IEEE-CS Joint Conference on Digital Libraries*, Fort Worth, Texas, USA, 2018. DOI: 10.1145/3197026.3203880
- [5] **Impact of URI Canonicalization on Memento Count** *JCDL '17*  
Mat Kelly, Lulwah M. Alkwaï, Sawood Alam, Michael L. Nelson, Michele C. Weigle, Herbert Van de Sompel  
*Proceedings of the 17th ACM/IEEE-CS Joint Conference on Digital Libraries*, Toronto, Ontario, Canada, 2017. DOI: 10.1109/JCDL.2017.7991601
- [6] **Client-side Reconstruction of Composite Mementos Using ServiceWorker** *JCDL '17*  
Sawood Alam, Mat Kelly, Michele C. Weigle, Michael L. Nelson  
*Proceedings of the 17th ACM/IEEE-CS Joint Conference on Digital Libraries*, Toronto, Ontario, Canada, 2017. DOI: 10.1109/JCDL.2017.7991579
- [7] **InterPlanetary Wayback: Peer-To-Peer Permanence of Web Archives** *TPDL '16*  
Mat Kelly, Sawood Alam, Michael L. Nelson, Michele C. Weigle  
*Proceedings of the 20th International Conference on Theory and Practice of Digital Libraries*, Hannover, Germany, 2016. DOI: 10.1007/978-3-319-43997-6\_35
- [8] **Web Archive Profiling Through Fulltext Search** *TPDL '16*  
Sawood Alam, Michael L. Nelson, Herbert Van de Sompel, David S. H. Rosenthal  
*Proceedings of the 20th International Conference on Theory and Practice of Digital Libraries*, Hannover, Germany, 2016. DOI: 10.1007/978-3-319-43997-6\_10
- [9] **InterPlanetary Wayback: The Permanent Web Archive** *JCDL '16*  
Sawood Alam, Mat Kelly, Michael L. Nelson  
*Proceedings of the 16th ACM/IEEE-CS Joint Conference on Digital Libraries*, Newark, New Jersey, USA, 2016. DOI: 10.1145/2910896.2925467
- [10] **MemGator - A Portable Concurrent Memento Aggregator** *JCDL '16*  
Sawood Alam, Michael L. Nelson  
*Proceedings of the 16th ACM/IEEE-CS Joint Conference on Digital Libraries*, Newark, New Jersey, USA, 2016. DOI: 10.1145/2910896.2925452

- [11] **Web Archive Profiling Through CDX Summarization** TPDL '15  
Sawood Alam, Michael L. Nelson, Herbert Van de Sompel, Lyudmila Balakireva, Harihar Shankar, David S. H. Rosenthal  
*Proceedings of the 19th International Conference on Theory and Practice of Digital Libraries*, Poznan, Poland, 2015. DOI: 10.1007/978-3-319-24592-8\_1
- [12] **Improving Accessibility of Archived Raster Dictionaries of Complex Script Languages** JCDL '15  
Sawood Alam, Fateh ud din B. Mehmood, Michael L. Nelson  
*Proceedings of the 15th ACM/IEEE-CS Joint Conference on Digital Libraries*, Knoxville, Tennessee, USA, 2015.  
DOI: 10.1145/2756406.2756926 (Extended preprint: arXiv:1409.1284)
- [13] **Document Compression and Cipherring Using Pattern Matching Technique** MTECS '08  
Sawood Alam  
*Proceedings of the National Conference on Modern Trends in Electronics and Communication Systems*, Ali-garh, India, 2008.

## Technical Reports

- [1] **Supporting Web Archiving via Web Packaging** ESCAPE '19  
Sawood Alam, Michele C. Weigle, Michael L. Nelson, Martin Klein, Herbert Van de Sompel  
Workshop on Exploring Synergy between Content Aggregation and the Publisher Ecosystem, Internet Architecture Board, 2019. <https://www.iab.org/wp-content/IAB-uploads/2019/06/sawood-alam-2.pdf>  
(Also available as: arXiv:1906.07104)
- [2] **Impact of HTTP Cookie Violations in Web Archives** WADL '19  
Sawood Alam, Plinio Vargas, Michele C. Weigle, Michael L. Nelson  
Workshop on Web Archiving and Digital Libraries, 2019. <https://arxiv.org/abs/1906.07141>
- [3] **Web Archive Profiling Via Sampling Final Report** Project Report  
Sawood Alam, Michael L. Nelson, Herbert Van de Sompel, Lyudmila Balakireva, Harihar Shankar, Nicolas J. Bornand, David S. H. Rosenthal  
International Internet Preservation Consortium, 2016. [https://netpreserve.org/resources/IIPC\\_project-Archive\\_profiling-final\\_report.pdf](https://netpreserve.org/resources/IIPC_project-Archive_profiling-final_report.pdf)
- [4] **Support for Various HTTP Methods on the Web** CoRR '14  
Sawood Alam, Charles L. Cartledge, Michael L. Nelson  
arXiv:1405.2330, 2014. <https://arxiv.org/abs/1405.2330>
- [5] **HTTP Mailbox - Asynchronous RESTful Communication** CoRR '13  
Sawood Alam, Charles L. Cartledge, Michael L. Nelson  
arXiv:1305.1992, 2013. <https://arxiv.org/abs/1305.1992>

## Others

- [1] **Memento Compliance Audit of PyWB** Blog Post  
Sawood Alam  
Web Science and Digital Libraries Research Group Blog, 2020. <https://ws-dl.blogspot.com/2020/03/2020-03-26-memento-compliance-audit-of.html>
- [2] **TweetedAt: Finding Tweet Timestamps for Pre and Post Snowflake Tweet IDs** Blog Post  
Mohammed Nauman Siddique, Sawood Alam  
Web Science and Digital Libraries Research Group Blog, 2019. <https://ws-dl.blogspot.com/2019/08/2019-08-03-tweetedat-finding-tweet.html>
- [3] **Cookie Violations Cause Archived Twitter Pages to Simultaneously Replay in Multiple Languages** Blog Post  
Sawood Alam  
Web Science and Digital Libraries Research Group Blog, 2019. <https://ws-dl.blogspot.com/2019/03/2019-03-18-cookie-violations-cause.html>
- [4] **Unified Key Value Store** Specification Draft  
Sawood Alam, Michael L. Nelson  
2018. <https://github.com/oduwsdl/ORS/blob/master/ukvs.md>

