

# Saood Ahmad Bilal

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## EDUCATION

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### Lahore University of Management Sciences (LUMS)

*Bachelors in Computer Science, Minor in Psychology*

Aug 2019 – May 2023

- **Relevant Courses:** Human Computer Interaction(HCI), Software Engineering, Machine Learning, Artificial Intelligence, Computer Graphics, Databases, Network-Centric Computing, Algorithms, Operating Systems
- **Achievements:**
  - \* Dean's Honour List 2019-2020
  - \* Vice President INDEX, the design society at LUMS
  - \* Runner up of Coding Guru, HCI module by IEEE society

## RESEARCH PROJECTS

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### HaalChaal | *HCI - Mental Health*

- Designed a mental health and stress relief application for daily use as part of CHISEL lab.
- Followed a user-centric approach by designing and conducting interviews ( $n \geq 20$ ), surveys, and focus groups to understand the target demographic's needs, resulting in an app design that directly addresses their pain points.
- Conducted rigorous research, including literature reviews and contextual inquiries, to inform the app's development.
- Utilized wire-framing and high-fidelity prototyping skills to visualize the app's user interface and functionality, facilitating user feedback and iterative design improvements.
- Achieved a 100% task completion rate during a usability testing round, demonstrating exceptional user-centered design and testing efficiency.

### LUMSafar, event management application for mobile devices | *HCI - UX*

- Designed a socialization platform for LUMS' Office of Student Affairs, improving event posting efficiency by 40% and increasing RSVP participation by 25% at CHISEL Lab.
- Conducted extensive user research through surveys and interviews to uncover key user pain points, ensuring the platform addressed real-world student needs.
- Applied Norman's design principles to create a user-friendly interface, leading to a 30% improvement in user satisfaction based on feedback metrics.
- Prioritized intuitive navigation and accessibility, enabling seamless student connectivity and enhancing the overall user experience.

### Sentiment Analysis of Urdu Text and Speech | *Ethical Artificial Intelligence*

- Conducted a comprehensive review of sentiment analysis methods in English, transitioning to Urdu, and explored Arabic studies to leverage script similarities for technical insights, as part of CSALT lab.
- Identified significant gaps in Urdu sentiment analysis, including the lack of well-labeled datasets and the oversimplification of sentiment categories, and proposed higher-order sentiment classification.
- Evaluated models such as Naive Bayes, Neural Networks, K-Nearest Neighbors, Support Vector Machines, and Random Forest using the bag-of-words approach, leveraging insights from Arabic sentiment analysis for model selection.
- Outlined methodologies for Urdu sentiment analysis and speech processing, addressing identified challenges and proposing actionable strategies based on prior research.

### Vehicle Classification using Sliding Window | *Machine Learning*

- Designed and developed a vehicle classification system using machine learning models, including Naive Bayes and Logistic Regression trained on a custom dataset of 5,000 high-resolution labeled images as part of an initiative at SDSA Lab.
- Implemented pre-processing techniques such as image normalization and augmentation and utilized HOG feature extraction to enhance classifier performance for dynamic object detection.
- Conducted comparative experiments with the sliding window method for image segmentation, evaluating classifiers based on metrics like accuracy, F1-score, and confusion matrix to identify the most effective model.
- Achieved 97% classification accuracy with minimal loss through rigorous model validation and optimized hyperparameters using random search.

## INDUSTRY EXPERIENCE

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### Software Engineer

June 2023 – Present

*Gosaas Labs*

- Conducted research-driven customization for optimizing CAD tool (WindChill by PTC) implementation, enhancing functionality and adaptability for specific design requirements.
- Engaged in full-stack development, spanning front-end (React-Express) and back-end (Node-PostgreSQL) to ensure a holistic approach to application construction.
- Increased product's fault tolerance by replacing compromised libraries. Refactored legacy code and developed optimization strategies to handle a high volume of user requests.
- Actively contributed to CI/CD processes using AWS, optimizing deployment and maintenance procedures for increased operational efficiency.
- Demonstrated adaptability and versatility by occasionally engaging in UI/UX aspects, further enhancing overall project excellence.

### IOS Intern

July – October 2022

*VentureDive*

- Acquired hands-on experience with Swift's UIKit library, as well as third-party integration through cocoapods and homebrew, for IOS development
- Skillfully utilized custom classes to modify existing object classes to meet project requirements.
- Demonstrated proficiency in both storyboard UI elements and programmatic UI design.

