Erfan **Khadem**

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An Electrical Engineering student looking for research opportunities

Education

Bachelors of Science in Electrical Engineering   *2022 - 2026*
Sharif University of Technolog   *Tehran, Iran*

- Optional Courses: Realtime Embedded Systems | Operating Systems | Networks Lab | Cryptography | Advanced Programming
- GPA: 18.60, Top 12%

Highschool Diploma in Physics and Mathematics   *2019 - 2022*
Dastgheib 1 Highschool of Shiraz   *Shiraz, Iran*

- Shahid Dastgheib 1 highschool is under the supervision of NODET, National Organization for Development of Exceptional Talents.
- GPA: 19.75 / 20

Professional Experience

Embedded Hardware and Backend Developer   *2023*
Home Automation Project at National Elites Foundation   *Tehran, Iran*

- Lead a team of computer security experts, electrical engineers and developers to build home automation appliances and smart gateways using TI's Zigbee chips and Espressif System's ESP32 and ESP8266 microcontroller series
- Technologies:
  ‣ FreeRTOS
  ‣ Websocket
  ‣ Nodejs
  ‣ Embedded Linux
  ‣ Svelte

Fullstack Developer and Systems Administrator   *2022 - 2023*
Abarkelas   *Tehran, Iran*

- Fix bugs and improve UX at our frontend using SSR and Vue.js
- Improve monitoring and alerting for our backend systems
- Implement self-healing procedures for our backend systems
- A/B test new features to guide our product development process
- Technologies:
  ‣ Django REST Framework
  ‣ Vue.js
  ‣ Docker
  ‣ Postgres + Redis
  ‣ Grafana + Prometheus

Fullstack Developer and Systems Administrator   *2020 - 2022*
Niroutrans Co.   *Shiraz, Iran*

- Development of an advanced monitoring system for Niroutrans' solar power plant, the biggest roof-mounted solar power plant in Iran
- Design and implement online product documentation center
- Technologies:
  ‣ Microsoft SQL Server + Redis
  ‣ Bootstrap 4 & 5
  ‣ Modbus TCP
  ‣ Protobuf
  ‣ Nginx

Projects & Associations

Breathing Rate Detection Using WiFi Channel State Information
2024

In the Process of Publication
Demo Available on Request

- Breathing rate detection using a common off the shelf intel network card.
- Achieves an accuracy of more than 98 % even in highly congested areas.
- Runs transparently and does not disrupt the normal user activity.

Linear OptoCoupler
2024

Electronics Lab Project

- A highly linear, optically isolated analog voltage isolator using `HCNR201`.
- Achieves a maximum signal bandwidth of more than $1\ \mathrm{MHz}$.
- Less than $-70\ \mathrm{dB}$ THD at $1\ \mathrm{KHz}$ and full swing.
- PCB was designed using KiCAD.

RP2040 based Intel 8080 emulator
2024

erfan-khadem/rpi8080
Github

- Implemented a full-fledged Intel 8080 emulator on the Raspberry Pi Foundation's RP2040.
- The project has been used since Spring 2024 in the computer architecture laboratory for educational purposes.
- On-chip debugger, virtual input and output ports and accompanying PC software for ease of use.

Advanced Algorithms in Rust
2022

TheAlgorithms/Rust
Github

- Implemented advanced graph algorithms such as centroid decomposition and max-flow.
- Implemented various cryptographic algorithms including Salsa20 and HMAC.
- Improved and optimized the implementation of various algorithms like SHA256 and DSU.
- Many other big and small improvements and implementation.

SSH Anti-Censorship Tool
2023

SSH-liberty-bridge
Github

- Implemented in go with the user management component written in python.
- Has been used successfully for bypassing GFW restrictions in Iran and bringing internet freedom to the citizens.
- Integrated in Hiddify's excellent GFW bypass solution.

Certificates

| 2021 | **Scientific Computing with Python**, Free Code Camp | *view* |
| 2021 | **Javascript Algorithms and Data Structures**, Free Code Camp | *view* |

Skills

Languages	English	Persian	Arabic (basic)
Tech Stack	JS (Svelte/Vue.js)	Python (Pandas/Numpy/Django)	Rust	Go	C/C++ (HW/RTOS/Linux)
Hobbies	Mathematics	Cryptography	Bicycle	Electronics