- [5] **Tic-Tac-Toe and Magic Square Made Me a Problem Solver and Programmer** *Blog Post*  
Sawood Alam  
Web Science and Digital Libraries Research Group Blog, 2018. <https://ws-dl.blogspot.com/2018/07/2018-07-22-tic-tac-toe-and-magic-square.html>
- [6] **Client-Assisted Memento Aggregation Using the Prefer Header** *WADL '18*  
Mat Kelly, Sawood Alam, Michael L. Nelson, Michele C. Weigle  
Workshop on Web Archiving and Digital Libraries, 2018. [https://www.cs.odu.edu/~mkelly/papers/2018\\_wadl\\_preferData.pdf](https://www.cs.odu.edu/~mkelly/papers/2018_wadl_preferData.pdf)
- [7] **Cookies Are Why Your Archived Twitter Page Is Not in English** *Blog Post*  
Sawood Alam, Plinio Vargas  
Web Science and Digital Libraries Research Group Blog, 2018. <https://ws-dl.blogspot.com/2018/03/2018-03-21-cookies-are-why-your.html>
- [8] **IPNS Blockchain** *Specification Draft*  
Sawood Alam  
2018. <https://github.com/oduwsdl/IPNS-Blockchain>
- [9] **Introducing Reconstructive - An Archival Replay ServiceWorker Module** *Blog Post*  
Sawood Alam  
Web Science and Digital Libraries Research Group Blog, 2018. <https://ws-dl.blogspot.com/2018/01/2018-01-08-introducing-reconstructive.html>
- [10] **UrduTech - The GeoCities of Urdu Blogosphere** *Blog Post*  
Sawood Alam  
Web Science and Digital Libraries Research Group Blog, 2016. <https://ws-dl.blogspot.com/2016/10/2016-10-27-urdutech-geocities-of-urdu.html>
- [11] **Dockerizing ArchiveSpark - A Tale of Pair Hacking** *Blog Post*  
Sawood Alam  
Web Science and Digital Libraries Research Group Blog, 2016. <https://ws-dl.blogspot.com/2016/07/2016-07-21-dockerizing-archivespark.html>
- [12] **Memento: Help Us Route URI Lookups to the Right Archives** *Blog Post*  
Sawood Alam  
International Internet Preservation Consortium Blog, 2016. <https://netpreserveblog.wordpress.com/2016/01/08/memento-help-us-route-uri-lookups-to-the-right-archives/>
- [13] **CDXJ: An Object Resource Stream Serialization Format** *Blog Post*  
Sawood Alam  
Web Science and Digital Libraries Research Group Blog, 2015. <https://ws-dl.blogspot.com/2015/09/2015-09-10-cdxj-object-resource-stream.html>
- [14] **Profiling Web Archives for Efficient Memento Query Routing** *WADL '15*  
Sawood Alam, Michael L. Nelson, Herbert Van de Sompel, Lyudmila Balakireva, Harihar Shankar, David S. H. Rosenthal  
Workshop on Web Archiving and Digital Libraries, 2015. <http://www.ieee-tcdl.org/Bulletin/v11n2/papers/alam.pdf>
- [15] **HTTP Mailbox - Asynchronous RESTful Communication** *Masters Thesis*  
Sawood Alam  
Old Dominion University, Norfolk, VA, USA, 2013. <http://ws-dl.blogspot.com/2013/05/2013-05-09-http-mailbox-asynchronous.html>
- [16] **WIDE: Web Integrated Development Environment** *Bachelors Thesis*  
Sawood Alam, Alankrita Jethi  
Jamia Millia Islamia, Delhi, India, 2008.
- [17] **Multiplatform Online IDE/Compiler** *Algorhythm '07*  
Sawood Alam, Neha Gautam  
Jamia Millia Islamia, Delhi, India, 2007.