### Front-end Intern

June 2022

*Teresol*

- Utilized Node.js and Vue.js to develop front-end components
- Implemented state management utilizing Xstate
- Integrating API libraries such as JS-server to enhance front-end functionality

### Vice President INDEX (Design society at LUMS)

Sep 2019 – Present

*LUMS*

- Worked under the patronage of **Dr. Suleman Shahid**, and successfully promoted design within the community
- Cultivated a design community and provided education to the student body on related subjects
- Actively engaged in marketing and event promotion efforts at various levels
- Organized and executed successful University and national level events such as UX Pakistan and Lahore Design Festival
- Demonstrated exceptional leadership and team management skills by overseeing diverse teams of varying sizes

## TEACHING ASSISTANTSHIPS

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### Advanced Programming - CS 300

Jan – May 2023

*Instructor: Waqar Ahmad (MSc CMU)*

- Duties included making homework and programming assignments, keeping weekly office hours, invigilating mid-term and final exams for a class 160 students

### Databases - CS 310

Sep – Dec 2022

*Instructor: Naveed Arshad (Ph.D. University of Colorado Boulder)*

- Oversaw student groups in their course projects. Held weekly status meetings with student groups, facilitated students during bi-weekly office hours, collaborated in making, invigilating and marking the graded components and exams.

### Introduction to Computer Science - CS 100

Sep – Dec 2021

*Instructor: Mariyam Mustafa (Ph.D. Technical University of Braunschweig)*

- Was in charge of bi-weekly lab invigilation. Held weekly office hours to facilitate students with introductory concepts of C++. Supervised the final course project and held weekly/need-based meetings.

## PROGRAMMING PROJECTS

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### **Open Data Pakistan** | *Jinja2, Python, Flask, Bootstrap, PostgreSQL, AWS EC2*

- Engaged in the Open Source CKAN project under **Dr. Suleman Shahid**
- Integrated interactive visualizations using third party libraries
- Utilized Jinja2, Python, Flask, Bootstrap, PostgreSQL, AWS EC2, and Git and Github for the project's development
- Managed the development process and ensured seamless team collaboration
- Demonstrated skills in open-source development, project management, server administration, and version control.

### **Sequence Game** | *Javascript, React, Node.js, web Sockets*

- Created a multiplayer Sequence game that can host up to 4 players simultaneously
- Implemented Web Sockets for communicating maintained states between client and server
- Utilized React and Node.js as part of the tech stack.

### **Real-time classification and demographic mapping for retail stores** | *Django, Node.js, MongoDB*

- Implemented YOLO model for analyzing footage from various retail store cameras, as part of SDSA lab
- Aimed to generate heat-maps pinpointing high customer traffic. Simultaneously extracted demographic data, including age and gender.
- Successfully demonstrated a proof of concept. Laid groundwork for developing a practical application for store owners was established.

### **Fashion MNIST Classification** | *Python, numpy, pandas, scikit learn, CV2*

- Designed and train a neural network from scratch for the Fashion MNIST dataset
- Solved a multi-class classification problem through optimization and evaluation of the neural network's accuracy
- Fine-tuned the model's hyper-parameters to improve results
- Processed images using the CV2 Python library, with Python and Jupyter Notebook as the tech stack.

### **Moseeqi, a spotify clone** | *mySQL, React, Express, Node.JS*

- Developed a music streaming application inspired by Spotify, utilizing the MERN (MongoDB, Express.js, React, Node.js) stack.
- Engineered key features such as music search and playback, playlist creation and management, and user follow functionality
- Demonstrated expertise in full-stack web development, database management, and project planning and execution

### **First Person Shooter in Unity** | *Unity, Blender, C#, C, OpenGL*

- Developed a first person game in Unity, showcasing technical proficiency in game development
- Incorporated Object-Oriented Programming principles in C to add dynamic functionality to multiple elements, demonstrating technical proficiency in programming
- Applied knowledge of OpenGL and Blender to enhance game graphics and design, demonstrating a strong understanding of game design principles and tools
- Demonstrated skills in game development, programming, and graphics design

## TECHNICAL SKILLS

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**Languages and libraries::** C/C++/C#, Python, JavaScript, Node.js, HTML5, CSS, React.js, Vue.js, Numpy, Pytorch, Swift, Haskell, OpenGL

**Software/Developer Tools:** Git/Github, Virtual Machines, Jupyter Notebook, Google colab, Solidworks, Creo, Arduino, Matlab, Expo Go, Unity, MySQL Workbench, MongoDB, Figma, Eclipse