- Jul, 2019 **Supporting Web Archiving via Web Packaging** *Cisco, Herndon - USA*  
Presented our position paper in support of Web Packaging from the Web Archiving perspective. Later, presented the talk to the Decentralized Web community on a video call. (Slides: <https://www.slideshare.net/ibnesayeed/supporting-web-archiving-via-web-packaging>)
- Jun, 2019 **Impact of HTTP Cookie Violations in Web Archives** *UIUC, Urbana-Champaign - USA*  
Presented my research work in the WADL Workshop at JCDL '19 Conference. (Slides: <https://www.slideshare.net/ibnesayeed/impact-of-http-cookie-violations-in-web-archives>)
- Jun, 2019 **MementoMap: An Archive Profile Dissemination Framework** *UIUC, Urbana-Champaign - USA*  
Presented my research work in the WADL Workshop at JCDL '19 Conference. (Slides: <https://www.slideshare.net/ibnesayeed/mementomap-an-archive-profile-dissemination-framework>)
- Jan, 2019 **MementoMap: A Web Archive Profiling Framework for Efficient Memento Aggregation** *ODU, Norfolk - USA*  
Presented my MementoMap research progress on Dr. Edward Fox's ODU visit from VT.
- Aug, 2018 **InterPlanetary Wayback: The Next Step Towards Decentralized Archiving** *Colorbloq, San Francisco - USA*  
Gave an extended talk on the issues and potential solutions towards a truly Decentralized Web Archiving system in the IPFS Lab Day. (Slides: <https://www.slideshare.net/ibnesayeed/interplanetary-wayback-the-next-step-towards-decentralized-web-archiving-108525567>)
- Jul, 2018 **IPWB: A Distributed and Persistent Archival Replay System Using IPFS** *Internet Archive, San Francisco - USA*  
Presented InterPlanetary Wayback (IPWB) in the Science Fair of the Decentralized Web Summit in the IA Headquarters then gave a lightning talk in the San Francisco Mint. (Report: <https://ws-dl.blogspot.com/2018/11/2018-11-08-decentralized-web-summit.html>)
- Jul, 2018 **Decentralized Web Archiving** *Mozilla, San Francisco - USA*  
Steered Decentralized Web Archiving session in the IndieWebCamp SF and demonstrated MemGator and IPWB. (Report: <https://ws-dl.blogspot.com/2018/11/2018-11-08-decentralized-web-summit.html>)
- Jun, 2018 **Introducing Programming, Problem Solving, and Research to High Schoolers** *ODU, Norfolk - USA*  
Gave a lecture to High School students of the Hampton Roads metropolitan region in the Machine Learning and Data Science Summer Camp. Apart from telling them the story of my first software program, I also introduced them to Docker and Web Archiving. (Report: <https://ws-dl.blogspot.com/2018/07/2018-07-22-tic-tac-toe-and-magic-square.html>)
- Jun, 2018 **Client-Assisted Memento Aggregation Using the Prefer Header** *UNT HSC, Fort Worth - USA*  
Co-presented our exploratory research work in the WADL Workshop at JCDL '18 Conference. (Slides: <https://www.slideshare.net/matkelly01/clientassisted-memento-aggregation-using-the-prefer-header>)
- Jun, 2018 **A Survey of Archival Replay Banners** *UNT HSC, Fort Worth - USA*  
Gave a lightning talk accompanying a poster in the WADL Workshop at JCDL '18 Conference.
- Nov, 2017 **Introducing Docker - Application Containerization and Service Orchestration** *ODU, Norfolk - USA*  
Gave a colloquium talk to introduce Docker and micro-services in the CS Department of ODU. (Report: <https://ws-dl.blogspot.com/2017/12/2017-12-03-introducing-docker.html>)
- Aug, 2017 **Introducing Web Archiving and Docker** *ODU, Norfolk - USA*  
Gave a talk on Web Archiving and Docker to interns from India visiting ODU for a Summer Workshop. (Report: <https://ws-dl.blogspot.com/2017/08/2017-08-14-introducing-web-archiving.html>)
- Jun, 2017 **Intersection of Occupy Wall Street Movement Records in Archives** *British Library, London - UK*  
Presented our findings on the archival coverage and overlap of Occupy Wall Street movement in various collections and social media in the Archives Unleashed 4.0 datathon. (Report: <https://ws-dl.blogspot.com/2017/07/2017-07-19-archives-unleashed-40-web.html>)
- Jun, 2017 **Avoiding Zombies in Archival Replay Using ServiceWorker** *British Library, London - UK*  
Gave a lightning talk on my research work in the Archives Unleashed 4.0 datathon. Later, presented it again in the WADL Workshop at JCDL '17 Conference. (Slides: <https://www.slideshare.net/ibnesayeed/avoiding-zombies-in-archival-replay-using-serviceworker>)

- Feb, 2017 **Good News/Bad News** *Internet Archive, San Francisco - USA*  
Demonstrated a machine learning based system to explore local news in the Archives Unleashed 3.0 datathon. (Report: <https://ws-dl.blogspot.com/2017/03/2017-03-7-archives-unleashed-30-web.html>)
- Jul, 2016 **Introducing Web Archiving and WSDL Research Group** *ODU, Norfolk - USA*  
Gave a talk on Web Archiving and higher studies to interns from India visiting ODU for a Summer Workshop. (Report: <https://ws-dl.blogspot.com/2016/09/2016-09-27-introducing-web-archiving-in.html>)
- Jun, 2016 **Archive X-Ray - Web Archive Profiling for Efficient Memento Aggregation** *Rutgers, New Brunswick - USA*  
Presented my research progress in the JCDL '16 Doctoral Consortium workshop. In September, 2016, I presented my progress again in the TPDL '16 Doctoral Consortium workshop.
- Jun, 2016 **Dockerize Your Projects - A Brief Introduction to Containerization** *WSDL ODU, Norfolk - USA*  
Gave an introductory overview of Docker to my research fellows in our research lab at ODU. (Slides: <https://www.slideshare.net/ibnesayeed/dockerize-your-projects-a-brief-introduction-to-containerization>)
- Mar, 2016 **InterPlanetary Wayback (IPWB)** *Uni. of Toronto, Toronto - Canada*  
Demonstrated newly developed archival replay system (IPWB) utilizing IPFS in the Archives Unleashed 1.0 datathon. (Report: <https://ws-dl.blogspot.com/2016/03/2016-03-07-archives-unleashed-web.html>)
- Mar, 2016 **MemGator - A Memento Aggregator CLI and Server in Go** *Uni. of Toronto, Toronto - Canada*  
Introduced newly developed portable Memento aggregator tool in the Archives Unleashed 1.0 datathon. Later, demonstrated enhanced capabilities in the Archives Unleashed 2.0 datathon in June, 2016, at the Library of Congress. (Slides: <https://www.slideshare.net/ibnesayeed/memgator-a-memento-aggregator-cli-and-server-in-go>)
- Oct, 2015 **Archive X-Ray - Web Archive Profiling for Efficient Memento Aggregation** *CS Dept. ODU, Norfolk - USA*  
Presented my research progress to other fellow researchers in the monthly PhD Gathering.
- Sep, 2015 **Web Archiving: A Brief Introduction** *Magdeburg-Stendal University, Magdeburg - Germany*  
Invited for the Lunch Lecture to introduce Web Archiving and our WSDL Research Group to the SPiRiT Research Group in Germany. (Report: <https://ws-dl.blogspot.com/2015/09/2015-09-30-digital-preservation.html>)
- Apr, 2015 **Archive Profile Serialization** *Stanford University, Palo Alto - USA*  
Presented Archive Profile serialization approaches and issues in the IIPC General Assembly 2015. (Slides: <https://www.slideshare.net/ibnesayeed/profiling-serialization-iipcga15>)
- Apr, 2015 **Profiling Web Archives** *Internet Archive, San Francisco - USA*  
Presented my research work in the IIPC General Assembly 2015. Subsequently, I present my research progress on this in the WADL Workshop at JCDL '15 Conference in June, 2015, and on Dr. Herbert Van de Sompel's ODU visit from LANL in August, 2015. (Slides: <https://www.slideshare.net/ibnesayeed/profiling-webarchives-iipcga15>)
- Oct, 2014 **Web Archiving: A Brief Introduction** *Jamia Millia Islamia, New Delhi - India*  
Introduce Web Archiving and our WSDL Research Group to the B.Tech. students of the Computer Engineering Department of Jamia Millia Islamia as an alumnus. (Slides: <https://www.slideshare.net/ibnesayeed/web-archiving-introduction>)
- May, 2013 **Media Roundtable on UNICEF India's Campaign on Open Defecation** *UNICEF, New Delhi - India*  
Invited as a media representative from UrduWeb to discuss about the Open Defecation issue in India.
- Nov, 2013 **Envision the Future of Urdu** *National Council for Promotion of Urdu Language, New Delhi - India*  
Met the director of NCPUL and an Urdu journalist to discuss the future of the Urdu language on the Web and outline some Urdu related research and development project ideas.
- Nov, 2013 **Urdu Media Editors' Conference on Innovations in Education** *UNICEF & Shikhar, New Delhi - India*  
Invited as a media representative from UrduWeb to discuss about the Innovations in Education.

Nov, 2013	<b>Urdu in Digital Era and UrduWeb</b> Invited as the chief guest in an extended lecture organized jointly by the Center for Information Technology and the Urdu Departments of JMI University to talk about the current state of the Urdu language and the role of UrduWeb in promoting Urdu on the Web. (Slides: <a href="https://www.urduweb.org/slides/">https://www.urduweb.org/slides/</a> )	<i>Jamia Millia Islamia, New Delhi - India</i>
Nov, 2013	<b>HTTP Mailbox - Asynchronous Restful Communication</b> Presented my Masters research work to the final year B.Tech. students of the Computer Engineering Department of Jamia Millia Islamia as an alumnus. (Slides: <a href="https://www.slideshare.net/ibnesayeed/httpmailbox">https://www.slideshare.net/ibnesayeed/httpmailbox</a> )	<i>Jamia Millia Islamia, New Delhi - India</i>
Oct, 2013	<b>Path to Graduate Studies</b> Gave an extended lecture to the Senior School (also known as Intermediate) students from Maths and Biology majors to motivate and guide them for graduate studies in their respective majors.	<i>Rais Ahmad Inter College, Itwa, Siddhartha Nagar - India</i>
Apr, 2013	<b>Visualizing Growing Network Live</b> Demonstrated my realtime and replayed network visualization tool called "Preserve Me! Viz" to the students of Information Visualization course.	<i>Old Dominion University, Norfolk - USA</i>
Oct, 2012	<b>Ruby on Rails - An Introduction to MVC</b> Presented the Model-View-Controller (MVC) application design paradigm in Ruby on Rails to the student members of the ACM group. (Slides: <a href="https://www.slideshare.net/ibnesayeed/ruby-on-rails-12521223">https://www.slideshare.net/ibnesayeed/ruby-on-rails-12521223</a> )	<i>ODU ACM, Norfolk - USA</i>
Apr, 2012	<b>Ruby on Rails - A Quick Walkthrough</b> Presented a quick walkthrough of Ruby on Rails to the student members of ACM group. (Slides: <a href="https://www.slideshare.net/ibnesayeed/ruby-on-rails-12521223">https://www.slideshare.net/ibnesayeed/ruby-on-rails-12521223</a> )	<i>ODU ACM, Norfolk - USA</i>
Jan, 2009	<b>Rapid Web Development - RoR</b> Presented and demonstrated rapid web application development using Ruby on Rails.	<i>Acharya Narendra Dev College, New Delhi - India</i>
Jun, 2008	<b>Kashmiri Localisation Workshop</b> I was a speaker at a two day workshop on Kashmiri localization where I shared my experience with Urdu localization of Linux and other software in general. I also shared some tools and guides to get started with the software localization process and motivated students to collaborate in such projects to make computing easier in their local language.	<i>University of Kashmir, Srinagar - India</i>
Jun, 2008	<b>Rapid Web Development with Frameworks: Ruby/RoR</b> Presented Ruby on Rails as a rapid web application development framework.	<i>IPEC, Ghaziabad - India</i>
May, 2008	<b>Local Language Computing</b> Organized a workshop and presented my Urdu GNOME Linux Desktop localization work.	<i>Jamia Millia Islamia, New Delhi - India</i>
Mar, 2008	<b>Hindi, Kashmiri, and Urdu Localisation</b> Attended the project review meeting at Sarai where I gave feedback on Hindi localization and speech-to-text and presented my progress on Urdu GNOME Linux Desktop localization work.	<i>Sarai, CSDS, New Delhi - India</i>

## Teaching

2020	<b>Cloud Computing and Amazon Web Services</b> Gave a guest lecture on getting started with cloud computing instances on AWS in the Research Methods in Data and Web Science course.	<i>Old Dominion University, Norfolk - USA</i>
2020	<b>Introduction to LaTeX/Overleaf</b> Gave a guest lecture on the basics of LaTeX in the Research Methods in Data and Web Science course. I covered topics of the document structure, common commands and macros, packages, mathematical equations, citation management, and compilation from the command line as well as in the online Overleaf IDE. Finally, I illustrated how to write a scientific research paper.	<i>Old Dominion University, Norfolk - USA</i>
2020	<b>Linux Command Line Interface</b> Gave a guest lecture on Linux CLI basics in the Research Methods in Data and Web Science course. I covered various commonly used commands, purpose of various I/O streams, redirection, conventions of CLI, and effective use many Unix tools for data wrangling.	<i>Old Dominion University, Norfolk - USA</i>



2019	<b>CS 431/531 Web Server Design</b> I offered a course to develop a standard compliant HTTP Web Server from scratch. Lectures included both theoretical and applied HTTP topics (full lectures list: <a href="https://cs531-f19.github.io/lectures/">https://cs531-f19.github.io/lectures/</a> ). I created an HTTP server testing framework and leveraged modern tools like Git and Docker to set up an automated workflow for deployment and evaluation of student projects (Deployer and Tester: <a href="https://cs531.cs.odu.edu/">https://cs531.cs.odu.edu/</a> ).	<i>Old Dominion University, Norfolk - USA</i>
2018	<b>Coding for Elementary School</b> Served as a volunteer coding teacher in a weekend school where I leveraged Block programming lessons from the Code.org <a href="https://code.org/educate/curriculum/elementary-school">https://code.org/educate/curriculum/elementary-school</a> ).	<i>Al-Iman Islamic School, Norfolk - USA</i>
2018	<b>HTTP Method Support</b> Gave a guest lecture to describe my prior research work about the support of various HTTP methods on the Web in the Web Server Design course.	<i>Old Dominion University, Norfolk - USA</i>
2018	<b>HTTPMailbox - Asynchronous RESTful Communication</b> Gave a guest lecture to describe my Masters thesis on indirect communication using HTTP in the Web Server Design course.	<i>Old Dominion University, Norfolk - USA</i>
2018	<b>Web ARChive File Format, Indexing, and Replay</b> Gave a guest lecture to describe WARC files in the Web Server Design course (Slides: <a href="https://www.slideshare.net/ibnesayed/web-archive-warc-file-format">https://www.slideshare.net/ibnesayed/web-archive-warc-file-format</a> ).	<i>Old Dominion University, Norfolk - USA</i>
2018	<b>Application Containerization and Microservice Orchestration</b> I created a self-paced online course with step-by-step interactive examples to learn basics of application containerization using Docker and gradually evolving the application as a composed orchestration of micro-services (Interactive course: <a href="https://training.play-with-docker.com/microservice-orchestration/">https://training.play-with-docker.com/microservice-orchestration/</a> ).	<i>Play With Docker Classroom - Online</i>
2018	<b>Introduction to Docker</b> Gave a guest lecture in the Web Server Design course. Later, I was invited to repeat the lecture in various courses including Web Programming, Professional Workforce Development, and Research Methods in Data and Web Science.	<i>Old Dominion University, Norfolk - USA</i>
2016	<b>Introduction to Python</b> Gave a guest lecture on Python in the Web Science course multiple times in successive years (Slides: <a href="https://cs531-f19.github.io/slides/lecture-05-python.pdf">https://cs531-f19.github.io/slides/lecture-05-python.pdf</a> ).	<i>Old Dominion University, Norfolk - USA</i>
2016	<b>Senior Research Projects and Professional Workforce Development</b> I mentored and evaluated various teams and projects of CS 410/411 course since 2016.	<i>Old Dominion University, Norfolk - USA</i>
2015	<b>Web Development: Usability, Aesthetics, and Good Practices</b> Gave a guest lecture in the Web Programming course (Slides: <a href="https://www.cs.odu.edu/~salam/cs418/slides/">https://www.cs.odu.edu/~salam/cs418/slides/</a> ).	<i>Old Dominion University, Norfolk - USA</i>
2014	<b>Mathematical Induction</b> Gave a guest lecture in the Introduction to Discrete Structures course.	<i>Old Dominion University, Norfolk - USA</i>
2007	<b>Automata Theory Crash Course</b> I offered extended lectures during my undergrad to help my classmates revise and prepare for finals.	<i>Jamia Millia Islamia, New Delhi - India</i>
2007	<b>Algorithm Design Crash Course</b> I offered extended lectures during my undergrad to help my classmates revise and prepare for finals.	<i>Jamia Millia Islamia, New Delhi - India</i>

## Grants

2007	<b>Urdu OCR</b> During my undergrad, I received a research grant under FLOSS Fellowship Program from Sarai-CSDS for initial exploration of Optical Character Recognition in Urdu (a complex-script right-to-left language).	<i>RGF-Sarai, New Delhi - India</i>
2006	<b>Urdu Localization of GNOME</b> During my undergrad, I received a research grant under FLOSS Fellowship Program from Sarai-CSDS for Urdu Localization of GNOME Desktop and to spread awareness about opens-source software localization.	<i>RGF-Sarai, New Delhi - India</i>



## Memberships

Active	<b>ACM and ACM-SIGIR Student Member</b> I am an ACM member since 2015. I have also been a member of ACM SIGIR (Special Interest Group on Information Retrieval) since 2017.	<i>Association for Computing Machinery</i>
Active	<b>IIPC Member</b> IIPC does not offer membership for individuals, but the Old Dominion University is a member organization and I am among a few to represent ODU in IIPC. I have worked on IIPC-funded projects, attended their annual General Assembly, regularly participate in their online events and meetings, engage in ongoing members-only conversations, and actively contribute to various IIPC projects to support digital preservation.	<i>International Internet Preservation Consortium</i>
Past	<b>LUG Member</b> I have been an active member of Linux Users' Groups of various cities and universities in the past and lead a couple of those. As a Linux and Open Source Software enthusiast I organized many events and participated in various activities to promote Linux and OSS.	<i>Various GNU/Linux Users' Groups</i>
Past	<b>CSI Student Member</b> During my undergrad years I have become a CSI member and served it as a vice-chair for a year. I organized various events, workshops, trips, and annual festivals in the college.	<i>Computer Society of India</i>

## Awards

2020	<b>Preparing Future Faculty Certificate</b> I received the PFF certificate as part of the academic career preparation.	<i>Old Dominion University, Norfolk - USA</i>
2019	<b>Graduate Teaching Assistant Instructors' Institute</b> I completed this certification as a requirement for offering a course as the primary instructor.	<i>Old Dominion University, Norfolk - USA</i>
2019	<b>SPEAK Test</b> I passed the Speaking Proficiency English Assessment Kit Test with the highest scale, described as, "communication almost always effective".	<i>Old Dominion University, Norfolk - USA</i>
2019	<b>Best Paper Award Nominee</b> MementoMap Framework for Flexible and Adaptive Web Archive Profiling.	<i>JCDL '19, Urbana-Champaign - USA</i>
2018	<b>Best Poster Award</b> ArchiveNow: Simplified, Extensible, Multi-Archive Preservation.	<i>JCDL '18, Fort Worth - USA</i>
2017	<b>Docker Certified Associate</b> I was among the first few people to receive this certification during the beta testing of the Docker Certification program.	<i>Docker Certifications - Online</i>
2017	<b>Best Poster Award</b> Impact of URI Canonicalization on Memento Count.	<i>JCDL '17, Toronto - Canada</i>
2015	<b>Distinguished Alumnus</b> The Department of Computer Engineering recognized me among a few distinguished alumni in its evaluation report.	<i>Jamia Millia Islamia, New Delhi - India</i>
2007	<b>Distinguished Problem Solver</b> A professor awarded me for my exceptional performance in his Algorithm Design course.	<i>Jamia Millia Islamia, New Delhi - India</i>
2007	<b>3rd Prize in Technical Paper Presentation Contest</b> I won the third prize in Algorhythm '07, an All India Techno-cultural Festival of the Computer Society Of India.	<i>Jamia Millia Islamia, New Delhi - India</i>
2006	<b>1st Prize in Linux Awareness Quiz Contest</b> I won the first prize in a quiz contest of the Freedel '06 event organized by Delhi's chapter of Indian Linux Users Group.	<i>Freedel, Delhi - India</i>
2005	<b>2nd Prize in Talent Hunt Contest</b> I won the second prize in the talent hunt contest of Algorhythm '05, an All India techno-cultural festival of the Computer Society Of India.	<i>Jamia Millia Islamia, New Delhi - India</i>

2004	<b>30<sup>th</sup> Rank in UPTU Engineering Entrance Test</b> Rubic's Rostrum Institute awarded me for securing 30 <sup>th</sup> rank in a highly competitive engineering entrance examination among over 200,000 applicants.	<i>Rubic's Rostrum, Lucknow - India</i>
1997	<b>Electrician Wireman</b> I received a diploma certificate in Electrician Wireman as a part time course during my middle school years. I was recognized as the youngest topper of the batch.	<i>Khair Technical Centre, UP - India</i>

## Services

Active	<b>Reviewer, JASIST</b> I reviewed various submissions in the journal and provided detailed feedback.	<i>Journal of the Association for Information Science and Technology</i>
Active	<b>Program Committee Member, JCDL</b> I reviewed many JCDL submissions since 2012 and continue to serve this conference.	<i>ACM/IEEE Joint Conference on Digital Libraries</i>
Active	<b>Volunteer Developer, arXiv</b> I contributed to the codebase that powers arXiv e-print server and participated in its private developer conversations.	<i>An Open Access ePrint Archive for Scholarly Articles</i>
Active	<b>Administrator, WSDL Research Group's Services and Infrastructure</b> A few years after joining the Web Science and Digital Libraries Research Group I started taking the responsibility of managing many of its services gradually. I re-architected its service deployment infrastructure to leverage modern tools (such as Docker, Git, and CI/CD systems) that enable better automation and scaling. I administer WSDL's GitHub organization ( <a href="https://github.com/oduwsdl">https://github.com/oduwsdl</a> ), Slack, data sets, and almost a dozen publicly accessible Web archiving related services. I am readily available to discuss research issues of other colleagues, help them by pointing to the right tools and technology, suggest algorithmic optimizations, and discuss new ideas for potential collaborations.	<i>Old Dominion University, Norfolk - USA</i>
Active	<b>Administrator, UrduWeb</b> UrduWeb is a premier online Urdu community portal ( <a href="https://www.urduweb.org/">https://www.urduweb.org/</a> ), which is promoting Unicode Urdu on the Web since 2005. In the early days Unicode Urdu was rare on the Web, support for Urdu in software was poor, and people were lacking awareness of writing and consuming Urdu content. I joined UrduWeb in 2008 and soon became an administrator. Since then I contributed to and lead many projects, such as, Discussion Forums, Urdu Literature, UrduWeb Digital Library, Urdu Encyclopedia, Font Server, Blog Aggregator, Typography, Urdu Dictionary, Software Localization, Urdu Keyboard, and Book Digitization System to name a few. While I still maintain its servers, I have offloaded community management tasks to other members so that I can focus on the big picture and long-term goals and plans.	<i>A Unicode Urdu Language Portal, Online</i>
Past	<b>Campus Ambassador, Docker</b> Docker Inc. appointed me as the Campus Ambassador for ODU to spread the word about Docker (a Linux container technology) in academia.	<i>Old Dominion University, Norfolk - USA</i>
Past	<b>Co-founder, MetaSpiders</b> I co-founded this company with a college during my undergrad years and worked on a few client projects. After I moved to the US for higher studies I could not give enough time to the company to sustain it.	<i>A Web Development Company, Online</i>
Past	<b>Founding President, ODU Linux Users' Group</b> Soon after joining ODU in the MS program I founded the ODU-LUG student organization. However, my priorities have changed when I moved to the PhD program.	<i>Old Dominion University, Norfolk - USA</i>
Past	<b>Chairperson, JMI GNU/Linux Users' Group</b> I was among the founding members of this LUG and served as the chairperson during the last year of my undergrad. I organized various events in the college to promote Open Source Software and Linux.	<i>Jamia Millia Islamia, New Delhi - India</i>
Past	<b>Vice-chairperson, Computer Society of India - JMI Student Chapter</b> In the last year of of my undergrad I was elected as the vice-chair of the CSI-JMI student organization. Both before and during my lead role I actively participated in the activities of the group and organized various events and college trips. I played a vital role in its annual techno-cultural festivals in planning and managing various aspects of the event. I also served it as the maintainer of its web site for many years.	<i>Jamia Millia Islamia, New Delhi - India</i>

Past	<b>Volunteer, Media Center Cyber Cafe</b> <i>India Social Forum '06, New Delhi - India</i> I was a member of the team that set up over 60 computers by installing Linux OS on them and configuring networks to provide Internet access to the delegates from all around the globe.
Past	<b>Technical Advisor, Urdu Kidz Cartoon</b> <i>Kids' Cartoon Portal, Online</i> I am an honorary member of the team behind this Urdu comics portal. In the early days of its establishment I advised them on the matters related to usability, aesthetics, and search engine optimization. <a href="https://www.urdukidzcartoon.com/">https://www.urdukidzcartoon.com/</a>
Past	<b>Technical Advisor, Asia Times</b> <i>Urdu News Portal, Online</i> In the early days of this born-digital news portal I advised them about their site design, outreach and promotions, and financial sustainability models online. <a href="http://www.asiatimes.co.in/">http://www.asiatimes.co.in/</a>
Past	<b>Editor-in-chief, Izhar-e-Haq</b> <i>Urdu Monthly Magazine - India</i> A friend of mine and I registered the name of this magazine (which means, the expression of truth) with the Office of Registrar of Newspapers for India during my undergrad years. Unfortunately, we could not sustain the magazine for too long as our academic priorities have changed.
Past	<b>Co-editor, Samt</b> <i>Quarterly Urdu Webzines, Online</i> Samt is a born-digital Urdu magazine, online since 2005. I served it for almost a decade and primarily helped it in the technical matters. <a href="http://samt.bazmeurdu.net/">http://samt.bazmeurdu.net/</a>

## Projects

Active	<b>IPFS Setup Action</b> <i>IPFS, JavaScript, CI/CD, GitHub Action</i> A cross-platform GitHub Action to easily setup go-ipfs in CI/CD pipelines for testing Distributed Applications (DApps) that rely on InterPlanetary File System (IPFS). <a href="https://github.com/marketplace/actions/ipfs-setup-action">https://github.com/marketplace/actions/ipfs-setup-action</a>
Active	<b>AccessLog Parser</b> <i>Python Module, CLI</i> A Web server access log parser and CLI tool with added features for web archive replay logs. <a href="https://github.com/oduwsdl/accesslog-parser">https://github.com/oduwsdl/accesslog-parser</a>
Complete	<b>TweetedAt</b> <i>JavaScript, Python, CLI</i> TweetedAt tells the time of a Tweet based on its Iweet ID accurately for post-Snowflake implementation and projected estimate for older Tweets. <a href="https://github.com/oduwsdl/tweetedat">https://github.com/oduwsdl/tweetedat</a>
Complete	<b>Fixity Manifest Server</b> <i>Python, Server</i> A server to host and distribute atomic manifest files and blocks for archival fixity. <a href="https://github.com/oduwsdl/manifest">https://github.com/oduwsdl/manifest</a>
Active	<b>WSDLThesis</b> <i>LaTeX Document Class, Thesis/Dissertation Template</i> A thesis/dissertation LaTeX template primarily created form the WSDL Research Group, but other people from the Old Dominion University found it useful. <a href="https://github.com/oduwsdl/wsdldthesis">https://github.com/oduwsdl/wsdldthesis</a>
Active	<b>MementoMap</b> <i>Python Module, CLI</i> An tool to summarize Web archive holdings efficiently and perform prefix lookups using binary search on file. <a href="https://github.com/oduwsdl/MementoMap">https://github.com/oduwsdl/MementoMap</a>
Active	<b>WebServer Tester</b> <i>HTTP Testing Framework, Python Module, Server, CLI</i> An HTTP server testing and Docker-based deployment system with various test suites, primarily created for the CS 531 (Web Server Design) course projects. Later, this framework was listed on the HTTP Testing Resources page ( <a href="https://github.com/httpwg/wiki/wiki/HTTP-Testing-Resources">https://github.com/httpwg/wiki/wiki/HTTP-Testing-Resources</a> ) of the IETF HTTP Working Group. <a href="https://github.com/ibnesayeed/webserver-tester">https://github.com/ibnesayeed/webserver-tester</a>
Active	<b>Reconstructive</b> <i>JavaScript, ServiceWorker, Custom Elements, Archival Replay, Replay Banner</i> A ServiceWorker module for client-side reconstruction of composite mementos by rerouting resource requests to corresponding archived copies. It also provides a Custom HTML Element-based archival replay banner. <a href="https://oduwsdl.github.io/Reconstructive/">https://oduwsdl.github.io/Reconstructive/</a>

Active	<b>InterPlanetary Wayback (IPWB)</b> A distributed and persistent archive replay system using IPFS. The tool was created during the Archives Unleashed 1.0 event. Later, it was recognized by the IPFS community. As a result Protocol Labs co-sponsored my participation in the Decentralized Web Summit '18. <a href="https://github.com/oduwsdl/ipwb">https://github.com/oduwsdl/ipwb</a>	<i>Python, Archival Replay, Server</i>
Active	<b>MemGator</b> A cross-platform concurrent Memento Aggregator CLI and server. <a href="https://github.com/oduwsdl/MemGator">https://github.com/oduwsdl/MemGator</a>	<i>Go, Memento Aggregator, Server, CLI</i>
Active	<b>Classifier Reborn</b> A general classifier module to allow Bayesian and other types of classifications. I re-architected its Bayesian Classifier implementation to support flexible persistent backends and implemented Memory and Redis backends. In addition, I added a modular validation component for classifiers and revamped the documentation. <a href="https://jekyll.github.io/classifier-reborn/">https://jekyll.github.io/classifier-reborn/</a>	<i>Ruby, Classifier, Naive Bayes</i>
Past	<b>Archive-It@ODU</b> The Internet Archive shared over 300 TB of its Archive-It data with ODU for a dark mirror (inaccessible outside the university) in 2014. I index it and set up a protected archival replay server.	<i>Dark Archie, Mirror, Web Archival Replay</i>
Stalled	<b>Farhang Explorer</b> A multi-lingual dictionary explorer that enables quick definition lookup in scanned raster images of old dictionaries.	<i>JavaScript, ExtJS, Multi-lingual Dictionary, Scanned Dictionary Explorer</i>
Complete	<b>HTTPMailbox</b> Mailbox for HTTP Messages to enable Asynchronous RESTful communication and group communication over HTTP. <a href="https://github.com/ibnesayeed/HTTPMailbox">https://github.com/ibnesayeed/HTTPMailbox</a>	<i>Ruby, HTTP, Asynchronous Communication, Server</i>
Complete	<b>Preserve Me!</b> I implemented a framework of decentralized preservation in which digital objects communicate with each other asynchronously to form a Friend of a Friend (FoaF) linked data graph and preserve copies of each other. I have also created an interactive visualization tool to monitor and replay activities in the network. <a href="https://ws-dl.blogspot.com/2013/10/2013-10-23-preserve-me-if-you-can-using.html">https://ws-dl.blogspot.com/2013/10/2013-10-23-preserve-me-if-you-can-using.html</a>	<i>Ruby, JavaScript, Decentralized Digital Preservation, Visualization</i>
Complete	<b>Moment.js Urdu Translation</b> I contributed the Urdu translation of this popular date and time parsing and formatting library. <a href="https://github.com/moment/moment/blob/develop/src/locale/ur.js">https://github.com/moment/moment/blob/develop/src/locale/ur.js</a>	<i>JavaScript, Natural Language DateTime, Localization, i18n, Urdu</i>
Complete	<b>XenForo Urdu Translation</b> I translated thousands of public-facing strings of XenForo to use in UrduMehfil and provided its copies to Urdu forum admins on demand. <a href="https://www.urduweb.org/mehfil/">https://www.urduweb.org/mehfil/</a>	<i>PHP, Forum, Localization, i18n, Urdu</i>
Complete	<b>Archive-It K12 Explorer</b> A tool to load Archive-It's K12 collections for enhanced navigation, filtering, thumbnails, and diff lookup. <a href="http://k12arch.herokuapp.com/">http://k12arch.herokuapp.com/</a>	<i>JavaScript, ExtJS, Archive Explorer, HTML Diff</i>
Complete	<b>UrduWeb Digital Library</b> A system to volunteer-driven digitization of books, formatting, metadata creation, and publishing in Unicode Urdu. <a href="http://www.urdulibrary.org/">http://www.urdulibrary.org/</a>	<i>Ruby, Digital Library, Book Digitization</i>
Complete	<b>UrduWeb Font Server</b> An interactive Urdu font collection explorer. <a href="http://font.urduweb.org/">http://font.urduweb.org/</a>	<i>JavaScript, ExtJS, Urdu Fonts</i>
Past	<b>Chesapeake Bay Program</b> Old Dominion University collects data to support the objectives of the Virginia Department of Environmental Quality. They used an old desktop software to store data in FoxPro in the past. I was tasked to port the application over to a PHP-based Web application with added features like authentication and authorization and migrate the database to Oracle. <a href="http://www.sci.odu.edu/chesapeakebay/project5/index.php">http://www.sci.odu.edu/chesapeakebay/project5/index.php</a>	<i>PHP, Oracle, Research Database</i>
Past	<b>Startpage</b> Startpage (earlier branded as Ixquick) is a privacy-preserving metasearch engine that I worked on during my job at Belzabar Software. My contribution primarily included work on some long-standing JavaScript issues and exploration of an efficient privacy-preserving search suggestion system. <a href="https://www.startpage.com/">https://www.startpage.com/</a>	<i>Perl, JavaScript, Metasearch Engine</i>

Complete	<b>WIDE</b> Web-based Integrated Development Environment was my Bachelors degree project. It included features like syntax highlighting, code folding, remote compilation, remote execution. This was implemented in 2008 when Web-based text editors were not common.	<i>Ruby, JavaScript, IDE</i>
Complete	<b>HITS Algorithm Simulator</b> A simple simulation of HITS Algorithm to illustrate of the convergence of values. <a href="https://www.cs.odu.edu/~salam/hub_auth.html">https://www.cs.odu.edu/~salam/hub_auth.html</a>	<i>JavaScript, Hub and Authority, Simulator</i>
Past	<b>Jamia Admission Portal</b> I worked on this project as a trainee in the Centre for Information Technology, Jamia Millia Islamia. The goal was to implement a custom system to enable admission applications online. The project was completed, but was not deployed as the university moved to a different content management system by the time it was ready.	<i>PHP, MySQL, Web Application</i>
Complete	<b>JPlayer</b> This was a 3-day group project during my undergrad in which we implemented a Web-based music streaming system. The application had multiple channels to choose from and the songs were prioritized in the queue in each channel based on votes, which would reset to zero after the playback of the song.	<i>JavaScript, PHP, VLC, Music Streaming, Social Radio</i>
Complete	<b>Tic-Tac-Toe</b> This was the very first application I wrote in the early years of my undergrad after learning fundamentals of programming. One day, it occurred to me that I can leverage Magic Square logic to decide potential winning moves of Tic-Tac-Toe. I wanted to implement it with GUI, so I ended up learning Visual Basic for it. <a href="https://ws-dl.blogspot.com/2018/07/2018-07-22-tic-tac-toe-and-magic-square.html">https://ws-dl.blogspot.com/2018/07/2018-07-22-tic-tac-toe-and-magic-square.html</a>	<i>Visual Basic, Game, Magic Square</i>